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P.4 MATHEMATICS LESSON NOTES

BREAKDOWN FOR TERM I, II & III

THEME 1: SETS

TOPICS: SET CONCEPT

- Definition of sets
- Examples
- Set symbols
- Set descriptions

Types of sets

- Equal and unequal sets
- Equivalent and non equivalent sets
- Intersecting and non intersecting sets
- Odd and even sets
- Union sets
- Empty sets
- Difference of sets
- Complement of sets

Venn –diagrams

- Shading regions
- Describing shaded regions and unshaded regions
- Filling information on the venn diagram
- Using venn diagram to solve problems
- Subsets
- Forming subsets
- Finding number of subsets

THEME 2 : NUMERACY

TOPIC: 1 WHOLE NUMBERS

- Forming using the given digits
- Place values up to hundreds thousands
- Value numbers using place values, values and powers
- Finding the expanded numbers
- Writing figures in words
- Writing words in figures

ROMAN NUMBERS

- Changing from Hindu – Roman

- Changing from Roman to hindu –Arabic
- Application of Roman numerals

TOPIC 4: FRACTION

- Illustration showing part of a whole
- Types of fractions
- Equivalent fractions
- Finding unknown in equivalent fraction
- Reducing fraction
- Ordering fraction according to values
- Changing mixed numbers to improper fractions and fractions with the same denominators
- Word problems involving addition and subtraction of fractions
- Mixed number (addition and subtractions)
- Multiplication of fraction by fraction
- Multiplication of fraction by a whole number
- Application

TOPIC II: OPERATION OF NUMBERS

- Addition of whole numbers
- Word problems involving addition
- Subtraction of whole numbers
- Word problems involving subtraction
- Multiplication of whole numbers
- Word problems
- Comparing numbers using less than, greater than and equal to (<,> and =)

TOPIC 3 : NUMBER PATTERNS AND SEQUENCES

Number patterns

- Whole numbers
- Natural numbers
- Even numbers
- Odd numbers
- Prime numbers
- Composite numbers
- Square numbers
- Filling in the missing numbers

Multiplication of numbers

- Common multiples
- Lowest common multiples (LCM)

Factors of numbers

- Common factors
- Greatest common factors (G.C.F/H.C.F)

TOPIC 5: DECIMALS

- Places values of decimals

- Values of decimal fractions
- Writing decimals in words and vice-versa
- Changing vulgar fraction to decimals and vice-versa
- Changing mixed fractions to decimal fractions and vice-versa
- Addition of decimals
- Ordering of decimal fraction using numberline

FRACTIONS PART ONE

- Definition
- Types of fractions
- Writing fractions in words
- Finding equivalent fractions
- Finding unknown equivalent fractions
- Writing fractions in words and vice versa
- Changing improper fractions to a mixed number
- Changing a mixed number to improper fractions
- Shading fractions
- Reducing fractions
- Ordering fractions
- Comparing fractions using >, < or =
- Addition of fractions
- Multiplication of fractions
- Application of fractions

FRACTIONS PART TWO (DECIMALS)

- Changing common fractions to decimals
- Changing decimals to common fractions
- Writing decimals in words
- Writing decimals in figures
- Place values of decimals
- Values of decimals
- Expanding decimals using values and places values
- Finding expanded decimals
- Comparing decimals
- Ordering decimals
- Addition of decimals
- Subtraction of decimals
- Multiplication of decimals

DATA HANDLING

- Drawing and interpreting pictographs
- Drawing and interpreting tallies
- Interpreting bar graphs and line graph

GEOMETRY

- Drawing lines and angles
- Naming lines and angles
- Drawing and naming geometric shapes
- Drawing and naming solid shapes
- Naming parts of solid shapes
- Drawing circles using radius
- Drawing and measuring lines
- Right angles and angles on a straight line
- Angles in a triangle
- Complementary and supplementary angles

MONEY

- Identifying money notes and coins
- Identifying features on money notes and coins
- Writing money in figures
- Addition of money
- Multiplication of money
- Simple shopping rates
- Shopping list
- Simple shopping bills
- Finding loss
- Finding profit/gain

TIME

- Telling time using a half past , a quarter past, half to and a quarter to
- Writing time in digital form
- Changing hours to minutes
- Changing minutes to hours
- Subtraction of time
- Addition of time
- Finding duration
- Adding years and months
- Adding weeks and days
- Subtraction of weeks and days
- Changing days to hours
- Changing hours to days
- Changing weeks to days
- Changing days to weeks

LENGTH

- Changing metres to centimeters
- Changing centimeters to meters
- Identifying objects to measure length
- Addition of meters and centimeters

- Subtraction of metres and centimeters
- Changing kilometers to metres
- Changing metres to kilometers
- Addition of kilometers and meters
- Subtraction of kilometers and meters

PERIMETER

- Finding perimeter of regular shapes
    - Triangle
    - Square
    - Rectangle
    - Kite
- Finding perimeter of irregular shapes

AREA

- Finding area of a rectangle, square and triangle
- Finding area of combining figures
- Difference of area

CAPACITY

- Identifying objects to measure capacity
- Addition of litres and half litre
- Addition of litres
- Changing litres to militaries
- Changing militres to litres
- Addition of litres and milliliters
- Subtraction of litres and milliliters
- Changing kilograms to gramme
- Addition of kilogram and gramme
- Multiplication of kilogram and gramme

VOLUME

- Identifying objects that contain volume
- Finding the volume of the cube and cuboid

ALGEBRA

- Writing letters in short forms
- Using letters for numbers
- Using letters to find perimeter of different figures
- Collecting like terms
- More about collecting like terms
- Formation of equations
- Solving equations involving addition, subtractions, division and multiplication
- Subtraction
- Substitution

WEEK 1
PD 1
THEME: SETS
TOPIC: SET CONCEPT

What is a set?

- A set is a collection of well defined members put together.

Note:

- A member is an object that belongs to the given set.
- An element is another name to be a member.

DRAWING SET SYMBOLS AND NAMING THEM

Symbols	Name	Symbols	Name
{ } or $\varnothing$	Empty /null/void set	$\subset$	subset of
$\equiv$	Equivalent to	$\not\subset$	not subset of
=	Equal to	$\cap$	Intersection of
$\neq$	Not equal to	$\cup$	Union set
$\sum$	Universal set	B^1	Complement of set B/Set B complement
$\not\equiv$	Not equivalent to	n(A)	Number of elements of set A.

Activity:

1. Name the symbols below.

a) $\subset$ _____ b) $\equiv$ _____

c) $\sum$ _____ d) $\cup$ _____

e) n(K) _____

2. Draw the symbols for the sets below.

   i) Set P complement _____

   ii) Intersection of _____

   iii) Empty set _____

   iv) Equal to _____

   v) Subset of _____

3. List down any four examples of sets.

EVALUATION:

Empty sets

Qn. What are empty sets?

These are sets without members or elements

Note: The symbol for empty set is { } or ∅

Examples

i) Set P = { P.4 girls without heads}

Set P is an empty set { }

ii) Set B = {A car with four legs}

Set B is { }

iii) Set X = {glass that cannot break}

Set X is { }

iv) Set K = {rabbit without hair and fur}

Set K is { }

DESCRIPTION OF SETS

Describing and naming sets

Examples: Describe the following sets

a) Set A = {a, e, i, o, u}

Set A is a set of vowel letters.

b) Set K = {January, February, March, April}

Set K is a set of the first four months of the year.

c) Set H = {first six odd numbers}

List down the element of set H

Set H = {1, 3, 5, 7, 9, 11}

ACTIVITY:

1. Use empty or not empty set to complete the statement below.

i) Set F = {daughters who are as old as their mothers}

ii) Set Q = {cars which can fly like helicopters}

iii) Set K = {bulls which produce milk}

iv) Set A {birds without wings}

2. Describe the following sets.

i) Set Y = {October, November, December}

3. List down the elements between zero and ten}

i) Set K = {even numbers between zero and ten}

ii) Set M = {counting numbers less than five}

iii) Set V = {multiples of 3 less than 20}

WEEK 1

PD 4

TOPIC: SET CONCEPT

Equivalent sets and non equivalent sets.

Equivalent sets

These are sets with the same number of members.

Symbol " ↔ "

Examples

a) A = { ☆ , ▭ , ⬭ } B = { , , ⊠ }

Set A has 3 members and B has 3 members

Set R ↔ set R

b) R = { , , , } S = { m, n, t, p, q}

Set R has 4 members and set S has 5 members.

Set R ↮ set R

Exercise

Use equivalent sets or non-equivalent sets

1. A = { , , } B= { , , }

Set A has _____ members and set B has _____ members.

Set A and B are _____ sets.

2. D = {  ,  ,  } M = { }

Set D has _____ members but set M has ___ members.

Set D is _____ to set K.

3. L = {  ,  ,  } M = {  ,  ,  }

Set L has ___ members and set M has _____ members.

Set L is ____ to set M.

4. N = {  ,  } K = { , }

Set N has ___ members and set K has ____ members

Set N is _____ to set K.

Use ↔ or ↔/ to describe the sets below.

5. A = (a, e, i, o, u} B= {1, 2, 3, 4, 5}
Set A has ____ members and set B has ___ members.
Set A is ____ to set B.

6. D = {P, Q, R} E = {X, Y, Z}
Set D has ___ members and set E has ____ members.
Set D is ____ to set G.

7. F = {0, 2, 4, 6, 8} G = {x, y, x}
Set F has ___ members and set G has _____ members.
Set F is _____ to set G.

8. P ={1, 2, 3, 4, 5} T = {b, e, d, f}
Set P has ____ members and set T has ___ members
Set P is ____ to set T

EVALUATION

Self Evaluation

Strong points: _____

Weak points: _____

Way forward: _____

WEEK 1

PD 5

THEME: SETS (TOPIC: SET CONCEPTS)

Equivalent and equal

Equal sets

Equal sets are sets with the same number of members which are exactly the same.

Equivalent sets

Equivalent sets have the same number of objects.

Examples

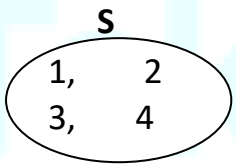
a) If set A = {a, e, i, o, u} and B= {1, 2, 3, 4, 5}
Set A is ⟷ set B

b) C = {T, O, P} and D = {P, O, T}
Set C is = set D

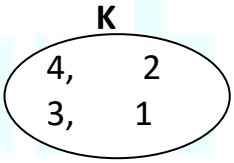
Activity

Write equal or equivalent sets

a)

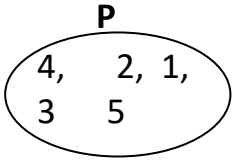


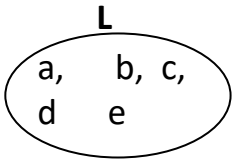
b)



Set S and set K are _____ sets.

b)





Set P and set L are ____ sets.

c) K = {boy, girl} L = {m, n} Set K is _____ to set L.

d) P = {s, u, n, a} F = {e, v, i, l} Set P is _____ to set F.

Intersection of sets

Intersection sets are sets with common members

Symbol is " ∩ "

Joint sets are also called intersection sets.

Examples

a) Set P = {a, b, c, d, e} Q = {a, e, i, o, u}

Find P ∩ Q = {a, e}

b) A = {▭, ◯, △} B = {  △ ▭ 

A ∩ B {▭, △}

c) D = { X, Y, Z, W} Q = {4, 5, 6, 7}

D ∩ K = ∅

ACTIVITY

Write intersection sets of these sets.

Find:

a) Set A= {a, b, c} B = {b, d, e, f} (A∩B) =

b) P = {a, e, i, o, u} Q = {a, b, c, d, e, f} (P∩Q)

c) M = {1, 2, 3, 4, 5} Q = {3, 4, 7} (M∩N) =

d) L = {0, 1, 2, 3, 6, 8} K = {6, 8, 7, 5} (L∩K) =

e) X = { △, ◯, ▭ } Y = { □,  , ▭,  } (X∩Y) =

EVALUATION

Intersection and union of sets

Examples

1. Set P = { a , b , c , d , e } and Set Q = { a , e , i , o , u }
   Find (P ∩ Q)

Solution

P = { a , b , c , d , e }
Q = { a , e , i , o , u }

(P ∩ Q) = { a , e }

Find (P n Q)
P = { a , b , c , d , e }
Q = { d , e , i , o , u }

(P U Q) = { a , b , c , d , e , i , o , u }

2. Given that set A = {⌓ , ⌂ , △} and set B = { , ○ ⌂ , ▭ ⊡ }
   i) Find (A ∩ B)
   A = {⌓ , ⌂ , △ , ⊡ }

   B = {○ , ⌂ , ▭ , ⊡ }

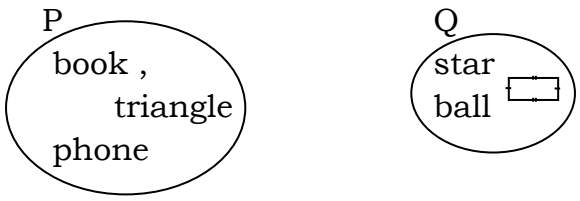
   (A ∩ B) = {⌂ , ⊡}

   ii) What is (A U B)?
   A = {⌓ , ⌂ △ ⊡

   B = {○ , ⌂ ▭ ⊡

   (A U B) = { , ⌓, ⌂ } △ ⊡ ○ ▭

Exercise

1. 

What is (P ∩ Q)?

2. F = { Teddy , Kapere , Okello , Teo }
M = { Teo , Lumonde , Okello)
a) Find (F ∩ M)
b) What is (F U M)

3. Given M = {x , y , z , w , v}
N = { r , s , t , u , v , w }
Find; i) (M U N)
ii) (M ∩ N)

4. Given that set R = {all vowels} and S = { first 6 alphabetical letters}
a) List down members of set R and set S
b) Find (R ∩ S)
c) What is n(R ∩ S)?
d) Find (R U S)

5. 

a) Find; i) (K ∩ L)
ii)(K U L)

6. If P = { l , m , n , q , r } and Q = { m , p , x , r }
a) List members of (P U Q)
b) List members of (P ∩ Q)

WEEK 1:

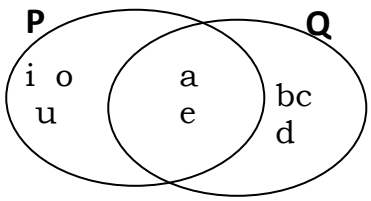
PD 7

THEME: SETS (TOPIC: SET CONCEPT)

Finding intersection and union sets using a venn diagram

Examples

a) If P = {a, e, i, o, u} and Q {a, b, c, d, e}

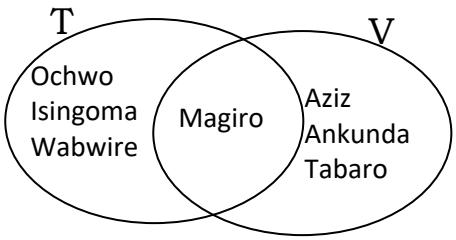


P∩Q = {a, e}

PUQ ={o, i, u, a, e, b, c,d}

b) Given T = {Wanwire, magino, Isingoma, ochwo}

V = {Aziz, Nankunda, Tabaro, Majorie}



What is TUV?

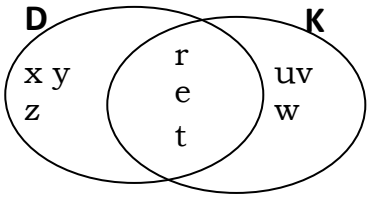
TUV = {Ochowo, Isingoma, Wabwire, Magiro, Aziz, Ankunda, Tabaro}

TnV = {Magiro}

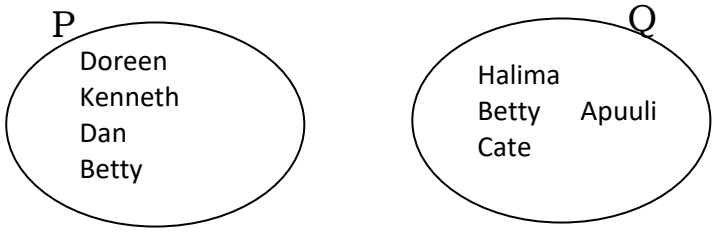
Activity

1. Given {1, 2, 3, 4, 5} B = {3, 4, 6, 8, 9}
   a) Use a venn diagram to show the sets above.
   b) Find i) A∩B ii) AUB

2. Use the venn diagram below to answer questions.



a) Find DUK b) Work out D∩K

3. 

a) Show the set P and Q on a venn diagram.

b) Find P∩Q c) Find PUQ

4. A = {p, q, r, s, t} B = {p, q, r, s, t, u, v, x}

a) Show sets A and B on a venn diagram.

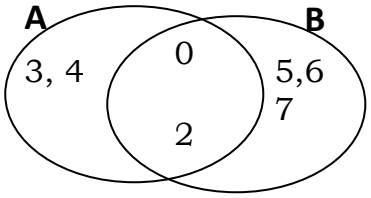
c) What is AUB?

5. P = {0, 1, 2, 3, 4} Q = {2, 4, 6, 8}
   a) Show sets P and Q on a venn diagram.
   b) What is P∩Q?
   c) Find PUQ?

Finding number of elements in the union and intersection sets

1. Given P = {a, e, i, o, u} and Q = a, b, c, d, e}
   i) Find n(P∩Q}
   ii) P∩Q = {a, e}
   iii) n{P∩Q} = 2

   b) n(PUQ)
   PUQ = {i, o, u, a, e, b, c, d}
   n(PUQ) = 8

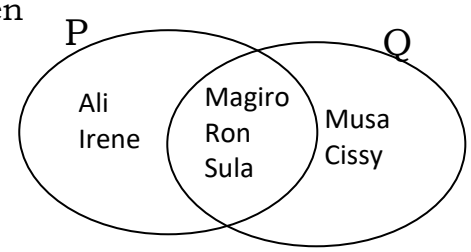
2. 

   a) How many members are in set A n B?
   AnB = {0,2}
   n(AnB) = 2

   b) How many elements are in set AUB?
   AUB = {3, 4, 0, 2, 5, 6, 7}
   n(AUB) =7

Activity

a) Given



   Find i) PnQ ii) n(PUQ) iii) n(PnQ)

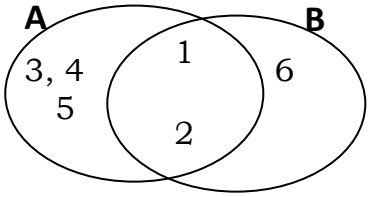
b) Set K = {x, y, z, t} and Z = {a, e, I, o, u}

   Find n(KnZ) n(KUZ)

c) P = {1, 2, 3, 4} Q = {2, 4, 6, 8}
   i) How many elements are in set P?
   ii) How many elements are in set Q?

iii) How many elements are in set PnQ?
iv) How many elements are in set PUQ?

d)



i) Find the number of members in set A.

ii) Find the number of members in set B.

iii) Find n(AnB)

iv) Find n(AUB)

EVALUATION

Self Evaluation

Strong points: _____

Weak points: _____

Way forward: _____

WEEK 1: PERIOD 8
THEME: SETS
TOPIC: SET CONCEPT

Difference of sets

Examples

a) Given A = {a, b, c, d, e} B = {d, e, h,i, f,g}
Find A – B = {a, b, c}
B – A {h, i, f, g}

b) P ={1, 2, 3, 4, 5} Q = {7, 5, 1, 2, 9}
Find i) Q –P ii) P – Q
Q – P = {7, 9} P – Q {3, 4}

Activity

a) A = {a, b, c, d, e} B = {a, e, i, o, u}
Find i) Q – P
ii) B – A

b) P = {x, w, y, z} Q = {w, z, p}
Find i) P– Q ii) Q – P

c) M = {1, 3, 5, 9} N = {3, 2, 0, 7, 9}

Find: i) M – N ii) N –M

d) K = {Alex, Musa, Ali, Kigonza} L = {Mao, Musa, Ali}

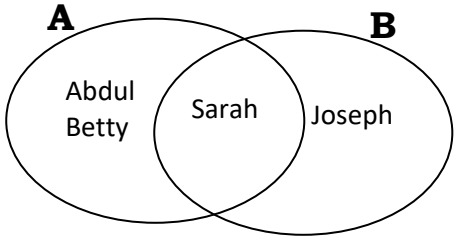
Find: i) L – K ii) K – L iii) n(L – K)

e) F = {a, b, c, d, e} R = {a, e, i o, u}

Find: i) R –F ii) F – R

Using a venn – diagram

Examples

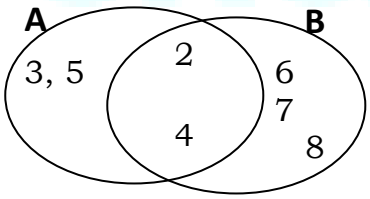


Find i) A – B
A = {Abdul, Betty}
ii) n(B– A}
B – A = {Joseph)
n(B –A) = 1

iii) How many elements are in A –B
A – B = { Abdul, Betty}
n(A – B) = 2

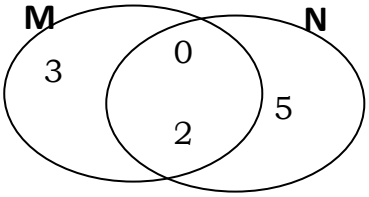
Exercise

a)



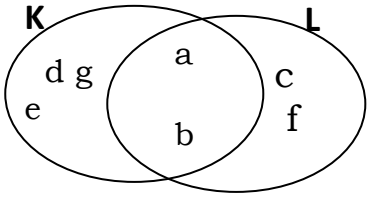
Find i) n(A –B) ii) B- A

b)



Find i) n(M–N) ii) N – M

c) Find: i) L- K ii) n(K – L)



EVALUATION

Self Evaluation

Strong points: _____

Weak points: _____

Way forward: _____

WEEK 2:

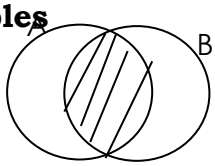
PD 1

THEME: SETS

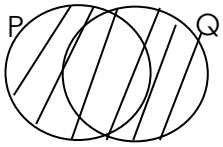
TOPIC: SET CONCEPT

Describe shaded regions of a venn diagram in set form

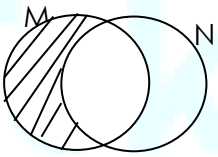
Examples



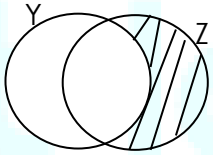
A∩B



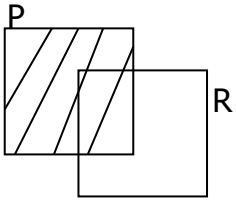
PUQ



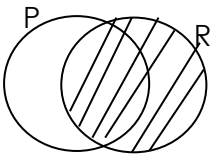
M –N



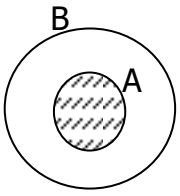
Z – Y



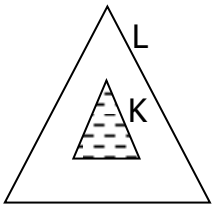
Set P



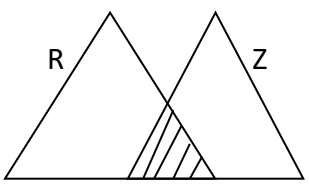
Set R



A∩B



K∩L



R∩N

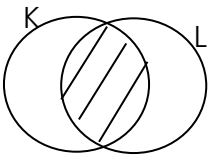
Exercise

Draw and shade the following Regions describe below on a venn diagram.

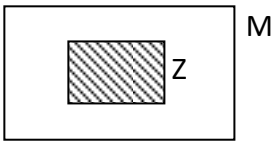
a) K-L b) L - K c) Set M∩Z d) A∩P

e) Set NUM

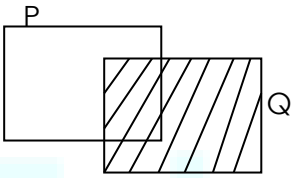
Describe the Shaded regions below.

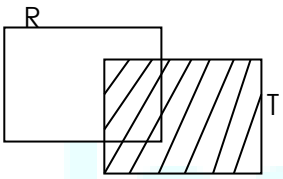


_____



_____





EVALUATION

Self Evaluation

Strong points: _____

Weak points: _____

Way forward: _____

WEEK 2:
PD 4
THEME: NUMERACY
TOPIC: *Numeration System and Place values*
Forming numerals from digits

Examples

a) Write any 3 digit figure formed by the digits 3, 7, 5
   375, 753, 573

b) Write the smallest number or numeral that can be formed using digits
   7, 2, 3, 6
   Smallest = 2, 3, 6, 7
   = 2, 367

c) What is the biggest number or numeral that can be formed from the following:

digits = 1, 5, 2, 8, 3?
biggest = 8, 5, 3, 2, 1
= 85, 321

d) Find the difference between the largest and smallest numeral gotfrom 3, 7, 5

Smallest numeral 3, 5, 7 largest numeral 7, 5, 3
3 5 7 7 5 3
Difference = 7 5 3
= - 3 5 7
3 9 6

Sum = 7 5 3
+ 3 5 7
1110

Exercise

a) Form two numerals from the digits 3, 9, 2
b) Form the largest numeral got from the digit 3, 1, 5
c) Form the smallest numeral got from 4, 5, 1, 8
d) Find the sum of the largest and the smallest numeral got from 1, 7, 2
e) What is the difference between the largest and smallest numeral got from digits 3, 5, 2.
f) Give any two numbers that can be formed using the digits below.
i) 2, 5, 3, 7 ii) 9, 2, 6, 7, 8

g) What is the difference between the smallest and the largest number that can be formed using the digits below?
i) 2, 7 5
ii) Find the sum of the largest and the smallest number that can be formed from the above digits.

EVALUATION
Self Evaluation
Strong points: _____
Weak points: _____
Way forward: _____

WEEK 2:
PD 5
THEME: NUMERACY
TOPIC: *Numeration System and Place values*
Subtopic: *Forming numerals from digits*

Examples

Qn. Given the digit 9, 3, 8.

i) List down all the possible 3 digit numbers that can be got by using the above digit.

Soln: 9, 3,8. First re-arrange the digits in order of their size i.e

3,8,9./

The numbers are : 389 839 938

398 893 983

ii) find the difference between the largest and the smallest numbers formed in i) above.

soln: Difference = 81713

$$\begin{array}{r} 9\not{8}\ 3 \\ -\ 3\ 8\ 9 \\ \hline 5\ 9\ 4 \end{array}$$

iii) What is the sum of the largest and the smallest numbers formed above?

soln: Sum = 9 8 3

$$\begin{array}{r} +\ 3\ 8\ 9 \\ \hline 1372 \end{array}$$

Activity:

1. Given the digits 7, 2, 5.

a) List down all possible 3 digit numerals that can be formed using the digits above.

b) Find the sum of the largest and the smallest numbers formed in a) above.

c) Workout the difference between the largest and smallest numbers formed in a) above.

2. Use the digits 4, 7, 8 and 2 to answer questions that follow.
   a) Write down the largest numeral that can be formed using the above digits.
   b) Find the place value of the largest digit.
   c) What is the value of the smallest digit?
   d) Write the number formed in a) above in expanded form.

3. Give the digits 5, 1, 3. Write down all the numbers that are greater than 350.

EVALUATION

Self Evaluation

Strong points: _____

Weak points: _____

Way forward: _____

WEEK 2:
PD 6
THEME: NUMERACY
TOPIC: *Numeration System and Place values*

Place values of numbers
Examples

a) What is the place value of the each digit in the number below?
32065.

T.TH	TH	H	T	O
3	2	0	6	5

Ten thousands
Thousands
Hundreds
Tens
Ones

b) What is the place value of 3 in the number 3 4 9 2?

TH	H	T	O
3	4	9	2

Thousands

The place value of 3 is thousands.

Exercise

a) Find the place value of the underlined digits.
i) 40561 ii) 93812
iii) 72554 iv) 34500
iv) 12645 v) 67821

b) In the number 382, what is the place value of?
i) 3 ii) 8 iii) 2

c) Find the place value of each digit in the number.
i) 2483 ii) 403 iii) 67821

EVALUATION
Self Evaluation

Strong points: _____

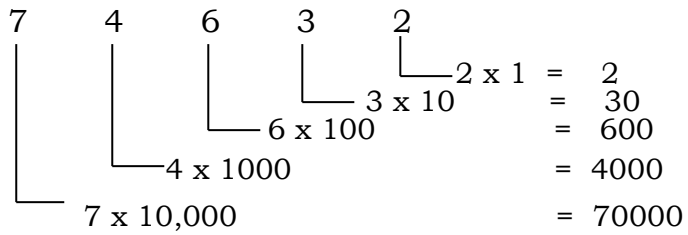
Weak points: _____

Way forward: _____

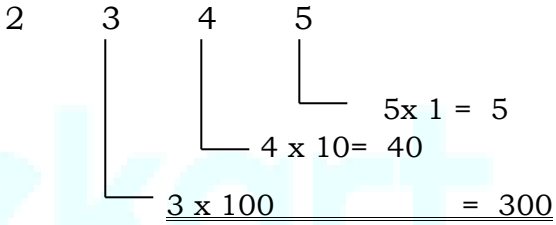
Contact: 0754895241/0783298434
Email: tekule@tekartlearning.com
Website: www.tekartlearning.com

WEEK 2:
PD 7
THEME: NUMERACY
TOPIC: *Numeration System and Place values*

Values of numbers
Examples
What is the value of each digit in the number?
a) 7 4 6 3 2



b) What is the value of 3 in the number 2345?



The value of 3 = 300

Examples
1. Find the value of each digit in the number.
   a) 249 b) 2483

2. Find he value of the underlined digits givern below
   a) 5 4 1 b) 7 0 3 2 c) 1 1 9 3 6
   d) 4 0 5 6 1 e) 7 2 5 5 4 f) 3 4 5 0 0
   g) 5 8 0 42 h) 9 3 2

EVALUATION

Self Evaluation

Strong points: _____
Weak points: _____
Way forward: _____

WEEK 2:
PD 8
THEME: NUMERACY
TOPIC: *Numeration System and Place values*

Expanding numbers

a) Using values

Examples

Expand 7, 432 using values

7, 4 3 2 = 7 4 3 2

2 x 1 = 2
3 x 10 = 30
4 x 100 = 400
7 x 1000 = 7000

7, 432 = 7000 + 400 + 30 + 2

b) Expand 93,458 using values

93458 = 9 3 4 5 8

8 x 1 = 8
5 x 10 = 50
4 x 100 = 400
3 x 1000 = 3000
9 x 10,000 = 90,000

93, 458 = 90,000 + 3000 + 400 + 50 + 8

Exercise

Expand the following numbers using values

a) 340 b) 342 c) 1,245 d) 5,347

e) 3,672 f) 235 g) 62,894 h) 7,845

i) 78,764 j) 99,845

Expanding numbers using place values

Examples

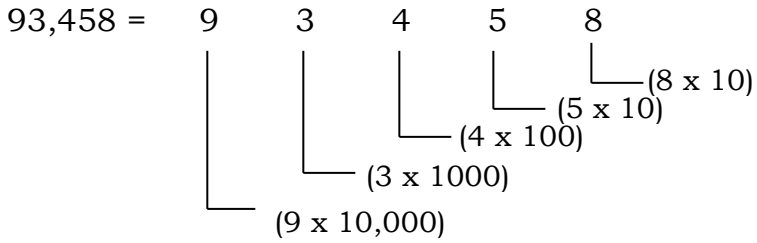
1. Expand 7,432 using place values

7432 = 7 4 3 2

(2 x 1)
(3 x 10)
(4 x 100)
(7 x 1000)

7432 = (7 x 1000) + (4 x 100) + (3 x 10) + (2 x 1)

2. Expand 93,458 using place values



93,458 = (9 x 10,000) + (3 x 1000) + (4 x 100) + (5 x10) + (8 x 1)

Exercise

Expand the following numbers using place values.

a) 235 b) 677 c) 645 d) 3,786
e) 4,538 f) 6, 781 g) 86,862 h) 78,764
i) 7,845 j) 99,845

EVALUATION

Self Evaluation

Strong points: _____

Weak points: _____

Way forward: _____

WEEK 3:

PD 1

THEME: NUMERACY

TOPIC: NUMERACY SYSTEM AND PLACE VALUES

Writing numbers in short

Examples

1. Write in short

7000 + 400 + 30+ 2
7000
400
30
+ 2
7432

2. (9 x 10,000) + (3 x 1000) + (4 x 100) + (5 x 10) + (8 x 1)
90,000 + 3000 + 400 + 50 + 8
90,000
3,000
400
50
+ 8
93,458

3. $(7 \times 10^3) + (4 \times 10^2) + (3 \times 10^1) + (2 \times 10^0)$
   7 x 10 x 10 x 10 + 4 x 10 x 10 + 3 x 10 + 2 x 1
   7000 + 400 + 30 + 2
   7000
   400
   30
+ 2
7432

Exercise

Write the following as single numbers

1. (4 x 100) + (8 x 10) + (6 x 1)
2. (3 x 1000) + (0 x 100) + (7 x 10) + (5 x 1)
3. (8 x 100) + (6 x 10) + (3 x 1)
4. 500 + 90 + 1
5. 20,000 + 4000 + 800 + 10 + 5
6. 90,000 + 600 + 4
7. 6000 + 5
8. (9 x 1000) + (3 x 100) + (2 x 10) + (1 x 1)
9. (7 x 10000) + (4 x 1000) + (3 x 100) + (2 x 10)
10. (2 x 1000) (3 x 1)

EVALUATION

WEEK 3
PD 2
THEME: NUMERACY
TOPIC: NUMERATION SYSTEM AND PLACE VALUE

Write figures in words

1. Write in words 841

   841 800 Eighty hundred
   41 Forty one
   841**Eight hundred forty one**

2. 2, 841
   2841 2000 Two thousand
   800 Eight hundred
   41 Forty one
   2841***Two thousand eight hundred forty one***

2. 45,617
   45,617 45,000 Forty five thousand
   600 Six hundred
   17 Seventeen
   45,617***Forty five thousand six hundred seventeen***

Exercise

Write the following in words

a) 364 b) 3, 528 c) 7,801

d) 12,214 e) 18,146 f) 23, 113

67, 678 h) 99, 466 i) 9,999

EVALUATION

Self Evaluation

Strong points: _____

Weak points: _____

Way forward: _____

WEEK 3
PD 3
THEME: NUMERACY SYSTEM AND PLACE VALUES

Writing numbers in figures

Examples

1. Write "Twelve thousand eight hundred thirty two" in figures.
   Twelve thousand = 12, 000
   Eight hundred = + 800
   Thirty two = 12,832
   Twelve thousand eight hundred thirty two = 12,832

2. Write eight hundred fifty two in figures
   Eight hundred 800
   Fight hundred + 52
   Eighty hundred fifty two **852**

3. Nine thousand six
   Nine thousand = 9000
   Six + 6

   Nine thousand six **9006**

Exercise

Write the following in figures.

1. Fourteen thousand, eight hundred sixty two.
2. Seventeen thousand, eight hundred forty nine.
3. Twenty thousand, eight hundred fifteen.
4. Twenty six thousand, three hundred eight.
5. Nineteen thousand, four hundred eighty.
6. Nineteen thousand, four hundred thirty three.
7. Thirty four thousand, two hundred seventy one.
8. Thirty six thousand, ninety eight.
9. Forty nine thousand, four hundred.
10. Forty four thousand, four.

EVALUATION

Self Evaluation

Strong points: _____

Weak points: _____

Way forward: _____

Writing decimals in words

Examples

1. Write 7.5 in words

   7.5 = Seven point five

   = **Seven and five tenths**

2. Write 27.24 in words

   27. 24 = Twenty seven point two four

   = Twenty seven and twenty four hundredths

3. Write 107. 2 in words

   107.2 = **One hundred seven point two**

   OR

   = **One hundred seven and two tenths**

4. 2381. 9 = Two thousand three hundred eight one point nine

   OR

Two thousand three hundred eighty one and nine tenths.

Exercise

Write the following in words

a) 3.9 b) 73.5 c) 506. 3

d) 813. 2 e) 62.4 f) 91.72

g) 5.32 h) 121.5 i) 813.2

j) 1468.3

Writing the following in words

Examples

1. Twenty five and three tenths

   Twenty five 25.

   Three tenths 0.3

   Twenty five and three tenths = 275.1

2. Write two hundred seventy five and one tenths in figures

   Two hundred 200.

   Seventy five 75.

   One tenth 0.1

   Two hundred seventy five and one tenths = 275. 1

Exercise

Write the following in figures

1. Thirty four and three tenths
2. Sixty two and one tenths
3. Eighty one and seven tenths
4. One hundred eleven and four tenths
5. Nine and six tenths.
6. Two hundred sixty two and five tenths
7. One hundred sixty two and five tenths.
8. Three hundred eighty and fifteen hundredths
9. Two hundred seventy one and nineteen hundredths
10. Six thousand three hundred twelve and six tenths.

EVALUATION

Self Evaluation

Strong points: _____

Weak points: _____

Way forward: _____

WEEK 3

PD 4/5
THEME: NUMERACY
TOPIC: NUMERACY SYSTEM AND PLACE VALUES

Roman numerals

1	I	80	LXXX
5	V	90	XC
10	X	100	C
40	XL	200	CC
50	L	300	CCC
60	LX	400	CD
70	LXX	500	D

Roman numerals got by adding to 5.

6	= 5 + 1	7	= 5 + 2	8	= 5 + 3
C	= V + I		= V + II		= V + III
	= VI		= VII		= VIII

The roman numerals got by subtracting from 5 or from 50

4 = 1 subtracted from 5 40 = 10 subtracted from 50
4 = IV 40 = XL

The Roman numerals got by subtracting from 10

9 = 1 subtracted from 10
9 = IX

Changing Hindu –Arabic to roman numerals

a) 19 = 10 + 9
= X + IX
= **XIX**

b) 36 = 30 + 6
= XXX + VI
= **XXXVI**

c) 192 = 100 + 90 + 2
= C + XC + II
= **CXCII**

Exercise

Change the following in roman numerals.

a) 11	b) 15	c) 63	d) 12
e) 20	f) 72	g) 19	h) 41
i) 87	j) 25	k) 50	l) 93
m) 30	n) 35		

EVALUATION

Self Evaluation

Strong points: _____

Weak points: _____

Way forward: _____

WEEK 3
PD 6
THEME: NUMERACY
TOPIC: NUMERACY SYSTEM AND PLACE VALUES

Changing roman numerals to Hindu Arabic

Examples

1. Write XIV in Hindu - Arabic
   XIV = X + IV
   = 10+ 4
   = **14**

2. Change XXXIX to Hindu – Arabic
   XXXIX = XXX + IX
   = 30 + 9
   = **39**

3. Change CI to Hindu –Arabic
   CI = 100 + 1
   = **101**

Exercise

1. X	2.	XXVI	3.	XXXI	4.	XLVII
5. XIII	6.	XXIX	7.	XLIV	8.	LV
9. XXIX	10.	XLVII	11.	LX	12.	LXIII
13. LXXXI	14.	LXXXVII	15.	CXV		

EVALUATION

Self Evaluation

Strong points: _____

Weak points: _____

Way forward: _____

WEEK 3
PD 7
THEME: NUMERACY
TOPIC: NUMERACY SYSTEM AND PLACE VALUES

Application

Examples

1. James is 20 years old. What is James' age in Roman numerals?
   20 = 20
   = XX

22. Namwenika is 11 years. What is her ager in Roman numerals?
   11 years = 10 + 1
   = X + I
   Namwnika = XI

3. Daddy is XLVI years. What is his years in Hindu Arabic?
   XLVI = XL + VI
   = 40 + 6
   Daddy is = 46 years

Exercise

1. Apire is 13 years old. Change her age in Roman numerals.
2. Babirye is 12 years. Change her age to Roman numerals.
3. Achen is 20 years. Change her age to Roman numerals.
4. Nakintu is 14 years. What is her age in Roman numerals?
5. There are 74 pupils in Aduku Primary 5. Write the number of pupils in Roman numerals.
6. Nakazzi had goats. Write this number in Roman numerals.
7. Mummy is XL years old. Write mummy's age in Hindu Arabic.
8. Mugwanya has XXIX chicken. Write this number in Hindu Arabic numerals.
9. Opio harvested XV bags of rice last season. Express his harvest in Hindu Arabic numerals.
10. Kizito planted 34 trees last year. Write the number of trees he planted in Roman numerals.
11. Express LXXIII in Arabic numerals.

EVALUATION

Self Evaluation

Strong points: _____

Weak points: _____

Way forward: _____

WEEK 3

PD 8

THEME: NUMERACY

TOPIC: WHOLE NUMBERS (ROUNDING OFF)

Rounding off whole numbers

Examples: Round off 268 to the nearest tens.

Solution: 268

\+ 1 ↵

270

268 approximately 270

2. Round of 623 to the nearest tens.

623 /

\+ 0 ↵

6 2 0

623 approximately 620

3. Round of 1356 to the nearest tens.

1356 /

\+ 1 ↵

1 3 6 0

1356 approximately 1360

4. Round off 1999 to the nearest tens.

1999 /

+1 ↵

2000

1999 approximately 2000

Activity

Round off the following numbers as instructed in brackets.

1. 2240 (to the nearest tens)
2. 5286 (to the nearest tens)
3. 7628 (to the nearest tens)
4. 2995 (to the nearest tens)
5. 47 (to the nearest tens)
6. 1879 (to the nearest tens)
7. 159 (to the nearest tens)

8. 967 (to the nearest tens)
9. 3193 (to the nearest tens)
10. 4999 (to the nearest tens)
11. 5087 (to the nearest tens)
12. 3346 (to the nearest tens)

EVALUATION

Self Evaluation

Strong points: _____

Weak points: _____

Way forward: _____

WEEK 4

PD 1

THEME: NUMERACY

TOPIC:

Operation on numbers

Addition

Examples

1. Add 7464 + 4425

	TH	H	T	O
	7	4	6	4
+	4	4	2	5
	11	8	8	9

2. Add: 4622 + 5043 + 6237

	TH	H	T	O
	4	6	2	2
	5	0	4	3
+	6	2	3	7
	15	9	0	2

Activity

Add the following

1) Add: 4622 + 5043 + 6237

	TH	**H**	**T**	**O**
	1	4	2	6
+	2	3	5	3

2)

TH	**H**	**T**	**O**
1	1	2	4
+ 7	3	2	1

3)

H	**T**	**O**
4	2	6
+ 3 5		3

4)

TH	**H**	**T**	**O**
9	8	8	7
+ 1	1	1	3

5)

	TH	H	T	O
	6	0	4	9
+	4	9	6	3

6)

	TH	H	T	O
	2	0	4	9
+	1	7	7	9
	3	6	4	8

7)

	TH	H	T	O
	1	4	5	6
+		8	6	5

8)

	H	T	O
	4	9	7
+	2	3	5

EVALUATION

Self Evaluation

Strong points: _____

Weak points: _____

Way forward: _____

WEEK 4

PD 2

THEME: NUMERACY

TOPIC: OPERATION ON NUMBERS

More about addition

What is the sum of 4,234 and 204

	TH	H	T	O
	4	2	3	4
+		2	0	4
	4	4	3	8

2. Amos carried 359 books, his brother carried 578 books. How many books were carried altogether.

	3	4	9	books
+	5	7	8	books
	9	2	7	books

Exercise

1. A boy counted 268 cans on Monday and 454 cans the next day. How many cans did he count in the two days?
2. What is the sum of 13696 and 5345?
3. Kangi earns 1928/= a day and sinabulya earns 11,345/=. How much money do Kangi and Sinabulya earn altogether?
4. At a petrol station one can was filled with fuel of sh.11,600/= and another of sh. 4860. How much money did both drivers pay?
5. Maria bought suager at 1200/=, soap at 800/= and matooke at 3000/=. What was her total expenditure?

6. A school has 440 boys and 839 girls. How many pupils are there altogether?
7. In a village there are 804 men and 1011 women. What is the total number of men and women in the village?
8. Musa had sh. 12,500/=, he got shs. 6800/= more, how much money does he have now?
9. A farmer had 1475 cows, he later bought 867 more. How many cows has he got altogether?

EVALUATION

Self Evaluation

Strong points: _____

Weak points: _____

Way forward: _____

WEEK 4:
PD 3
THEME: NUMERACY
TOPIC: OPERATION ON NUMBERS
SUBTRACTION
Examples

a) Subtract: 246 - 192

	H	T	O
2	4	6	
-	1	9	2
	0	5	4

b) Subtract 500 - 254

	H	T	O
5	0	0	
-	2	5	4
	2	4	6

Exercise
Subtract the following

1.

	TO
3	9
-	2 5

2.

	H	T	O
1	3	2	
-		2	9

3.

	H	T	O
1	2	0	
-		2	3

4.

	H	T	O
3	6	1	
-	1	7	3

5.

	H	T	O
3	7	2	
-	1	2	3

	H	T	O
3	8	4	
-	7	3	

7.

	TH	H	T	O
3	4	6	5	
-	2	3	4	3

	TH	H	T	O
7	8	9	2	
-	1	2	1	3

EVALUATION

Self Evaluation

Strong points: _____

Weak points: _____

Way forward: _____

WEEK 4:
PD 4
THEME: NUMERACY
TOPIC: OPERATION ON NUMBERS

More about subtraction
Examples

1. Muguni had 2,570/=, he brought a book for 843/=. What was his balance?

   2 5 7 0/=
   - 3 4 4/=
   2 2 2 7/=

2. What is the difference between 243 and 37?

   2 4 3=
   - 3 7/=
   2 0 6/=

Activity

1. Juma had 630/= he brought a toy car 56/=. How much money was he left with?
2. Take a way 53 from 111.
4. What number must you add 36 to get 176?
5. A man earns 4,380/= and spends 1,830/=, how much does he save?
6. Subtract 678 from 3,456.
7. A man had 8,790 heads of cattle, 3,021 died, how many remained?
8. By how much is 1653/= smaller than 2,040/=.
9. Find the difference between 13,850 and 4,040/=
10. Out of a man's salary of 12,500/=, 8,075/= was spent on school fees, how much money remained?

EVALUATION
Self Evaluation

Strong points: _____

Weak points: _____

Way forward: _____

WEEK 4:
PD 5
THEME: NUMERACY
TOPIC: OPERATION ON NUMBERS

Multiplication
Examples

1. Multiply 135 by 2

```
  1 3 5
x   2
-------
2 7 0
```

2. What is the product of 148 and 4?

```
  1 4 8
x   4
-------
5 9 2
```

Activity

Multiply the following numbers

a) 3 1 4 × 5

b) 6 2 4 × 5x 6

c) 4 2 5

d) 7 3 6 × 6

e) 7 3 0 × 4x 9

f) 6 5 4

d) 5 1 0 × 7

e) 3 2 1 × 8x 7

f) 7 4 5

EVALUATION
Self Evaluation

Strong points: _____

Weak points: _____

Way forward: _____

WEEK 4:
PD 6
THEME: NUMERACY
TOPIC: OPERATION ON NUMBERS

1. Find the product of 12 and 4.

```
  1 2
x   4
-------
  4 8
```

2. A loaf of bread costs 900/=, if 1 buys 8 loaves of bread, how much money shall I pay?

```
  9 0 0/=
  x   8
 ------
  7200
```

Exercise

a) Multiply 14 by 3
b) What is the product of 16 and 15?
c) What is the product of 20 and 8?
d) Multiply 128 by 6
e) I bought 4 books at 150 each, how much did I pay?
f) Each of the 7 classes in a school has 110 pupils. How many pupils are in the school?
g) A worker is paid 960 a day. How much will he collect if he works for 7 days?
h) 5 classes are contributing money to buy a ball. If each class is to contribute 876, how much does the ball cost?
i) A box contains 196 oranges, how many oranges can 9 boxes carry?
j) Nambole stadium has 4 gates. If 436 people enter through each gate, how many people will enter in the stadium?

EVALUATION

Self Evaluation

Strong points: _____

Weak points: _____

Way forward: _____

WEEK 4:
PD 7
THEME: NUMERACY
TOPIC: OPERATION ON NUMBERS

More about multiplication
Examples

1. Multiply 18 by 12.

```
   1  8        18 x  2  = 35
 x 1  2        18  x 1 =  18
 -------
   3  6
+ 2 8 0
 -------
 2 1 6
```

2. 20 x 36

```
   2  0
 x 3  6
 -------
 1 2  0
+6 0
 -------
 7 2 0
```

Exercise

Multiply the following numbers

a) 12 by 11 b) 15 by 11 c) 13 by 12

d) 16 by 12 e) 28 by 11

f) 2 2 g) 7 7 h) 5 6

x 1 5 x 1 2 x 2 3

i) Workout j) 28 by 20

2 4

x 1 3

EVALUATION

Self Evaluation

Strong points: _____

Weak points: _____

Way forward: _____

WEEK 4:

PD 8

THEME: NUMERACY

TOPIC: OPERATION ON NUMBERS

Division

Examples

1. Divide 125 by 5

```
        0 2 5
    5 | 125
0 x 5 = - 0
        1 2     = 25
2 x 5 = - 1 0
      2 5
5 x 5 = - 2 5
        0
```

2. Divide 7760 by 2

```
        3 8 8 0
    2 | 7 7 6 0
2 x 3 = - 6
      1 7
1 7   = 3880
8 x 2 = - 1 6
        1 6
8 x 2 = - 1 6
        0
0 x 2 = - 0
```

Activity

Divide the following numbers.

a) 2 | 130 b) 5 | 365 c) 2 | 148

d) 5 | 380 e) 3 | 150 f) 6 | 666

g) $4\overline{)264}$ h) $3\overline{)174}$ i) $4\overline{)268}$

j) $4\overline{)256}$ k) $3\overline{)159}$ l) $7\overline{)721}$

EVALUATION

Self Evaluation

Strong points: _____

Weak points: _____

Way forward: _____

WEEK 5:
PD 1
THEME: NUMERACY
TOPIC: OPERATION ON NUMBERS

Word problem

1. Share 120 oranges among 2 girls.

```
        0 6 0
     2 | 120
0 x 2 = - 0 |
          1 2 |   = each will get 60 mangoes
6 x 2= -  1 2 |
            0
0 x 2= -    0
```

2. A man had 392 goats, he shared them equally among 7 sons. How many goats did each son get?

```
        0 5 6
     7 | 3 9 2
0 x 7 = - 0 |
          3 9 |        56 goats each.
5 x 7=   -3 5 |
            4  2
6 x 7=      4 2
```

Activity

a) Divide 124 by 4
b) Share 346 books among 6 pupils.
c) I shared 1440/= among 8 children. How much did each get?
d) A man had 9 workers, he pays tham at total of 3,645/= aday. How much does each worker get?
e) A total of 1344 books were given to Mpumudde Primary School wihci has 6 classes? How many books did each get?
f) 8 cars used 728 litres of petrol equally. How many litres did each can use?
g) A school bursar collected a total of 46,249 from 7 pupils. How much did each pupil pay?
h) A district officer paid 7,200/= to 100 workers, how much did each get?
i) After 7 minutes, Kyagaba had typed 5649 words. How many words did she type?
j) Share 232 sweets among 8 boys.

EVALUATION

Self Evaluation

Strong points: _____

Weak points: _____

Way forward: _____

WEEK 5:
PD 3
THEME: NUMERACY
TOPIC: OPERATION ON NUMBERS

Comparing numbers using is less than, is greater than or equals to (<, > or =)
Examples
Replace the star with the correct symbol.

1. 2 + 3 * 3 + 2
   5 is equal to 5
   5 = 5
   Therefore 2 + 3 = 3 + 2

2. 5 x 5 * 5 x 2
   25 is greater than 10
   25 > 10
   Therefore 5 x 5 > 5 x 2

3. 269 * 962
   269 is less than 962
   269 < 962

Activity

Replace the star (*) with a correct symbol >, < or =

a) 2 x 2 ..... 2 + 2
b) 4 + 2 ..... 4 x 2
c) 378 872
d) XXIX 29

e) 3 weeks ..... 14 days
f) 1 kg of stones * 1 kg of feather
g) 3 x 3 x 3 * 3 + 3 + 3
h) 2m * 100 cm
i) 14 days * fortnight
j) 20 4 * 20 - 4

EVALUATION

Self Evaluation

Strong points: _____

Weak points: _____

Way forward: _____

WEEK 5:
PD 4
THEME: NUMERACY
TOPIC: OPERATION ON NUMBERS
Number patterns and sequences
Whole numbers

These are numbers that begin with zero.
e.g 1, 2, 3, 4, 5, 6, ...

Even numbers

These are numbers that are exactly divisible by 2.
e.g.0, 2, 4, 6, 8, 10, 12, 14, 16, etc.

Odd numbers

these are numbers that are not exactly divisible by 2
e.g 0,1, 3, 5, 7, 9, 11, 13, 15, etc.

Prime numbers

Numbers with two factors one and its self.
e.g 2,3,5,7,11,13,17,19,23,29, etc.

Examples

a) Find the sum of the first two composite numbers
1st two composite numbers = 4, 6
Sum = 4 + 6
= **10**

b) Find the difference between the 4th whole number and the 2nd whole number
2nd number = 1 and 4th number = 3
Difference = 3 – 1
= **2**

c) Find the sum of the first five counting numbers
Counting numbers 1, 2, 3, 4, 5
Sum = 1 + 2 + 3 + 4 + 5
= **15**

Activity

1. List the first whole numbers.
2. Write the first five even numbers
3. Work out the sum of first five whole numbers
4. List down the first ten counting numbers.
5. List all the counting numbers less than 10
6. List all the whole numbers less than 10.
7. Write all the even numbers between 10 and 20
8. List all the whole numbers between 5 and 15.
9. List the first five composite numbers.
10. Write all the prime numbers less than 20.
11. Find the sum of the first two composite numbers.
12. Work out the first five prime numbers.

EVALUATION

Self Evaluation

Strong points: _____

Weak points: _____

Way forward: _____

WEEK 5:
PD 5
THEME: NUMERACY
TOPIC: OPERATION ON NUMBERS

Sequences
Examples

1. Find the next two numbers in the sequence given below.

2, 6, 8, 10, **12**, **14**

+4 +2 + 2 +2 +2

10 + 2 = 12

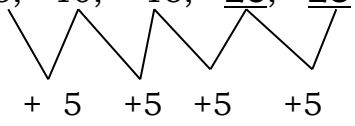
12 + 2 = 14

2. 2, 4, 8, 16, **32**, **64**

x 2 x 2 x 2 x 2 x 2

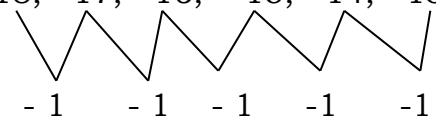
2 x 2 = 4
4 x 2 = 8
8 x 2 = 16
16 x 2 = 32
23 x 2 = 36

3. 5, 10, 15, **20**, **25**



15 + 5 = 20
20 + 5 = 25

4. 18, 17, 16, 15, 14, 13



14 - 13
15 - 14

Exercise

Fill in the missing numbers in the sequence given below.

a) 1, 2, 3, __, 5, ___, 7, __, 9, 10

b) 5, 10, __, 20, 25, __, 35

c) 0, 1, 3, 4, 6, 7, 9, ___, ___

d) 18, 15, 12, 9, ___, ___, ___

e) 30, 28, 26, ___, ___

f) 11, 22, 33, 44, ___, ___

g) 0, 2, 4, 6, ___, ___, ___, ___, 16

h) 32, 16, 8, 4, ___

i) 10, 20, 30, ___, ___

j) 1, 3, 6, 10, ___, 21, ___, 36

k) 30, 25, 20, 15, ____, ____

l) 1, ,3 9, 27, ___, ___

EVALUATION

Self Evaluation

Strong points: _____
Weak points: _____
Way forward: _____

WEEK 5:

PD 6

THEME: NUMERACY

TOPIC: NUMBER PATTERNS AND SEQUENCES

Multiples of numbers

Examples

1. List down all the multiples of 2 less than 12.

M_2 1 x 2 = 2
2 x 2 = 4
2 x 3 = 6
2 x 4 = 8
2 x 2 = 10
2 x 6 = 12

M_2 less than 12 = {2, 4, 6, 8, 10}

2. List the multiples of 2 between 10 and 20

6 x 2 = 12
7 x 2 = 14
8 x 3 = 16
9 x 4 = 18

M_2 between 10 and 20 = {12, 14, 16, 18}

3. List multiples of 9 less than 40.

1 x 9 = 9
2 x 9 = 18
3 x 9 = 27
4 x 9 = 36

= {9, 18, 27, 36}

Activity

List the multiples of the following.

1. Multiples of 2 less than 10
2. Multiples of 8 less than 30
3. Multiples of 3 between 20 and 30
4. Multiples of 8 between 10 and 20
5. Multiples of 6 less than 25
6. Multiples of 5 less than 40
7. Multiples of 7 between 30 and 50
8. Multiples of 10 less than 80
9. List all the odd multiples of 5 less than 50
10. List all the even multiples of 3 less than 50.

EVALUATION

Self Evaluation

Strong points: _____
Weak points: _____
Way forward: _____

WEEK 5:

PD 7

THEME: NUMERACY

TOPIC: NUMBER PATTERNS AND SEQUENCES

Common Multiples

Examples

1. Find the common multiples of 3 and 6.

M_3 = {3, (6), 9, (12), 16, (18), 21, (24), 27, (30), ……..}

M_6 = {(6), (12), (18), (24), (30), 36, 42, …..}

C.M = {6, 12, 18, 24, 30, ……..}

2. Find the common multiples of 5 and 10.

M_5 = {5, (10), 15, (20), 25, 30, ……..}

M_{10} = {(10), (20), (30), (40), 50, 60, …..}

C.M = { 10, 20, 30, ……..}

Activity

Find the common multiples of the following numbers.

a) 2 and 4 b) 2 and 6 c) 4 and 8

d) 5 and 10 e) 4 and 12 f) 6 and 12

g) 3 and 9 h) 2 and 8 i) 3 and 15

EVALUATION

Self Evaluation

Strong points: _____
Weak points: _____
Way forward: _____

WEEK 5:
PD 8
THEME: NUMERACY
TOPIC: NUMBER PATTERNS AND SEQUENCES

Finding LCM (Lowest Common Multiple)

Examples

1. Find the LCM of 2 and 4.

M2 = { (2), (4), 6, (8), (10), (12), 14 …}

M4 = { 4, (8), (12), 16, …}

C.M 4, 8, 12

LCM = 4

The LCM of 2 and 4 is 4.

2. Find the LCM of 4 and 12

M_4 = {(4), 8, (12), 16, 20, (24), 28, 32, (36)}

M_{12} = { (12), (24), (36), 48 …}

C.m = (12, 24, 36, 48, …}

LCM = 12

Exercise

Find the LCM of the following numbers.

a) 3 and 6 b) 5 and 10 c) 3 and 9

d) 2 and 8 e) 4 and 8 f) 2 and 6

g) 4 and 3 h) 3 and 5 i) 6 and 12

EVALUATION

Self Evaluation

Strong points: _____

Weak points: _____

Way forward: _____

WEEK 6:
PD 1
THEME: NUMERACY
TOPIC: NUMBER PATTERNS AND SEQUENCES

Finding factors of numbers

Examples

1. List all the factors of 6.

   F_6 1 x 6 = 6

   2 x 6 = 12

   = {1, 2, 3, 6}

2. List all the factors of 18.

   F_{18} 1 x 18 = 18

   2 x 9 = 18

   3 x 6 = 18

   = {1, 2, 3, 6, 7, 18}

3. List all the factors of 30.

   F_{30} 1 x 30 = 30

   2 x 15 = 30

   3 x 10 = 30

   5 x 6 = 30

   = { 1, 2, 3, 5, 6, 10, 15, 30}

Exercise

List all the factors of the following numbers

a) 2 b) 3 c) 8 d) 10 e) 4

f) 9 g) 12 h) 14 i) 15 j) 20

k) 24 l) 28 m) 32 n) 40 o) 48

EVALUATION

Self Evaluation

Strong points: _____

Weak points: _____

Way forward: _____

WEEK 6:
PD 2
THEME: NUMERACY
TOPIC: NUMBER PATTERNS AND SEQUENCES

Finding common factors

Examples

Find the common factor of 2 and 4

1. F_2 1 x 2 = 2 =(~~1~~, ~~2~~)

F_4 1 x 4 = 4
2 x 2 = 4
= {~~1~~, ~~2~~, 4 }

C.F of 2 and 4 = {1, 2}

2. Find the common factors of 12 and 24

F_{12} 1 x 12 = 12
2 x 6 = 12
3 x 4 = 12
={ ~~1~~, ~~2~~, ~~3~~, ~~4~~, ~~6~~, ~~12~~}

F_{24} 1 x 24 = 24
2 x 12 = 24
3 x 18 = 24
4 x 6 = 24
= { ~~1~~, ~~2~~, ~~3~~, ~~4~~, ~~6~~, 8, ~~12~~, 24}

C.F of 12 and 24 = { 1, 2, 3, 4, 6, 12}

Exercise

Find the common factor of the following numbers

a) 3 and 9 b) 2 and 6 c) 3 and 6 d) 5 and 10
e) 6 and 12 f) 4 and 8 g) 2 and 8 h) 10 and 20
i) 6 and 8

EVALUATION

Self Evaluation

Strong points: _____

Weak points: _____

Way forward: _____

WEEK 6:
PD 3
THEME: NUMERACY
TOPIC: NUMBER PATTERNS AND SEQUENCES
Finding H.C.F of 6 and 9

(Highest Common Factor or Greatest Common Factor)

Examples

1. Find the HCF of 6 and 9

F6	F9
1 x 6 = 6	1 x 9 = 9
2 x 3 = 6	3 x 3 = 9
= {1, 2, 3, 6}	= {1, 3, 9}
CF = {1, 3}	= {1, 3, 9}

H.C.F of 6 and 9 = 3

2. Find the GCF of 7 and 14

F_7 1 x 7 = 7
= {1, 7}

F_{14} 1 x 4 = 14
2 x 7 = 14
= {1, 2, 7, 14}

C.F = {1, 7}
H.C.F of 7 and 14 = 7

Exercise

Find the H.C.F of the following numbers

a) 3 and 9	b) 2 and 6	c) 3 and 6	d) 5 and 10
e) 6 and 12	f) 4 and 8	g) 2 and 8	10 and 20
i) 6 and 8	j) 12 and 24	k) 9 and 18	l) 12 and 18

EVALUATION

Self Evaluation
Strong points: _____
Weak points: _____
Way forward: _____

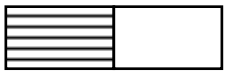
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WEEK 6:
PD 4
THEME: NUMERACY
TOPIC: NUMBER PATTERNS AND SEQUENCES

TERM II

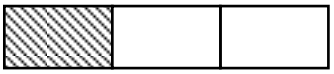
FRACTIONS
Definitions
A fraction is part of a whole.

Naming fractions



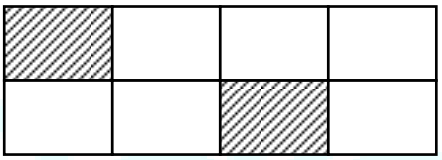
A half

$\frac{1}{2}$ $\frac{1}{2}$



A third

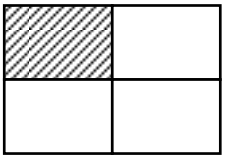
$^1/_3 ^1/_3 ^1/_3$



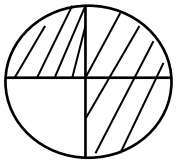
$\frac{2}{8}$ Two eighths

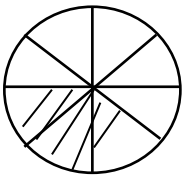
Activity

Describe the shaded fractions

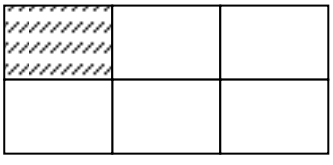
1. 

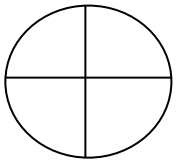
2. 

3. 

4. 

Describe the un-shaded fractions

1. 

2. 

EVALUATION

Self Evaluation

Strong points: _____

Weak points: _____

Way forward: _____

WEEK 6:
PD 5
THEME: NUMERACY
TOPIC: FRACTIONS

Types of fractions

1. ***Proper fractions***

   These are fractions with numerators smaller than denominators

   $\frac{1}{2}$, $\frac{3}{7}$, $\frac{4}{10}$, $\frac{12}{27}$, etc

2. **Improper fraction**
   A fraction with a numerator greater than a denominator.
   e.g $\frac{5}{2}$, $\frac{9}{4}$, $\frac{15}{3}$, etc
3. Mixed fractions (mixed numbers)
   A fraction with a whole number together with proper fraction.

   e.g 2 ½ , 9 ¾, 4 $^{7}/_{10}$, etc

NOTE
Given the fraction 5 ¾

5 is a whole number

3 is a numerator

4 is a denominator

Activity

Write proper, improper or mixed fraction in each of the following,

a) $4\frac{1}{2}$ b) $\frac{6}{8}$ c) $^{9}/_{4}$ d) $7\frac{3}{2}$

e) $9\frac{1}{2}$ f) $\frac{6}{2}$ g) $6\frac{1}{2}$ h) $\frac{3}{4}$

i) $4\frac{1}{6}$ j) $\frac{51}{2}$

k) $5\frac{14}{2}$ l) $\frac{7}{2}$ m) $\frac{1}{9}$ n) $8\frac{5}{6}$ o) $\frac{8}{7}$

EVALUATION

Self Evaluation

Strong points: _____

Weak points: _____

Way forward: _____

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WEEK 6:
PD 6
THEME: NUMERACY
TOPIC: FRACTIONS

Equivalent fractions
Examples

1. Find the equivalent fractions for ½ .

$\frac{1}{2} = \frac{1 \times 2}{2 \times 2}, \frac{1 \times 3}{2 \times 3}, \frac{1 \times 4}{2 \times 4}, \frac{1 \times 5}{2 \times 5}$

$\frac{1}{2} = \frac{2}{3}, \frac{3}{6}, \frac{4}{8}, \frac{5}{10}$, etc

2. Find the equivalent fractions for $\frac{2}{5}$

1. Find the equivalent fractions for $\frac{2}{5}$.

$\frac{2}{5} = \frac{2 \times 2}{5 \times 2}, \frac{2 \times 3}{5 \times 3}, \frac{2 \times 4}{5 \times 4}, \frac{2 \times 5}{5 \times 5}, \frac{2 \times 6}{5 \times 6}$

$\frac{2}{5} = \frac{4}{10}, \frac{6}{15}, \frac{8}{20}, \frac{10}{25}, \frac{12}{30}$,etc

Activity
Write the next four equivalent fractions for:

1. $\frac{2}{3}$, ___, ___, ___, ___
2. ¼ , ___, ___, ___, ___
3. $\frac{3}{8}$ ___, ___, ___, ___
4. $\frac{1}{3}$, ___, ___, ___, ___
5. $\frac{2}{11}$, ___, ___, ___, ___
6. $\frac{1}{6}$, ___, ___, ___, ___
7. $\frac{2}{9}$ ___, ___, ___, ___
8. $\frac{3}{7}$, ___, ___, ___, ___

EVALUATION

Self Evaluation

Strong points: _____

Weak points: _____

Way forward: _____

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WEEK 6:
PD 7
THEME: NUMERACY
TOPIC: FRACTIONS

Finding unknown is equivalent fractions
Examples

1. Find the missing number in;

$\frac{1}{2} = \frac{\square}{6}$

$\frac{1}{2} = \frac{2}{4}, \boxed{\frac{3}{6}}, \frac{4}{8}, \frac{5}{10}, \frac{6}{12}$

$\frac{1}{2} = \frac{3}{6}$

$\square = 3$

2. $\frac{3}{7} = \frac{9}{\square}$

$\frac{3}{7} = \frac{6}{14}, \boxed{\frac{9}{21}}, \frac{12}{28}, \frac{15}{35}$

$\frac{3}{7} = \frac{9}{21}$

$\square = 21$

Activity
Find the missing numbers

a) $\frac{1}{7} = \frac{\square}{28}$ b) $\frac{1}{2} = \frac{5}{\square}$ c) $\frac{3}{8} = \frac{15}{\square}$

d) $\frac{1}{3} = \frac{\square}{9}$ e) $\frac{2}{3} = \frac{8}{\square}$ f) $\frac{3}{4} = \frac{\square}{16}$

EVALUATION
Self Evaluation
Strong points: _____
Weak points: _____
Way forward: _____

WEEK 6:
PD 8
THEME: NUMERACY
TOPIC: FRACTIONS

Reducing fractions
Examples

1. Reduce $\frac{8}{16}$ to its lowest terms

F8 = {1, 2, 4, 8}

F16 = {1, 2, 4, 8 16}

GCF of 8 and 16 = 8

$\frac{8}{16} \div \frac{8}{8} = \frac{1}{2}$

$\frac{8}{16} = \frac{1}{2}$

2. Reduce $\frac{10}{25}$ to its lowest terms

F10 = {1, 2, 5, 10}
F25 = {1, 5, 25}
GCF of 10 and 25 = 5
$\frac{10}{25} \div 5 = \frac{2}{5}$
$\frac{10}{25} = \frac{2}{5}$

Activity
Write the following fractions in their lowest terms.

a) $\frac{2}{6}$ b) $\frac{6}{10}$ c) $\frac{10}{30}$ d) $\frac{10}{16}$

e) $\frac{8}{10}$ f) $\frac{8}{18}$ g) $\frac{6}{18}$ h) $\frac{15}{21}$

f) $\frac{4}{12}$ j) $\frac{15}{18}$ k) $\frac{4}{16}$ l) $\frac{25}{75}$

EVALUATION
Self Evaluation
Strong points: _____
Weak points: _____
Way forward: _____

WEEK 7:
PD 1
THEME: NUMERACY
TOPIC: FRACTIONS

Ordering fractions
Examples

1. Arrange ¼ , $^1/_3$, ½ in ascending order
   LCM of 4, 3 and 2 = 12
   ¼ x 12, $^1/_3$ x 12 , ½ x 12
   1 x 3 1 x 4 1 x 6
   3 4 6
   Ascending order; ¼ , $^1/_3$, $^1/_2$

2. Arrange $^5/_6$, ½, ¾ in descending order
   LCM of 6, 2 and 4 = 12
   $\frac{5}{6}$ x 12 , $\frac{1}{2}$ x 12, $\frac{3}{4}$ x 12

   5 x 2 1 x 6 3 x 3
   10 6 9

   Descending order; $^5/_6$, ¾ , ½

Activity
Arrange the following fractions in descending order

a) $^1/_3$, ½ , $^1/_5$ b) $^3/_8$, $^{15}/_{16}$, ¼

c) $^3/_5$, $^5/_{10}$, ¾

Arrange the following fractions in descending order.

a) $^3/_8$, ½ , $^5/_6$ b) ½ , $^2/_3$, $^1/_6$

c) $^2/_3$, $^5/_6$, ½ , $^7/_8$

EVALUATION

Self Evaluation

Strong points: _____

Weak points: _____

Way forward: _____

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WEEK 7:
PD 2
THEME: NUMERACY
TOPIC: FRACTIONS

Changing mixed numbers to improper fractions
Examples

1. Change 1 ½ to improper fractions

$$1\ ½ = \frac{(D \times W) + N}{D}$$
$$= \frac{(2 \times 1) + 1}{2}$$
$$= \frac{2 + 1}{2}$$
$$= \frac{3}{2}$$

2. Express $2^3/_5$ as improper fraction

$$2^3/_3 = \frac{(D \times W) + N}{D}$$
$$= \frac{(5 \times 2) + 3}{5}$$
$$= \frac{10 + 3}{5}$$
$$= \frac{13}{5}$$

Activity
Write the following fractions as improper fractions

a) $1^1/_5$ b) $3^2/_3$ c) $13½$ d) $2^2/_3$

e) $4¾$ f) $10^3/_{10}$ g) $4^1/_3$ h) $1^5/_7$

i) $3^4/_5$ j) $12\ ¼$

EVALUATION

Self Evaluation

Strong points: _____

Weak points: _____

Way forward: _____

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WEEK 7:
PD 3
THEME: NUMERACY
TOPIC: FRACTIONS

Changing improper fractions to mixed fractions/numbers
Examples

1. Change 5/2 to a mixed number

$5/2 = 2\overline{)5}$

$2x = -4$
1

$5/2 = 2\ ½$

2. Change $^{7}/_{3}$ as a mixed number

$^{5}/_{3} = 3\overline{)7}$

$2 \times 3 = -6$
1

$^{7}/_{3} = 20\ ^{1}/_{3}$

Activity
Change the following improper fractions to mixed fractions (number)

a) $^{7}/_{5}$ b) $^{17}/_{5}$ c) $^{7}/_{2}$ d) $^{21}/_{5}$

e) $^{10}/_{3}$ f) $^{13}/_{7}$ g) $^{17}/_{3}$ i) $^{14}/_{5}$

j) $^{12}/_{7}$

EVALUATION

Self Evaluation

Strong points: _____

Weak points: _____

Way forward: _____

WEEK 7:
PD 4
THEME: NUMERACY
TOPIC: FRACTIONS

Addition of fractions with same denominations
Examples

1. Add: $\frac{1}{5} + \frac{2}{5}$

$\frac{1}{5} + \frac{2}{5} = \frac{1+2}{5}$

$= \frac{3}{5}$

2. Add: $\frac{5}{8} + \frac{1}{8}$

$\frac{5}{8} + \frac{1}{8} = \frac{5}{8} + \frac{1}{8}$

$= \frac{6}{8} \div \frac{2}{2}$ G.C.F of 6 and 8 = 2

$= \frac{3}{4}$

Activity
Add the following fractions

a) $\frac{1}{6} + \frac{4}{6}$ b) $\frac{4}{9} + \frac{1}{9}$ c) $\frac{3}{7} + \frac{4}{7}$

d) $\frac{3}{20} + \frac{5}{20}$ e) $\frac{1}{15} + \frac{4}{15}$ f) $\frac{1}{8} + \frac{6}{8}$

Word problems in addition
Examples

1. John dug $^1/_6$ of the garden and Mary dug $^4/_6$ of the garden. What part of the garden was dug?

Joan and Mary dug $\frac{1}{6} + \frac{4}{6}$

Altogether: $\frac{1}{6} + \frac{4}{6} = \frac{1+4}{6}$

$= \frac{5}{6}$

Activity

1. Kadodi ate $^1/_3$ of fish for lunch and another $^1/_3$ of the fish for supper. What fraction of the fish did Kadodi?

2. What is the sum of $^2/_3$ and $^3/_8$?

3. Magogo read $^4/_7$ of a book on Monday and $^2/_7$ of it on Tuesday. What fraction of the book did he read altogether?

EVALUATION

Self Evaluation

Strong points: _____

Weak points: _____

Way forward: _____

WEEK 7:
PD 6
THEME: NUMERACY
TOPIC: FRACTIONS

Subtraction of fractions with the same denominators

Examples

1. Subtract: $\frac{7}{12} - \frac{1}{12}$

$\frac{7}{12} - \frac{1}{12} = \frac{7 - 1}{12}$

$= \frac{6 \div 6}{12 \div 6}$

$= \frac{1}{2}$

Activity

Subtract the following fractions

a) $\frac{4}{4} - \frac{1}{4}$ b) $\frac{8}{9} - \frac{3}{9}$ c) $\frac{9}{13} - \frac{5}{13}$

Word problems

Examples

1. Subtract $\frac{2}{5}$ from $\frac{4}{5}$

$\frac{4}{5} - \frac{2}{5} = \frac{4 - 2}{2}$

$= \frac{2}{5}$

2. Andrew had $^{7}/_{9}$ of a cake. He ate $^{5}/_{9}$ of it. What fraction remained?

$$\frac{7}{9} - \frac{5}{9} = \frac{7 - 5}{9}$$
$$= \frac{2}{9}$$

Activity

1. Subtract $^{2}/_{7}$ from $^{5}/_{7}$
2. What must be added to 5/11 to make $^{9}/_{11}$?
3. What remains if $^{7}/_{15}$ is subtracted from $^{13}/_{15}$?
4. I read $^{2}/_{5}$ of a mathematics book. What fraction was left?
5. A water tank was $^{7}/_{8}$ full. He used $^{4}/_{8}$ of the water. What fraction was left?

EVALUATION

Self Evaluation

Strong points: _____

Weak points: _____

Way forward: _____

WEEK 7:
PD 8
THEME: NUMERACY
TOPIC: FRACTIONS

Mixed numbers (Addition & subtraction)
Examples

1. Add: $2^{1}/_{7} + 3\ ^{5}/_{7} = (2 + 3) + {}^{1}/_{7} + {}^{5}/_{7}$

$$= 5 + \frac{(1 + 5)}{7}$$
$$= 5 + \frac{6}{7}$$
$$= 5\frac{6}{7}$$

OR $2^{1}/_{7} + 3^{5}/_{7} = {}^{15}/_{7} + {}^{26}/_{7}$

$$= \frac{15 + 26}{7}$$
$$= \frac{41}{7}$$
$$= 5\frac{6}{7}$$

2. Subtract: $4\frac{3}{4} - 1\frac{1}{4}$

$= (4 - 1) + (\frac{3}{4} - \frac{1}{4})$

$= 3 + \frac{(3 - 1)}{4}$

$= 3 + \frac{2}{4}$

$= 3 + \frac{1}{2}$

$= 3\frac{1}{2}$

OR $4\frac{3}{4} - 1\frac{1}{4}$

$= \frac{19}{4} - \frac{5}{4}$

$= \frac{19 - 5}{4}$

$= \frac{14}{4}$

$= 3\frac{2}{4}$

$= 3\frac{1}{2}$

Activity

Work out the following:

a) $2\frac{2}{3} + 1\frac{1}{3}$ b) $3\frac{1}{3} + 4\frac{1}{3}$ c) $2\frac{1}{2} - 1\frac{1}{2}$

d) $6\frac{3}{5} - 3\frac{1}{5}$ e) $4\frac{2}{3} - 1\frac{1}{3}$

f) Lydia had $8\frac{1}{8}$ kg of beans and brought $7\frac{4}{9}$ kg more. How many kg of beans does she have altogether?

g) The length of a rope was $9\frac{4}{5}$ m. If the rat ate $3\frac{1}{5}$ m, what was the length of the rope that remained?

EVALUATION

Self Evaluation

Strong points: _____

Weak points: _____

Way forward: _____

WEEK 8:
PD 1
THEME: NUMERACY
TOPIC: FRACTIONS

Multiplication of a fraction by a fraction
Examples

$\frac{1}{5} \times \frac{2}{3} = \frac{1}{5} \times \frac{2}{3}$

$= \frac{2}{15}$

$\frac{3}{4} \times \frac{2}{9} = \frac{3 \times 2}{4 \times 9}$

$= \frac{6}{36} \div \frac{6}{6}$

$= \frac{1}{6}$

Activity

Multiply the following fractions

a) $\frac{2}{3} \times \frac{1}{2}$ b) $\frac{2}{5} \times \frac{5}{6}$ c) $\frac{1}{2} \times \frac{1}{2}$

d) $\frac{3}{7} \times \frac{2}{3}$ e) $\frac{1}{3} \times \frac{1}{2}$ f) $\frac{3}{4} \times \frac{2}{5}$

Multiplication of a fraction by a whole number

Examples

1. Multiply: $\frac{1}{2} \times 12$

$\frac{1}{2} \times \frac{12}{1} = \frac{1}{2} \times \frac{12}{1}$

$= \frac{12}{2} \div 2$

$= \frac{6}{1}$

$= \mathbf{6}$

OR $\frac{1}{2} \times 12$

$= \frac{1}{6} \times 6$

$\frac{1}{2} \times \frac{12}{1}$ (6, 2)

1×6

6

2. Multiply: $\frac{2}{3} \times 15$

$\frac{2}{3} \times \frac{15}{1} = \frac{2 \times 15}{3 \times 1}$

$= \frac{30}{3} \div 3$

$= \frac{10}{1}$

$= 10$

OR $\frac{2}{3} \times 15$

$= 2 \times 5$

$= 10$

Activity

Work out the following:

a) $\frac{2}{5} \times 18$ b) $\frac{4}{5} \times 25$ c) $\frac{1}{2} \times 10$

EVALUATION

Self Evaluation

Strong points: _____

Weak points: _____

Way forward: _____

WEEK 8:
PD 2
THEME: NUMERACY
TOPIC: FRACTIONS

Application of fraction
Examples

1. What is $^2/_3$ of 36 oranges
   = $^2/_3$ x 36 oranges
   = 2 x 12 oranges
   = 24 oranges.

2. In a class of 40 pupils, ¼ were boys and the rest were girls.
   a) Find the fraction of girls.

Fraction of girls = $1 - \frac{1}{4}$

$= \frac{4}{4} - \frac{1}{1}$

$= \frac{4 - 1}{4}$

$= \mathbf{\frac{3}{4}}$

   b) How many boys were in the class?

Fraction of boys = ¼
Number of boys = ¼ x 40 pupils
= 10 pupils

   c) Find the number of girls in the class.
Fraction of girls = ¾
Number of girls = ¾ x 40 pupils
= 3 x 10
= 30 girls

Activity

1. What is $^1/_3$ of 12?
2. Find ¾ of 16 hens
3. In a class of 336 pupils, $^1/_3$ were absent and the rest were present.
   a) What fraction of the class were present?
   b) How many pupils were absent?
   c) Find the number of pupils present.
   d) How many more pupils were present than absent?

EVALUATION

Self Evaluation

Strong points: _____

Weak points: _____

Way forward: _____

WEEK 8:
PD 3
THEME: NUMERACY
TOPIC: FRACTIONS (DECIMALS)

Place Values of Decimals
Examples

1. What is the place value of each digit in the number 5.63?

Ones	Tenths	Hundredths
5	6	3

Ones Tenths Hundredths

2. What is the place value of 5 in the number 17.35?

1 7. 3 5
Hundredths
Tenths

Activity

1. Find the place value of each digit in the number.

   a) 0.2 b) 6.38 c) 49.15 d) 30.248

2. Find the place value of the underlined digits in the number.
   a) 45.0<u>1</u> b) 4. <u>5</u>6 c) 2<u>4</u>6.8 d) <u>6</u>39.25

   e) 1<u>5</u>.37
3. a) Find the place value of 3 in the number 2.03.
   b) What is the place value of 8 in the number 6.8.

EVALUATION
Self Evaluation

Strong points: _____

Weak points: _____

Way forward: _____

WEEK 8:
PD 4
THEME: NUMERACY
TOPIC: FRACTIONS (DECIMALS)

Values of Decimals

Examples

1. What is the value of each digit in the number 18.36?
   Soln:

Tens	Ones	Tenths	Hundredths
1	8	3	6

1 tens
1 x 10
10

8 ones
8 x 1
8

3 tenths
3 x 1/10
3x 0.1
0.3

6 Hundredths
6x 1/100
6 x 0.01
0.06

2. What is the value of 8 in the number 23.58?
   Soln:

Tens	Ones	Tenths	Hundredths
2	3	5	8

8 hundredths

8 x 1/100
8 x 0.01
0.08

3. Find the value of the underlined digit in the number 84.9.
   Soln

Tens	Ones	Tenths
8	4	9

8 tens
8 x 10
80

Activity:

1. Find the place value of each digit number.
   a) 3.28 b) 27.56 c) 209.76

2. What is the value of the underlined digit in the numbers below.
   a) 2.<u>8</u>6 ii) <u>4</u>5.9 iii) 74. 0<u>6</u>

3. Work out the value of 2 in the number 10.52.

4. What is the value of 9 in the number 6.29?

5. Find the value of 4 in the number 2.46.

6. Find the value of 3 in the number 17.83.

EVALUATION

Self Evaluation

Strong points: _____

Weak points: _____

Way forward: _____

WEEK 8:
PD 7
THEME: NUMERACY
TOPIC: FRACTIONS (DECIMALS)

<u>Writing decimals in words.</u>

Examples

1. Write 0.3 in words
   Soln: 0.3 = Zero point three
   = Three tenths

2. Write 4. 8 in words.
   Soln: 4.8 = Four point eight
   = Four and eight tenths

3. Write 12.5 in words.
   Soln: 12.5 = Twelve point five
   = Twelve and five tenths.

4. What is 102. 48 in words?
   Soln: 102.48 = One hundred two point four eight.
   = One hundred two and forty eight hundredths.

<u>Activity</u>

Write the following decimals in words.

a) 2.3 b) 34.9 c) 217.5 d) 6.87 e) 48.93

f) 0.8 g) 14. 4 h) 23.56 i) 5.01 j)7.14
k)80.69 l) 47.9 m) 3.3 n) 1.43 o) 0.08

EVALUATION

Self Evaluation

Strong points: _____

Weak points: _____

Way forward: _____

WEEK 8:
PD 8
THEME: NUMERACY
TOPIC: FRACTIONS (DECIMALS)

Writing decimals in figures.
Examples

1. Write four and three tenths in figures.
   Soln: Four = 4
   Three tenths = 0.3
   Four and three tenths 4.3

2. Write nine hundredths in figures.
   Soln: Nine hundredths = 9 x 0.01
   = 0.09
3. Write twenty seven and six tenths in figures.
   Soln: Twenty seven = 27
   Six tenths = 0.6
   Twenty seven and six tenths = 27.6

Activity:
Write the following in figures.
a) Eighteen and six tenths
b) Thirteen and four tenths.
c) Five and twelve hundredths.
d) One and fourteen hundredths
c) Six and nine tenths.
e) Thirty three and three tenths.
f) Twenty and five hundredths.
g) Two hundred ten and one tenths.
h) Eleven and eleven hundredths.
i) Sixteen point zero seven.

EVALUATION

Self Evaluation

Strong points: _____

Weak points: _____

Way forward: _____

WEEK 9:
PD 1
THEME: NUMERACY
TOPIC: FRACTIONS (DECIMALS)

Changing /converting vulgar/common fractions to decimal fractions.

Examples

1. Write $^{8}/_{10}$ as a decimal fraction.

Soln:

$^{8}/_{10}$ =

$$\begin{array}{r} 0.8 \\ 10\overline{)\,0.8} \\ -\,0\downarrow \\ \quad 8\ 0 \\ -\,8\ 0 \\ \quad 0\ 0 \end{array}$$

$\therefore {}^{8}/_{10} = \mathbf{0.8}$

2. What is ½ as a decimal fraction?

Soln:

$^{1}/_{2}$ =

$$\begin{array}{r} 0.5 \\ 2\overline{)\,1.0} \\ -\,0\downarrow \\ \quad 1\ 0 \\ -\,1\ 0 \\ \quad 0\ 0 \end{array}$$

$\therefore {}^{1}/_{2} = \mathbf{0.5}$

3. Change ¼ to a decimal fraction.

Soln:

$^{1}/_{4}$ =

$$\begin{array}{r} 0.25 \\ 2\overline{)\,1.00} \\ -\,0\downarrow \\ \quad 1\ 0 \\ -\ \ 8\downarrow \\ \quad\ 20 \\ \quad -20 \\ \quad\ 00 \end{array}$$

$\therefore {}^{1}/_{4} = \mathbf{0.25}$

Activity

Change the following fractionsf to decimals.

a) $\frac{2}{5}$ b) $\frac{3}{4}$ c) $\frac{4}{10}$ d) $\frac{3}{8}$ e) $\frac{2}{4}$ f) $\frac{3}{10}$ g) $\frac{1}{5}$

h) $\frac{25}{10}$ i) $\frac{55}{100}$ j) $\frac{7}{10}$ k) $\frac{11}{10}$ l) $\frac{5}{8}$ m) $\frac{1}{8}$

EVALUATION

Self Evaluation

Strong points: _____

Weak points: _____

Way forward: _____

WEEK 9:
PD 2
THEME: NUMERACY
TOPIC: FRACTIONS (DECIMALS)

Changing /converting mixed fractions to decimal fractions.
Examples
1. Express $3\,^{2}/_{10}$ as a decimal fraction.

Soln: $3^{2}/_{10} = 3 + \frac{2}{10}$

$= 3 + 10\overline{)2.0}$ (0.2)

-0 ↓
$2\ 0$
$-2\ 0$
$0\ 0$

$= 3 + 0.2$
$= 3.2$

sw
3.
+ 0.2
3.2

Activity:
Change the following fractions to decimal fractions.

a) $4^{6}/_{10}$ b) $12^{4}/_{10}$ c) $4^{4}/_{10}$

d) $4^{15}/_{100}$ e) $5\,^{3}/_{100}$ f) $3^{3}/_{10}$

g) $2^{1}/_{10}$ h) $11^{9}/_{1}$ i) $6^{5}/_{100}$

EVALUATION
Self Evaluation

Strong points: _____

Weak points: _____

Way forward: _____

WEEK 9:
PD 3
THEME: NUMERACY
TOPIC: FRACTIONS (DECIMALS)

Changing decimal fractions to common fraction
Examples

1. Express 0.6 as a vulgar fraction.

Soln: $0.6 = \frac{0.6}{1} \times \frac{10}{10}$

$= \frac{6}{10}$ **OR** $\frac{6}{10} \div 2$

$10 \div 2$

$= \frac{3}{5}$

2. Convert 1.2 to a common fraction.

Soln: $1.2 = \frac{1.2}{1} \times \frac{10}{10}$

$= \frac{12}{10} \div 2$

$= 10 \div 2$

$= 6$; $5\overline{)6}$, -5, 1

$\therefore \frac{6}{5} = 1\frac{1}{5}$

Activity

Change the following decimals to fractions

a) 0.2 b) 1.3 c) 1.4 d) 0.5 e) 0.25

f) 1.8 g) 0.75 h) 0.6 i) 0.7 j)1.1 k) 0.8

EVALUATION

Self Evaluation

Strong points: _____

Weak points: _____

Way forward: _____

WEEK 9:

PD 4

THEME: NUMERACY

TOPIC: FRACTIONS (DECIMALS)

Addition of decimals

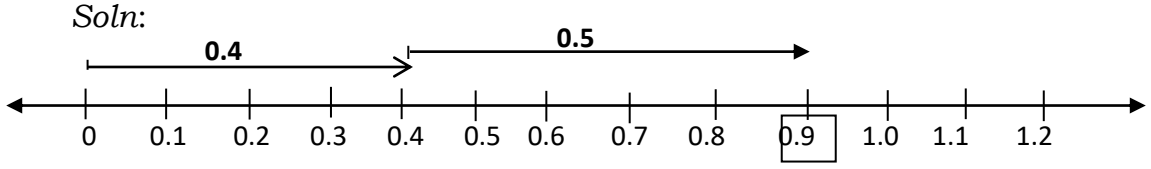
Examples

1. Add 0.5 + 0.7

Soln:
$$\begin{array}{r} 0.5 \\ +\ 0.7 \\ \hline 1.2 \end{array}$$

2. Add: 0.4 + 0.5 using a number line.

Soln:



$\therefore 0.4 + 0.5 = 0.9$

3. A baby drank 1.4 litres of milk on Monday and 1.6 litres on Tuesday. How many litres of milk did the baby drink altogether?

Soln: 1 . 4 litres
\+ 1 . 6 litres
3 . 0 litres

Exercise

1. Add the following decimals without using a number line.
   a) 0.2 + 0.6 b) 1.4 + 2.8 c) 4.3 + 2.5 + 0.9

2. Add the following using a number line.

   a) 0.3 + 0.4 b) 0.1 + 0.5 c) 0.6 + 0.2

3. a) What is the sum of 2.3 and 4.8?

   b) Cathy was given 2.6kg of sugar and Mercy was given 1.7 kg of sugar. How much sugar did they get altogether?

   c) Max bought 3.8 metres of ribbon. Mark bought 4.7 metres of ribbon. What length of ribbon do they have altogether?

   d) A rectangular flower garden measures 7.3 metres by 4.7 metres. What is the distance round it altogether?

EVALUATION

Self Evaluation

Strong points: _____

Weak points: _____

Way forward: _____

WEEK 9:
PD 5
THEME: NUMERACY
TOPIC: FRACTIONS (DECIMALS)

SUBTRACTION OF DECIMALS

Examples

1. Subtract: 2.3 - 0. 9

Soln: $\overset{1}{\cancel{2}}.\overset{13}{\cancel{3}}$
\- 0. 9
1. 4

2. Leticia had 19.2 metres of cloth, she sold 13. 5 metres, what length of cloth did she remain with?

Soln:
$$\begin{array}{r} {}^{8}\cancel{19}\,.\,{}^{12}2 \text{ metres} \\ -\ 13\,.\ 5 \text{ metres} \\ \hline 5\ .\ 7 \text{ metres} \end{array}$$

Exercise

1. Work out the following.
   a) 3.4 - 1 .5 b) 7.8 - 3.8 c) 6.4 – 2.9

   d) 6. 3 - 1.9 e) 2. 7 - 1.3

2. a) Derrick bought 12 litres of milk, he gave away 5.5 litres, how many litres of milk did he remain with?

   b) A boy cycles 8.2 km from his home to school. If he cycles 4.7km and then rests. How many km remained to reach school?

   c) A maid made 5.2 litres of juice, she served 2.8 litres, how much litres of juice remained?
   d) What is the difference between 14.3 and 6.9?

EVALUATIONS

Self Evaluation

Strong points: _____
Weak points: _____
Way forward: _____

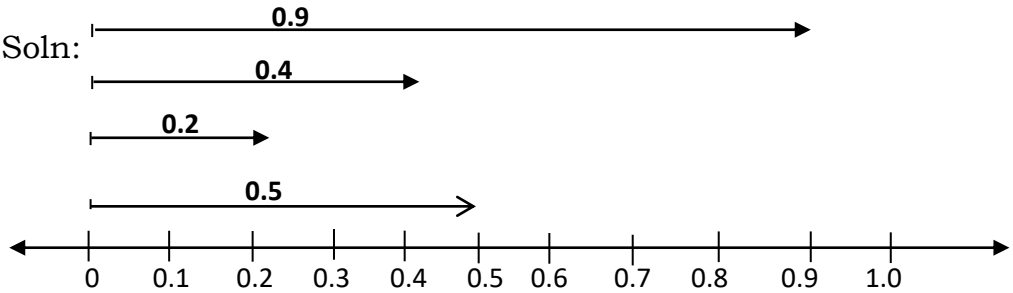
WEEK 9:
PD 6
THEME: NUMERACY
TOPIC: FRACTIONS (DECIMALS)

ORDERING DECIMAL FRACTIONS (Arranging fraction according to their size)

Examples

1. Arrange 0.6 , 0.2 and 0.4 in ascending order (starting with the smallest)

Soln:



The order is 0.9, 0.5, 0.4, 0.2

Exercise

1. Arrange the following in ascending order.
   a) 0.7, 0.3, 0.4, 0.5
   b) 0.3, 0.8, 0.5, 0.2
   c) 0.2, 2, 0.02, 2.2
   d) 0.3, 0.7, 0.6, and 0.9

2. Arrange the following decimals in descending order.
   a) 0.4, 0.1, 0.7, 0.6
   b) 1.2 , 2.3, 1.8 and 2.0
   c) 0.8, 0.3, 0.5, 0.2
   d) 0.5, 0.8, 0.2, 0.4

EVALUATION

Self Evaluation

Strong points: _____

Weak points: _____

Way forward: _____

GRAPHS AND INTERPRETATION OF DATA

Pictographs are also called picture-graphs.

Pictographs are graphs which show number or amount of different things for people, classes, animals e.t.c

On pictographs we usually use symbols to represent the data on the graph.

Example

The pictograph below shows the number of trees each farmer has.

Okullo	
Kambe	
Kizito	
Mulabi	

Scale

= 10 trees

Questions

a) How many trees does Kizito have?

Number of trees = 6 x 10 trees

= 60 trees

b) Find the sum of Kizito's trees and Kambe's trees

Kizito	= 6 x 10trees	=	60 trees
Kambe	= 3 x 10 trees	=	+ 30 trees
			90 trees

c) Who has the biggest number of trees?

Kizito

d) Find the difference between Mulabi's trees and Okullo's trees.

Mulabi	= 5 x 10 trees	=	50 trees
Okullo	= 2 x 10 trees	=	- 20 trees
			30 trees

Exercise

1. The graph below shows the number of balls picked by four sisters from a shop.

Doreen	
Diana	
Daphine	
Daizy	

Scale

Represents 5 balls

Questions

a) Which two sisters picked the same number of balls?
b) Who picked the largest number of balls?
c) How many balls did Doreen pick?
d) How many balls did Diana & Daphine pick?
e) Find the difference between Daphine's balls and Daizy's balls.
f) Find the sum of the highest number of balls picked and the lowest number of balls picked.
g) Work out the total number of balls that were picked by the four girls.

2. The pictograph below shows the apples imported from South Africa. Study and answer the questions that follows.

Mon	
Tue	
Wed	
Thur	
Fri	

Scale:  represents 20 apples

Questions

a) How many apples were imported on Monday?
b) How many apples were imported on Wednesday and Thursday?
c) How many more apples were imported on Friday than Tuesday?
d) How many apples were imported on Monday, Tuesday and Friday?
e) On which days were the same number of apples imported?
f) On which day were the highest number of apples imported.
g) On which day were the least number of apples imported?

TALLIES & BAR GRAPHS

To draw graphs we first collect information.
We may draw tally marks and use them to count and group things in fives.

Example:

/ One // two /// three 𝍸 five

N.B:

For each fifth item that we count we make a line across the first four.

Example:

𝍸 Five

𝍸 𝍸 / Eleven

𝍸 𝍸 𝍸 Fifteen

TALLY GRAPHS

Example III

Pupils were told to count the number of cars of different colours which passed by their school during break time for 5 days. The information is shown below.

Days of the week	White	Red	Black	Maroon
Monday	𝍸	𝍸 //	//	///
Tuesday	𝍸	𝍸 ///	𝍸 //	/
Wednesday	𝍸 𝍸 /	/	///	𝍸
Thursday	𝍸 /	///	𝍸	𝍸 𝍸
Friday	𝍸 𝍸 𝍸 𝍸	𝍸	𝍸	//

Questions:

a) How many cars were seen on Monday?
17 cars

b) How many white cars were seen on Thursday and Friday?
Thursday: 6 cars
Friday: + 20 cars
26 cars

c) Which colour appeared most?
White

d) What is the sum of all white cars?
48 cars

e) How many maroon cars were seen on Wednesday?
5cars.

Exercise

A school boy recorded the number of white cars that passed near his home in one week.

Days of the week	Number of white cars
Monday	𝍸 𝍸 𝍸
Tuesday	𝍸 𝍸 𝍸 𝍸
Wednesday	𝍸 𝍸
Thursday	𝍸 𝍸 𝍸 𝍸 //

Friday	𝍸 𝍸
Saturday	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸
Sunday	𝍸 //

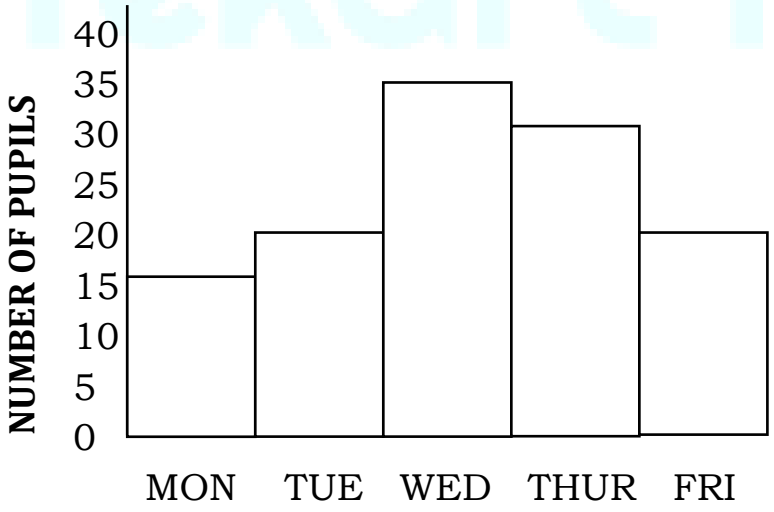
Questions

a) How many cars were recorded in the first two days of the week?
b) Which day did he record the largest number of cars?
c) How many cars were recorded on Friday, Saturday and Sunday?
d) What is the different between the largest and the smallest number of cars recorded that week?
e) On which days were the same number of cars recorded?
f) What is the total number of cars for the first three days?
g) What is the total number of cars for the last three days of the week?
h) What was the most common number of cars?

BAR GRAPHS

Example

The graph below shows the daily attendance of P.4 pupils for a week.



a) How many pupils were present on Thursday?
30 pupils

b) On which day were the same number of pupils present?
Tuesday and Friday

c) Find the difference between the highest and the lowest number of pupils in the class.

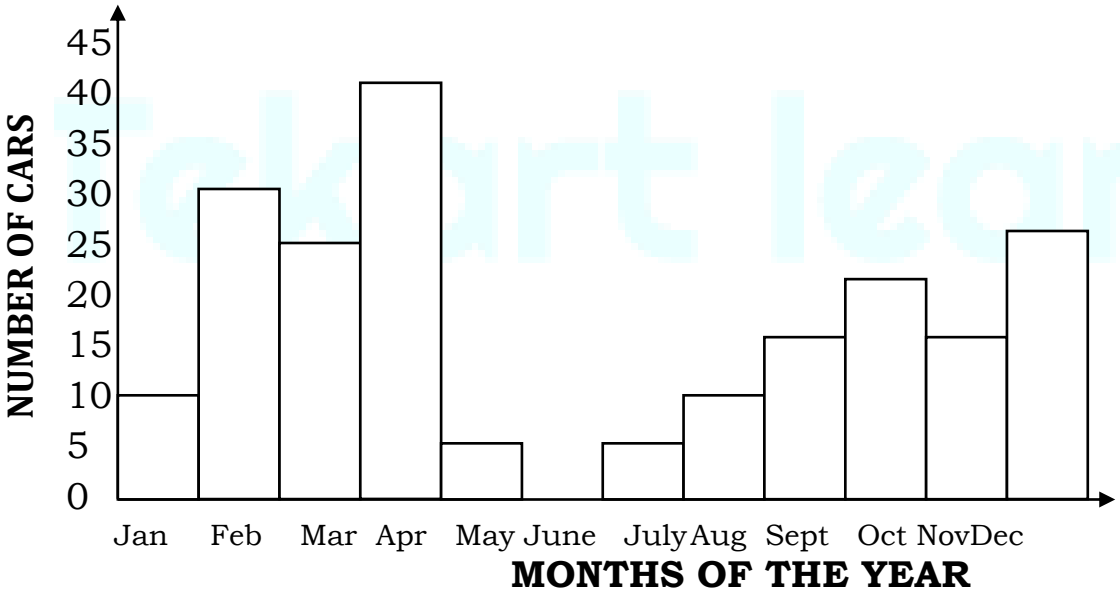
```
  3 5 pupils
- 1 5 pupils
  2 0 pupils
```

d) How many pupils came on the first 3 days?

Mon	15
Tue	20
Wed	+35
	70 pupils

Exercise:

1. The graph below shows the number of cars sold by Mr. Nyonjo at his garage.



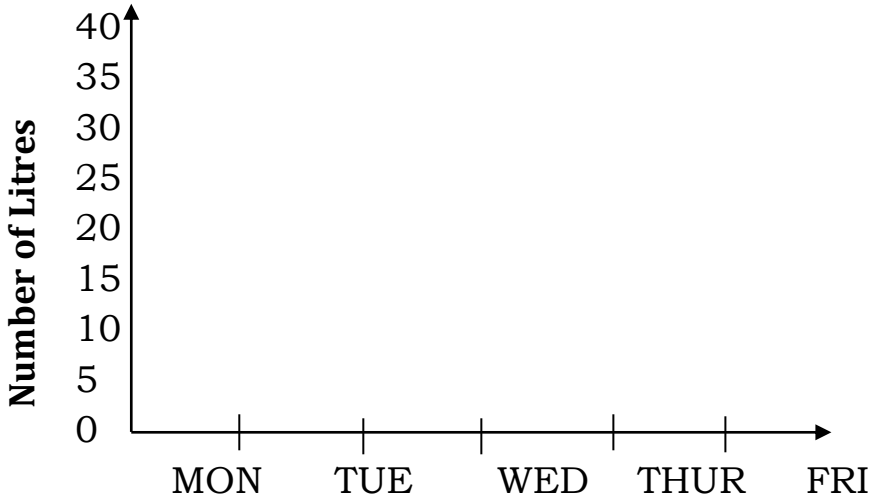
Questions:

a) How many cars were sold in March?
b) In which month did Nyonjo sell no car?
c) Which month had the highest number of cars sold?
d) How many more cars were sold in January than in May?
e) How many cars were sold in the first six months of the year?
f) How many cars were sold in the twelve months?

2. A school gives out milk to children as shown below.

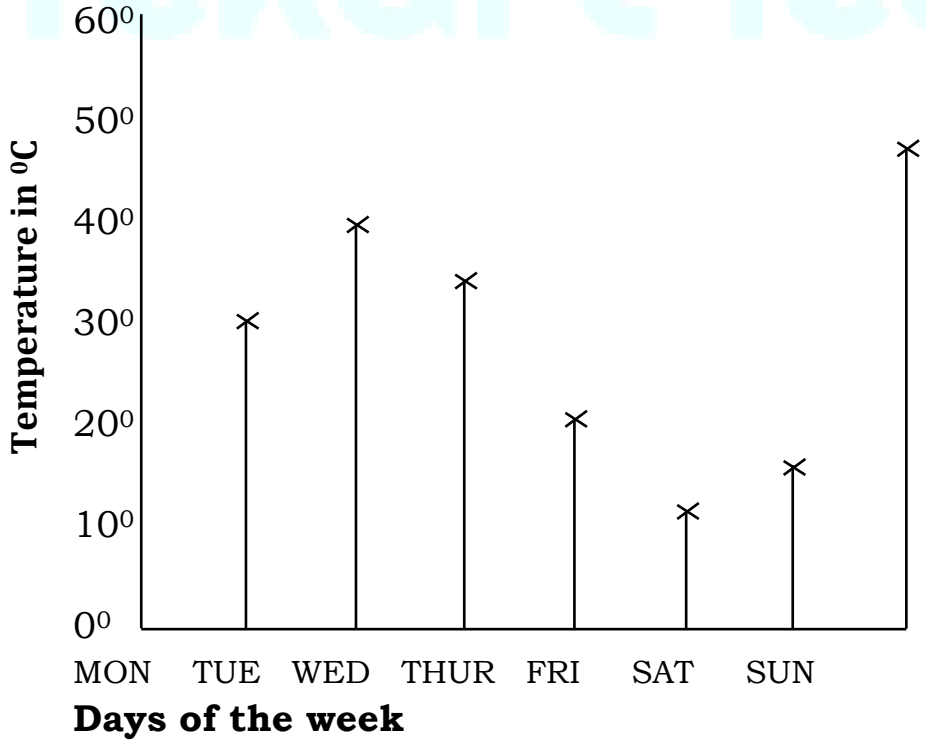
Day	MON	TUE	WED	THUR	FRI
Number of litres	20	15	40	10	25

Use the table above to complete the graph below.



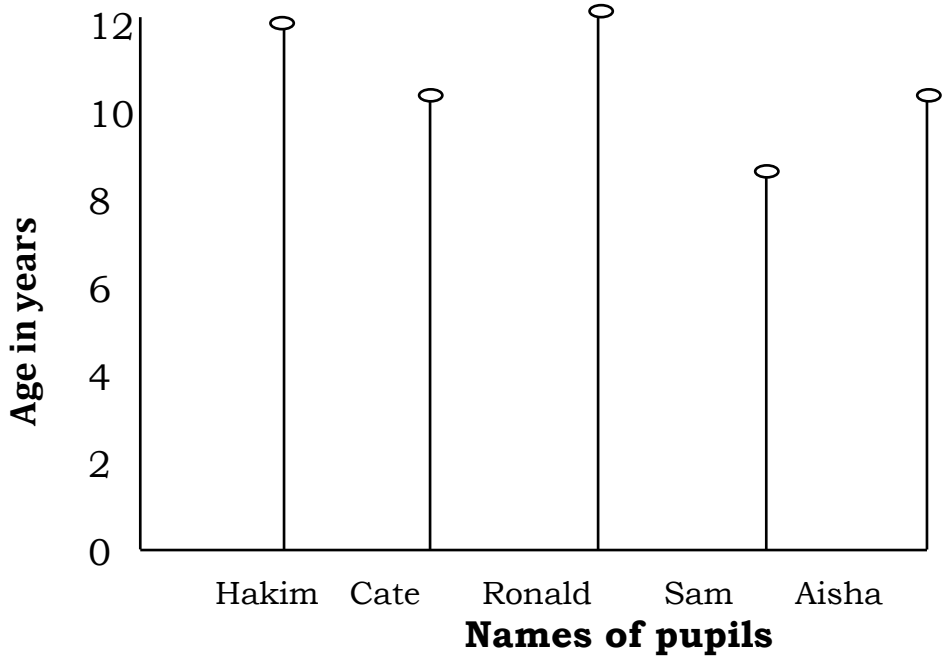
LINE GRAPH

1. The graph below shows the temperature on different days of the week.



a) Which was the hottest day of the month?
b) What was the temperature on Tuesday?
c) What is the total temperature on the first three days of the week?
d) What was the maximum temperature during the week?
e) What was the minimum temperature during the week?

2. The graph below represent the age of 5 pupils. Study it and answer the questions that follow.



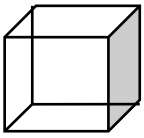
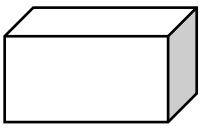
Questions

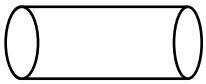
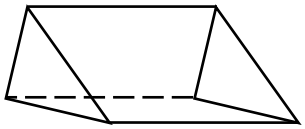
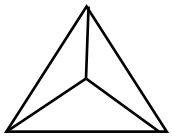
a) Name the pupils with the same age.
b) How old is the youngest pupil?
c) How old is Aisha?
d) Who is 10 years old?
e) How old is Ronald than Sam?

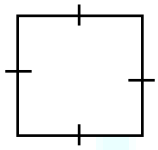
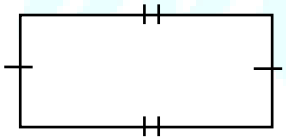
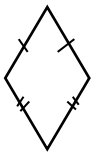
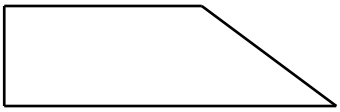
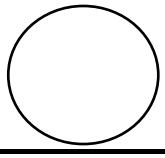
GEOMETRY

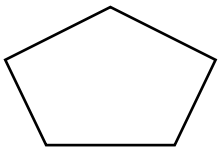
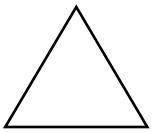
Solid shapes

These are shapes which have faces, edges, vertices (corners). These include; cone, cubes, cuboids, cylinder, triangular pyramid (tetrahedron), square or rectangular pyramid.

Geometric solid shapes	Name
	Cone / circular pyramid
	Cube / square prism
	Cuboid / rectangular prism

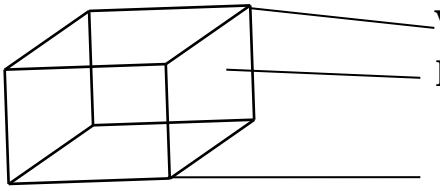
	Cylinder / circular prism
	Triangular prism
	Triangular pyramid /tetrahedron
	Rectangular and square pyramid

Other shapes	**Name**
	Square
	Rectangle
	Kite
	Rhombus
	Parallelogram
	Trapezium
	Circle

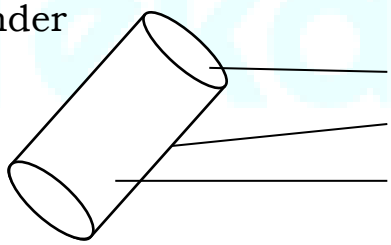
	Pentagon
	Hexagon
	Triangle

Naming parts of solid figures

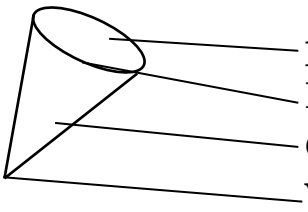
Cube



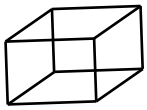
Cylinder

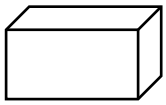
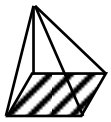


Cone



Activity

Solid shape	Name	No. of faces	No of vertices	No of edges
				
				

CIRCLE

Making a circle

Bending the stick

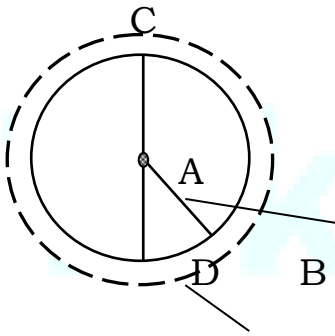
Fibre

By turning round a big toe

A pair of compasses

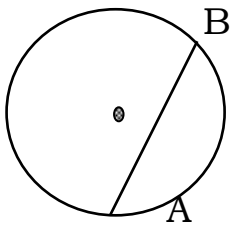
Parts of a circle

Naming diameter, radius and circumference.



AB is the radius

CD is the diameter



AB is not the diameter because it doesn't pass through the centre.

AB is called a chord.

Circumference

Is the distance around the circle.

A radius

Is a line which starts from the centre to the edge of the circle.

Diameter

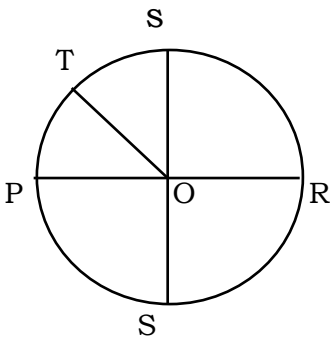
Is a straight line from one side of a circle to the other passing through the centre.

A chord

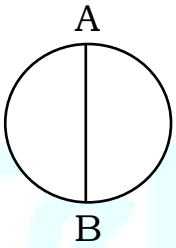
Is any straight line drawn across a circle.

Activity

1. Study the circle below.



a) Name the part of a circle marked O.
b) Name all the radius shown on the circle,
c) Name all the diameter you can see on the circle.

2. 

From the circle above line AB is called a diameter or a __

FINDING DIAMETER WHEN RADIUS IS GIVEN

Examples

1. Find the diameter of a circle whose radius is 5cm.

Diameter = Twice the radius
D = 2 r, where r = 5am
= 2 x r
= 2 x 5
D = 10cm

2. Complete the table below.

Radius (cm	6cm	4cm	1cm	12cm
Diameter (cm)	_____	_____	_____	_____

Where r = 6cm
D = 2r
D = 2 x r
D = 2 x 6 cm
D = 12 cm

Where r = 1 cm
D = 2r
D = 2 x r
D = 2 x 1cm
D = 2cm

Activity

1. Find the diameter of a circle whose radius is;
   a) 5cm
   b) 8cm
   c) 11cm
2. **Study and complete the table below**.

Radius	2cm	6cm	7cm	9cm	10cm	14cm	10cm
Diameter	____	____	____	_____	_____	_____	_____

FINDING RADIUS OF A CIRCLE WHEN DIAMETER IS GIVEN

Examples

1. Find the radius of a circle whose diameter is 8cm.

$$\text{Radius} = \frac{\text{Diameter}}{2} \text{ or } D \div 2$$

When d = 8cm

$$r = \frac{d}{2}$$

$$r = \frac{8\text{cm}}{2}$$

$$r = 4\text{cm}$$

2. Study the table below and answer the questions that follow.

Radius	____	____	____
Diameter	10cm	6cm	12cm

When Diameter is 12cm

$$r = \frac{\text{diameter}}{2}$$

$$r = \frac{12\text{cm}}{2}$$

r = 6cm

When Diameter is 6cm

$$r = \frac{d}{2}$$

$$r = \frac{6\text{ cm}}{2}$$

r = 3cm

Activity

1. Find the radius of a circle whose diameter is;
   a) 4cm
   b) 6cm
   c) 10cm
   d) 14cm
2. Study and complete the table below.

Radius	___	____	____	____	____
Diameter	8cm	16cm	20cm	24cm	30cm

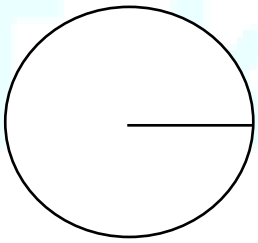
3. Study and complete the table below carefully.

Radius	2cm	___	6cm	_____	10cm
Diameter	____	4cm	_____	8cm	____

DRAWING CIRCLES

With different radii

Example:



Activity

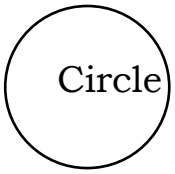
Draw circles of the following radii.

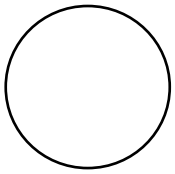
a) 2cm b) 5cm c) 3cm d) 1.5cm
e) 2.5cm f) 2.5 cm g) 1cm h) 4cm
i) 3.5cm

N.B:

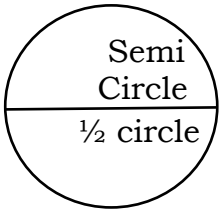
They will also measure the radii of circles given.

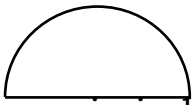
PARTS OF A CIRCLE





circular region

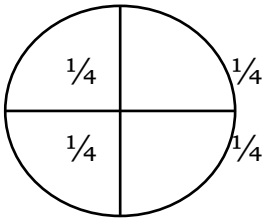


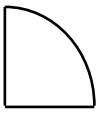


semi-circle

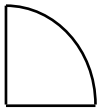


semi circular region





quarter circle
Quadrant

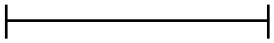


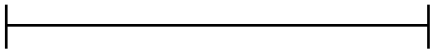
quarter

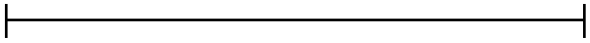
LINE SEGMENT

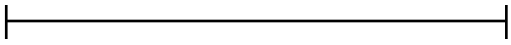
A line segment has two end points. E.g: 

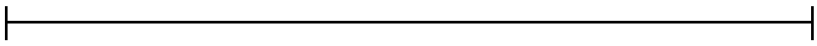
MEASURING LINE SEGMENTS

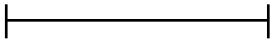
a) 

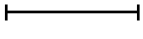
b) 

c) 

d) 

e) 

f) 

g) 

DRAWING LINE SEGMENTS WITH DIFFERENT LENGTH

Draw a line of;

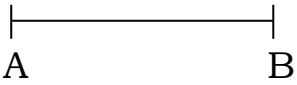
a) 4cm	b) 6cm	c) 8cm	d) 5cm
e) 4.5cm	f) 12cm	g) 2cm	h) 7.5cm

Naming lines and Angels

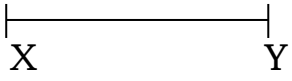
Lines are named according to the points through which they pass.



This is line PQ or $\overleftrightarrow{PQ}$

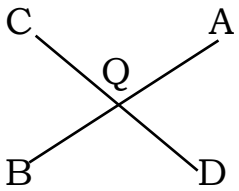


This is line AB or $\overleftrightarrow{AB}$



This is line XY or $\overleftrightarrow{XY}$

Study the angles formed below



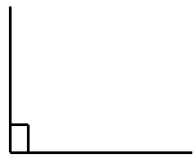
The point of intersection is only one and it is named with letter Q.

The angles formed are;

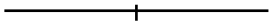
a) CQA or AQC
b) BQD or DQB
c) BQC or CQB
d) DQA or AQD

Naming the marked angles.

a) U



Angle _____

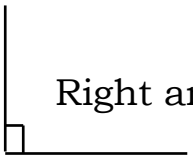


Angle _____

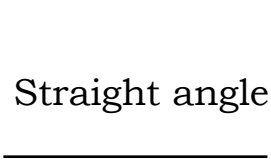
TYPES OF ANGLES

- Right angle
- Straight angle

Right angle add up to 90^0.



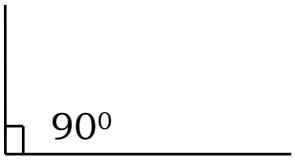
Straight angle add up to 180^0



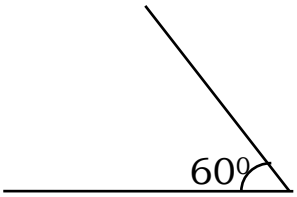
Drawing different angles using a protractor

Draw the following angles using a protractor.

a) 90^0



b) 60^0



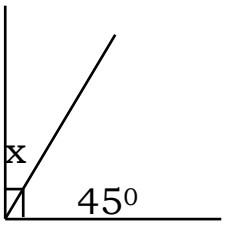
Activity

Draw the following angles.

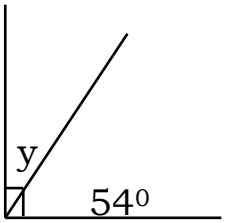
a) 45^0 b) 70^0 c) 60^0 d) 80^0
e) 120^0 f) 150^0 g) 30^0 h) 100^0

Finding the unknown angles

Examples



$X + 45^0 = 90^0$
$X + 45^0 - 45^0 = 90^0 - 45^0$
$X = 90^0 - 45_0$
$X = 45^0$

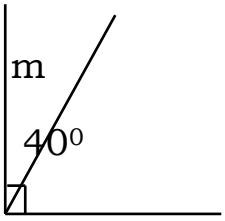


$y + 54^0 = 90^0$
$y + 54^0 - 54^0 = 90^0 - 54^0$
$y = 90^0 - 54^0$
$y = 36^0$

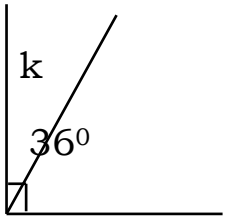
Exercise

Find the value of the missing angles.

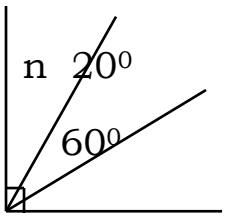
a)



b)



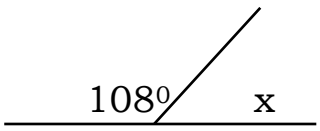
c)



Solving for the unknown angles

Examples

a)



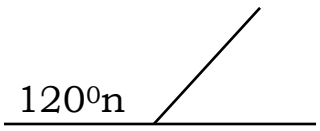
$x + 108^0 = 180^0$

$x + 108^0 - 108^0 = 180^0 - 108^0$

$x = 180^0 - 108^0$

$x = 72^0$

b)



$n + 120^0 = 180^0$

$n + 120^0 - 120^0 = 180^0 - 120^0$

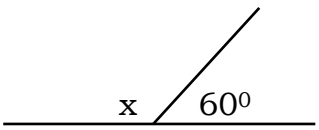
$n = 180^0 - 120^0$

$n = 60^0$

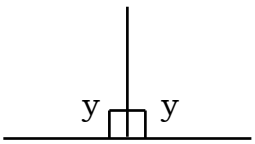
Exercises

Solve for the unknown angles.

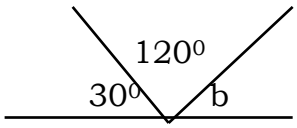
a)



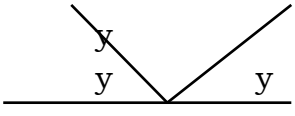
b)



c)

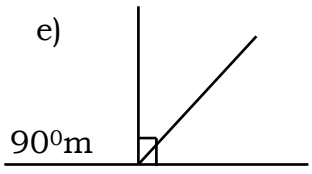


d)



45^0

e)



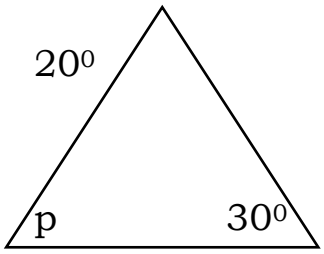
Contact: 0754895241/0783298434
Email: tekule@tekartlearning.com
Website: www.tekartlearning.com

ANGLES ON A TRIANGLE

The sum of angles on a triangle is always 180^0.

Examples

Find angle p.



$p + 20^0 + 30^0 = 180^0$

$p + 50^0 = 180^0$

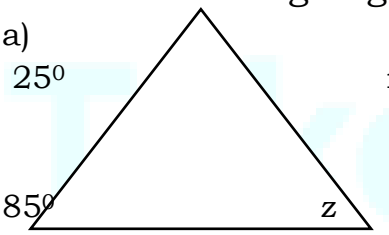
$p + \cancel{50^0} - \cancel{50^0} = 180^0 - 50^0$

$p = 130^0$

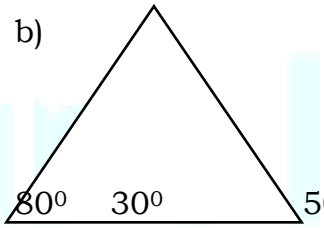
Activity

Find the missing angles.

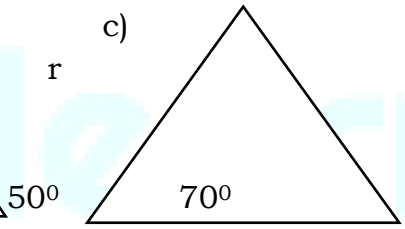
a)



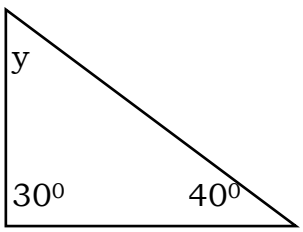
b)



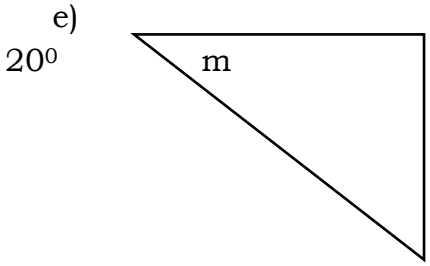
c)



d)



e)



TERM III
ALGEBRA
Writing in short

Examples

1. m + m + m
   = 2m + m
   = 3m
2. t + t + t + t + t
   = 2t + 2t + t
   = 4t + t
   = 5t
3. g + g + g + 2g
   (g +g) + (g + 2g)
   = 2g + 3g
   = 5g

Exercise

Write in short.

1. p + p =
2. l + l + l + l =
3. q + q + q + q =
4. m + m + m + m + m
5. d + d + d
6. w + w + w + w + w + w
7. e + e + e + e + e
8. h + h + h + h
9. y + y + y + y
10. 2y + y
11. z + z + z + z
12. a + a + a + a + a

Using letters for numbers

Examples

1. 2 balls + 2 balls
   = 4 balls

2. 1 pen + 1 pen + 1 pen + pen
   Let each pen be p.
   1p + 1p + 1p + 1p
   = 4p
   = 4pens
3. 3 mangoes + 1 mango + 7 mangoes
   Let m stand for mangoes
   3m + 1 m + 7m
   = 10 m
   = 10 mangoes

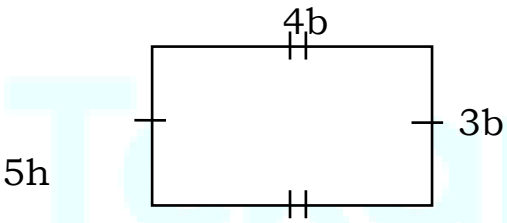
Activity

1. 2 bananas + 2 bananas
2. 4 cows + 10 cows
3. 2 dogs + 5 dogs
4. 9 cats + 5 cats
5. 5 eggs + 5 eggs
6. 12 pots + 8 pots
7. 15 frogs – 5 frogs
8. 1 tree + 2 trees + 1 tree + 6 trees
9. 22 houses – 12 houses
10. 12 ducks + 18 hens

Using letter to find perimeter of different figures

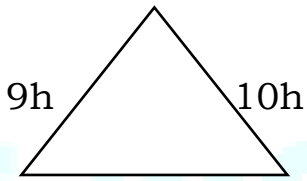
Examples

1.



P = s + s + s + s
= 4b + 3b + 4b + 3b
= 7b + 7b
= 14b

2.



P = s + s + s
= 5h + 9h + 10h
= 14h + 10h
= 24h

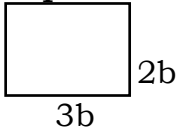
3. Simplify: 5b + 4b
= 5b + 4b
= 9b

4. 3d + 4d + 3d
= 3d + 4d + 3d
= 10d

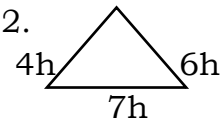
Activity

Find the perimeter of the following figures.

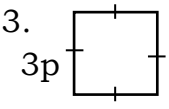
1.



2.



3.



Simplify the following.

4. 10y + 4y
5. 15m + 6m + m
6. 8k + 2k + 3k
7. 10z + 2z + z
8. 3x + 8x
9. m + 2m + m

Collecting like terms

Examples

1. Collect like terms a + a + b + b
   a + a + b + b
   2a + 2b

2. 2a + 2b + a + b
   2a + a + 2b + b
   3a + 3b

3. x + y + x + 3y + x
   x + x + x + y + 3y
   3x + 4y

4. m + 3y + m + k
   m + m + 3y + k
   2m + 3y + k

Activity

1. 2a + 2a + 3b + 3b
2. b + a + b + a
3. 2y + y + y + x
4. 4k + 7h + 3h + 4k
5. 2k + 4m + k + 3d + m
6. b + c + b + d
7. x + 2y + y + 3x
8. 9c + 8c + 2p + p
9. 4z + 4m + z + 6m
10. f + t + f + 3t + f
11. 2x + y + x + y
12. 4z + 8y + 2z + 3x
13. 6p + 5t + 2t + 8t
14. 6x + 2y + 3x + 5y

More about collecting like terms

Examples

1. Simplify: 5m – 3m
   = 2m

2. 4z – z + 3p – p
   3z + 2p

3. 9d + 4c – 3c
   9d + c

4. 5a + a – m
   6a – m

Activity

Simplify the following

a) 7k – 2k
b) 4k – k + n
c) 8d – 4d
d) 6x – 6y + y
e) 10p – p
f) 12p – p + k
g) 6n – 5n
h) 6a + a – m
i) 4f – 2f + k
j) 2y + 3y – z
k) 8p + 2p – p
l) 8t + 4x – 6t + x

Finding unknowns

- Solving equations with one unknown.
- An equation is an algebraic expression with an equal sign between.
  E.g: x + 3 = 5 is an equation and x is unknown.

Examples

X + 3 = 10
X + 3 – 3 = 10 – 3
X = 10 – 3
X = 7

2. 4 + x = 15
   4 – 4 + x = 15 – 4
   x = 15 – 4
   x = 11

Activity

Solve the following equations

a) n + 6 = 13
b) k + 9 = 17
c) n + 8 = 12
d) m + 12 = 18
e) n + 4 = 9
f) d + 7 = 24
g) m + 5 = 10
h) 7 + k = 19
i) x + 7 = 19
j) 10 + x = 36
k) a + a = 16
l) 9 + m = 18

Word problem

Examples

1. I think of a number, add 7 to it and the result is 10. What is the number?
   Let the number be y.
   Add7 to it:y + 7
   The result is 10: y + 7 = 10
   y + 7 = 10
   y + 7 – 7 = 10 – 7
   y = 10 – 7
   y = 3
   The number is 3
2. What number when added to 5 gives 11?
   Let the number be m.
   Add to 5: m + 5
   Gives 11: m + 5 = 11
   m + 5 = 11
   m + 5 – 5 = 11 – 5
   m = 11 – 5
   m = 6
   The number is 6
3. Seven is added to a number and the result is 15. Find the number.
   Let the number be p.
   Seven is added to a number: 7 + p
   The result is 15: 7 + p = 15
   7 + p = 15
   7 – 7 + p = 15 – 7
   p = 15 – 7
   p = 8
   The number is 8

Exercise

1. I have a number, I add 5 to it and the result is 29. What is the number?

2. When I add 5 to a number, the result is 10. What is the number?
3. Think of a number and add 3 to it. The answer is 20. What is the number?
4. I think of a number add 5 to it and the answer is 12. Find the number.
5. What number when added to 16 gives 30?

Subtraction

Examples

1. Solve: x – 9 = 5
   x – 9 = 5
   x – 9 + 9 = 5 + 9 (add 9 to each side)
   x = 5 + 9
   x = 14

2. Work out: q – 20 = 50
   q – 20 + 20 = 50 + 20
   q = 50 + 20
   q = 70

Activity

Solve the following equation.

a) p – 4 = 9	b) p – 8 = 13	c) k – 3 = 12
d) q – 12 = 17	e) d – 8 = 13	f) m – 20 = 30
g) c – 9 = 24	h) z – 45 = 35	i) k – 12 = 21

Word problem

Examples

1. When 3 is subtracted from a number the answer is 10. What is the number?
   Let the number be y.
   3 is subtracted from a number: y – 3
   The answer is 10: y – 3 = 10
   y – 3 = 10
   y – 3 + 3 = 10 + 3
   y = 10 + 3
   y = 13

2. I think of a number, subtract 4 from it and the result is 45. Find the number.
   Let the number be p
   Subtract 4 from it = p – 4
   The results is 45: p – 4 = 45

   p – 4 = 45
   p -4 + 4 = 45 + 4
   p = 45 + 4
   p = 49

Exercise

1. I think of a number, when I take away three, the number is 7. What is the number?
2. When 7 is subtracted from a number, the number is 13. What is the number?
3. I have a number, take away 21 from the number, the result is 6. What is the number?
4. 30 is subtracted from a number and the answer is 25. Find the number.
5. I think of a number, subtract 12 from it and the answer is 2. Find the number.

Multiplication

Examples

1. Solve: 3 x q = 12
   3q = 12
   $\frac{3q}{3} = \frac{12}{3}$
   q = 4

2. m x 7 = 14
   $\frac{7m}{7} = \frac{14}{7}$
   $m = \frac{14}{7}2$
   m = 2

Exercise

Work out the following.

a) 4 x m = 18
b) k x 7 = 63
c) 6 x t = 24
d) f x 10 = 90
e) 7 x p = 42
f) 5 x c = 65
g) 8 x q = 48
h) 8 x g = 96
i) r x 5 = 30

Word problem

Examples

1. A number is multiplied by 10 and the result is 30. What is the number?
   Let the number be p.
   Multiplied by 10: p x 10
   The result is 30: p x 10 = 30
   p x 10 = 30
   $\frac{10p}{10} = \frac{30}{10}$
   p = 3
   The number is 3

2. 5 is multiplied by a number and the result is 120. What is the number?
   Let the number be m.
   5 multiplied by it: 5 x m
   The result is 120: 5 x m = 120
   5 x m = 120
   5m = 120
   $\frac{5m}{5} = \frac{120}{5}$
   m = 24

Exercise

1. I think of a number multiplied by 3 the result is 9. What is the number?
2. A number is multiplied by 9 and the result is 90. What is the number?
3. A number is multiplied by 6 and the result is 24. Find the number.

4. 8 is multiplied by a number and the result is 48. What is the number?
5. I have a number, when 1 multiply it by 6 the answer is 36. Find the number.
6. 5 is multiplied by a certain number gives 60. Find the number.

Division

Examples

1. Solve: $m \div 6 = 8$

$\frac{m}{6} = 8$

$\cancel{6} \times \frac{m}{\cancel{6}} = 8 \times 6$

$m = 48$

2. Solve: $36 \div x = 9$

$\cancel{x} \times \frac{36}{x} = 9 \times x$

$36 = 9 \times x$

$36 = 9x$

$\frac{\cancel{9}x}{\cancel{9}} = \frac{36}{9}$

$x = 4$

Activity

Solve the following.

a) $m \div 3 = 9$ b) $30 \div m = 5$ c) $h \div 9 = 6$

d) $48 \div y = 6$ e) $m \div 2 = 7$ f) $35 \div y = 5$

g) $d \div 5 = 9$ h) $k \div 8 = 8$ i) $24 \div x = 8$

More about division

Examples

1. Work out: $\frac{m}{6} = 8$

$6 \times \frac{m}{6} = 8 \times 6$

$m = 8 \times 6$

$m = 48$

2. Solve: $\frac{36}{x} = 9$

$x \times \frac{36}{x} = 9 \times x$

$36 = 9 \times x$

$\frac{36}{9} = \frac{9x}{9}$

$4 = x$

Therefore x = 4

Activity

Work out the following

a) $\frac{t}{2} = 13$ b) $\frac{p}{7} = 7$ c) $\frac{n}{11} = 4$

d) $\frac{k}{7} = 5$ e) $\frac{b}{11} = 10$ f) $\frac{24}{x} = 8$

More about division

Examples

1. Solve: $7x = 35$

$\frac{7x}{7} = \frac{35}{7}$

x = 5

2. Solve: $9z = 72$

$\frac{9z}{9} = \frac{72}{9}$

z = 8

Exercise

Solve the following

a) $3x = 42$ b) $8f = 32$ c) $7p = 14$

d) $4m = 28$ e) $8d = 24$ f) $5k = 25$

g) $6x = 72$ h) $6x = 30$ i) $7p = 63$

j) $3k = 21$ k) $10a = 40$ l) $11k = 66$

m) $13p = 26$ n) $15t = 30$ o) $12d = 108$

Word problem

Examples

1. A number is divided by 3 and the result is 10. Find the number.

Let the number be p.
Divided by 3: p ÷ 3

The result is 10: p ÷ 3 = 10
P ÷ 3 = 10
$\frac{p}{3} = 10$
$3 \times \frac{p}{3} = 10 \times 3$
p = 30
The number is 30

2. 36 is divided by a number and the result is 18. What is the number?
Let the number be m.
36 is divided by it: 2 ÷ m
The result is 18: 36 ÷ m = 18
36 ÷ m = 18
$\frac{36}{m} = 18$
$\cancel{m} \times \frac{36}{\cancel{m}} = 18 \times m$
$\frac{36}{18} = \frac{\cancel{18}}{\cancel{18}} m$
2 = m
m = 2

Exercise

1. 21 divided by a number gives 7. What is the number?
2. 1 think of a number divide it by 5 and the result is 2. What is the number?
3. I have a number, when I divide it by 9 the result is 6. What is the number?
4. 30 is divided by a number and the result is 5. Find the number.
5. P is divided by 2 and the result is 7. What is the value of p?

Substitution

Substitution means replacing.

Examples

1. If g = 4, find 3 x g

3 x g
= 3 x 4
= 12

2. If m = 5 , n = 2, find;

a) m – 2
5 – 2
= 3

b) m + n
5 + 2
= 7

c) 2m
2 x m 5
= 2 x 5
= 10

d) $\frac{3}{5}$ m
= $\frac{3}{5}$x5 /
= 3 x 1
= 3

Activity

If b = 8, find the value of;

a) 2b
b) 3b
c) ½ b
d) b + 1
e) 12 – b
f) $\frac{b}{2}$
g) $\frac{3b}{2}$
h) 2b + 1
i) b x b

More about substitution

Examples

If m = 2, n = 5 , z = 10, find the value of;

a) m + n + z
2 + 5 + 10
= 7 + 10
= 17

b) z + n – m
10 + 5 – 2
= 15 – 2
= 13

c) m n
m x n
= 2 x 5
= 10

d) ½ z
½ x z
= ½ x 10
= 5

e) $\frac{2}{5}z$
= $\frac{2}{5}$ x 10
= 2 x 2
= 4

f) $\frac{z}{m}$
$\frac{10}{2}$
= 5

Activity

1. Given a = 2 , b = 3 , c = 4, find the value of;

a) a + b + c
b) c + a
c) a + c – b

d) a + b – c e) a x b f) b c

g) $\frac{c}{a}$

2. Given p = 4 , z = 8 , n = 10, find the value of;

a) P z b) $^2/_5$ n c) $\frac{p+z}{2}$

d) 2p + 2n e) 3z – 2p f) pz – n

g) $\frac{2n}{p}$

More about unknowns

Examples

1. Solve: 2y + 2 = 20

   2y + 2 – 2 = 20 – 2

   2y = 20 – 2

   2y = 18

   $\frac{2y}{2} = \frac{18}{2}$

   y = 9

2. Solve: 3p – 6 = 9

   3p – 6+6 = 9 + 6

   3p = 15

   $\frac{3p}{3} = \frac{15}{3}$

   p = 5

Activity

Solve the following equations

a) 2y + 4 = 20 b) 2y + 2 = 8 c) 5y + 5 = 20

d) 2y – 2 = 2 e) 6y + 6 = 36 f) 3p – 1 = 5

g) 5m – 2 = 8

MEASURES (MONEY)

Addition of money

Money is a medium of exchange.

Examples of money

Sh. 100, sh. 200 , sh. 300 , sh. 500 , sh. 100o, sh. 5000 e.t.c

Examples

1. Add sh. 170 + sh. 250

```
    Sh. 170
+   sh. 250
    sh. 420
```

2. John had sh. 4500 and Mary had sh. 3750. How much money do the two children have altogether?

```
    Sh. 4500
+   Sh. 3750
    Sh. 8250
```

Activity

1. Add: Sh. 190 + Sh. 260

2. Add: Sh. 380 + Sh. 1490

3. Add: Sh.4540 + Sh. 3680

4. Add: Sh. 1780 + Sh. 2640

5. I had sh. 480 and I was given sh. 1260. How much do I have altogether?
6. A porter earns sh. 1500 in the morning and sh. 2700 in the afternoon. How much does the porter earn altogether?
7. A mother bought meat for sh. 2500 and a bunch of matooke for sh. 4550. How much did she spend altogether?
8. Alice's school fees is sh. 7850 and Jane's school fees is sh. 1890. How muchmoney do the two pupils pay altogether?

Changing shillings to cents

A cent is a small unit of shillings
1 shilling = 100cents
Cents can also be written as "Cts"

Examples

1. Change 3 shilling to cents.
   1 sh = 100cts
   3 sh = (3 x 100)cts
   = 300cts

3sh = 300 cts

2. Write 250sh in cents.
   1 sh = 100cts
   250sh = (250 x 100)cts
   250sh = 2500cts

Activity

Change the following shillings to cents.

a) Sh. 25 b) sh. 8 c) sh. 60
d) sh. 150 e) sh. 100 f) sh. 36
g) sh. 1700 h) sh. 1256 i) sh. 9900

Changing cents to shillings

Examples

1. Change 400 cents to shilling
   100cents = 1sh
   400cts = (400 ÷ 100)sh
   $= \frac{400}{100}$ sh
   = 4 sh
   Therefore; 400cts = sh.4
2. Change two thousand cents to shillings.
   100cts = 1sh
   2000cts = (2000 ÷ 100)sh
   $= \frac{2000}{100}$ sh
   = 20sh
   Therefore; 2000cts = sh. 20

Activity

Change the following cents to shillings.

a) 200cts b) 655cts c) 1260cts
d) 400cts e) 900cts f) 1780 cts
g) 380 cts h) 770cts i) 1980cts
j) 2500cts

Subtraction of money

Examples

1. Subtract sh. 9000 – sh. 2000

   Sh. 9000
   - Sh. 2000
   Sh. 7000

2. Agaba had a ten thousand shilling note and he spent sh. 2500 on transport. What was his change?

   Sh. 10000
   - Sh. 2500
   Sh. 7500

Activity

a) Find how much change

I have the following notes	I spent	My change
Sh. 5000	Sh. 2500	__
Sh. 8000	Sh. 4050	__
Sh. 10,000	Sh. 6550	__
Sh. 10,000	Sh. 8500	__
Sh. 20,000	Sh. 4955	__

b) How much change do I get if I spend 6500 from 20,000/=?

c) Naigino had sh. 5000. If she spends sh. 3750 on Vaseline, what is her change?

Multiplication of money

Examples

1. Multiply: sh. 896
   x 6
   Sh. 5376

2. Find the cost of 5 books if one book costs sh. 320.

   1 book costs 320/=

   5 books will cost sh. 320

   x 5
   Sh. 1600

Activity

1. Work out;

a) Sh. 945 x 2 = _____

b) sh. 1500 x 9 = _____

c) sh. 490 x 5 = _____

2. The cost of 1 book is sh. 370. Find the cost of 10 books.
3. How much will you pay for;
   a) 2 packets of wheat flour at sh. 2550 a packet.
   b) 2kg of rice at sh. 950 a kg.
   c) 2 tins of margarine at sh. 2100 a tin.
   d) 4 cartons of soap at sh. 6150 a carton.
   e) 6 tins of kimbo at sh. 2900 a tin
   f) The cost of one loaf of bread is sh. 1600. Find the cost of 3 loaves of bread.

Division of money

Example

A shopkeeper sold 4 crates of soda for sh. 7200. What was the cost of one crate of soda?

Cost of 4 crates = sh. 7200

Cost of 1 crate = $4\overline{)7200}$ = 1800

1 x 4 = 4
- 4
32
8 x 4 = 32
- 32
0
0 x 4 = 0
- 0
0
0 x 4 = 0
- 0

The cost of 1 crate of soda is sh. 1800

Activity

1. Divide sh. 128000 among 4 girls. How much will each girl get?
2. A farmer sold 8 bags of coffee for sh. 40000. What was the price of one bag?
3. A shopkeeper sold 4 loaves of bread for sh.7200. What was the cost of one loaf of bread?
4. Agutu bought 9 litres of petrol for sh. 14850. What was the cost of petrol per litre?

PROFIT AND LOSS

Finding profit

What is profit?

Profit is the money you make in a business or by selling things especially after paying the costs involved.

Example:

Abdul bought a shirt at sh. 800. He later sold it at sh. 1000. What is his profit?

Profit = selling price – Buying price (cost price)
= SP- CP

Selling price	=	sh. 1000
Cost price	=	- sh. 800
Profit	**=**	**200**

Activity

1. A man bought a goat at sh. 35000 and sold it at sh. 42000. How much was his gain?
2. Jermaine bought a pen at sh. 500 and sold it at sh. 700. What was his profit?
3. Belle sold a book at sh. 900. She had bought it at sh. 750. What was her profit?
4. Aidah bought a packet of sugar at sh. 1500 and sold it at sh. 20000. What was her gain?
5. The price of a dress was sh. 12000. It was later sold at sh. 15000. What was the profit?

Finding loss

What is a loss?

A loss is money that has been lost by the business or an organization.

Example

David bought a book at sh. 1200 and sold it at sh. 800. What was his loss?

Loss = cost price – selling price
Loss = CP – SP

Buying price	=	sh. 1200
Selling price	=	- sh. 800
Loss	**=**	**sh. 400**

Activity

1. Annet bought a geometry set at sh. 2800 and sold it at sh. 220. What was her loss?
2. What was the loss on a commodity bought at sh. 2000 and sold it at 1700/=
3. A box of kimbo is bought at sh.3500 and is sold at sh. 2900. What was the loss?
4. John bough a pen at sh. 1800 and sold it at sh.1300. What was his loss?
5. Dr. Pius bought a tin of panadol at sh. 12000 and sold it at sh. 9500. What was his loss?

POSTAGE RATES

Study the table

Articles	**Destination**	**Charge**
Letter	Uganda East Africa Africa Europe Asia America	Sh. 150 Sh. 400 Sh. 500 Sh. 500 Sh. 500 Sh. 550
Small parcels (air)	Uganda East Africa Africa Europe Asia America	Sh. 1200 Sh. 10,000 Sh. 11000 Sh. 16000 Sh. 22500 Sh.8450
Aerogrammes		Sh. 300@
Post cards		Sh. 300@

Questions about the table

Example

Joseph sends 2 letters to Kenya and 3 letters to Tanzania. How much will he pay altogether?

For 2 letters to Kenya will pay sh. 400 x 2 = 800/=

For 3 letters to Tanzania will pay sh. 400x 3 = + 12000/=

Joseph will pay 2000 shillings 2000/=

Activity

1. Ndugga set 2 letters to Europe and bought 5 post cards. What was his total bill?
2. If a lady sends 4 letters to Asia and a small parcel to America. Calculate her total bill.
3. How much money will Kato pay if he sends 3 letters to Mbarara and 2 letters to Euroope?
4. Atim bought 10 post cards and 15 aerogrammes. How much money did he use?

MEASURES (TIME)

Changing hours to minutes

Examples

1. Change 4 hours to minutes.

   1 hour = 60 minutes
   4 hours = (4 x 60)
   = 240 minutes

2. Change 3 ¼ hours to minutes.

   3 ¼ hours = (3 + ¼)hours
   1 hour = 60mins
   3 hours = 3 x 60 = 180 minutes
   ¼ hours = ¼ x 60 = 15 minutes
   3 ¼ hours = (180 + 15) minutes
   = 195 minutes

Task

Change the following hours to minutes.

a) 2 hours b) 5 hours c) 3 ½ hours
d) ½ an hour e) 16 hours f) 4 ¾ hours
g) 10 hours h) 11 hours i) 1 ¼ hours
j) 30 hours
k) A boy walked for 1 ½ hours. How much time was this in minutes?

Changing minutes to hours

1. Write 60 minutes in hours.

   60 min = 1
   60 | 60
   60
   - -
   60min = 1 hour

2. Write 70 minutes in hours.

70 min = 1

60 | 70

60

10

70 min = 1 hour 10 minutes

Activity

Write the following in hours and minutes.

a) 120 minutes b) 100 minutes c) 130 minutes

d) 90 minutes e) 80 minutes f) 200 minutes

g) 110 minutes h) 150 minutes

i) a lesson took 140 minutes. How long was the lesson in hours?

j) A machine takes 140 minutes to wash 70 shirts. How long is this in hours?

Addition of time

Examples

1. Work out:

	Hrs	Min
	3	40
+	4	30
	8	10

40 + 30 = 70 min

1 hr = 60 min

70 ÷ 60 = 1 rem 10

2.

	Hrs	Min
	1	50
	2	15
+	3	30
	7	35

50 + 15 + 30 = 95min

1 hr = 60min

95 ÷ 60 = 1 rem 35

Activity

Add the following

a)

Hrs	Min
1	30
+3	35

b)

Hrs	Min
6	35
+7	46

c)

Hrs	Min
4	15
+3	40

d)

Hrs	Min
4	30
+ 3	50

e)

	Hrs	Min
	2	25
	1	35
+	3	30

f)

	Hrs	Min
	4	05
	5	45
+	1	30

Subtraction of time

1. Work out the following.

a)

	Hrs	Min
	18	30
-	6	05
	12 hr	25 min

b)

	Hrs	Mins
	3	25
-	1	45
	1 hr	40min

2. Timothy spent a total of 5 hours and 20 minutes at school. He played 1 hour 30 minutes. For how long did he stay in class?

		Hrs	Min
Total time at school		5	20
Time spent playing	-	1	30
Time in class		3hrs	50min

Activity

1. Subtract the following.

a)

	Hrs	Min
	5	48
-	1	15

b)

	Hrs	Min
	6	25
-	3	40

2. A party lasted 6hours 30 minutes. If 1 hour 45 minutes were used to secure food, how long did the other events take?

Multiplication of time

Examples

Work out;

a)

Hrs	Min
2	25
x	3
7	15

3 x 25 = 75

75 ÷ 60 = 1 rem 15

b)

Hrs	Min
7	30
x	5
37	30

5 x 39 = 150
150 ÷ 60 = 2 rem 30

Activity

a)

Hrs	Min
3	10
x	4

b)

Hrs	Min
2	15
x	4

c)

Hrs	Min
3	11
x	5

d)

Hrs	Min
1	45
x	2

Division of time

Examples

1. Divide 9 hours 30 mins by 3

	Hrs	Min
	3	10
3	9	30
	9	30

2. Divide 24 hours 40 min by 8

	Hrs	Min
	3	05
8	24	40
	24	40

Activity

a)

	Hrs	Min
4	12	48

b)

	Hrs	Min
3	6	15

c)

	Hrs	Min
9	9	45

TIME IN A.M AND P.M

a.m means - ant – meridian
Ante – meridian means before midday.
We use "A.M for morning time only.
P.M means post meridian
The time after noon is post meridian or p.m.
A day starts at 12 midday.

Activity
Complete the following tables

After mid night	1 hr	3 hrs	5 hrs	6 hrs	9 hrs	12 hrs
Time as a.m	1:00am	___	___	6:00am	___	___

After noon	1 hr	3 hrs	7 hrs	9 hrs	11 hrs	12 hrs
Time as p.m	1:00am	___	___	___	___	Mid night

Finding time in A.M and P.M

Examples

1. Express 6 o'clock in the morning using a.m or p.m
   6 o'clock in the morning is 6:00am

2. Express 8 o'clock in the evening using a.m or p.m
   8'oclock in the evening is 8:00pm

Activity

Write the following time in a.m or p.m
1. The time when the first lesson begins at 8 o'clock.
2. The time when you have lunch at 1 o'clock.
3. What time is a half past 3 o'clock in the afternoon?
4. The time when we play games at 4 o'clock.
5. The time you go to sleep at 8 o'clock.

Finding duration

Examples

Hassan started walking from his home at 7:15am and reached school at 8:15am. How long did it take him?

Reached school at	8 : 15
Started walking at	- 7 : 15
He took	1 : 00 hr

Hassan took 1 hour

Activity

1. A mathematics lesson started at 8:15am and ended at 9:35am. How long did it take?
2. The baby slept at 1:15am and woke up at 3:00pm. How long did it take sleeping?
3. A concert started at 4:30pm and ended at 10:20pm. How long was the concert?
4. Joselyne read a newspaper from 6:30pm to 7:25pm. How long did she take reading the news paper?
5. An examination started at 8:45am and ended at 11:am. How long did it take?

Note:

Hours, Days, Weeks, Months and years

60 minutes	=	1 hour
24 hours	=	1 day
7 days	=	1 week
14 days	=	1 fortnight (2 weeks)
4 weeks	=	1 month
52 weeks	=	1 year
12 months	=	1 year

Hours, Days and weeks

Changing hours to days

Example

1. How many days are there in 72 hours?

24 hours make 1 day

1 hour make $\frac{1}{24}$ day

72 hours make $\frac{1}{24}$ day x $\frac{72^{3}}{1}$ ~~hours~~ ~~hours~~

= 3 days

Activity

How many days are there in;

a) 48 hours b) 216 hours c) 60 hours
d) 240 hours e) 120 hours f) 144 hours

Changing days to hours

Example

How many hours are there in 5 days?
In one day there are 24 hours
In 5 days there are 24 x 5 = 120 hours
In 5 days there are 120 hours

Activity

There are 24 hours in 1 day. How many hours are there in;

a) 4 days b) 6 days c) 10 days
d) 13 days e) 15 days f) 17 days
g) 19 days h) 21 days i) 24 days
j) 30 days k) 92 days l) 50 days

Changing weeks to days

Examples

1. 1 week has 7 days
   How many days are there in 8 weeks?
   1 week = 7 days
   8 weeks = (8 x 7) days
   = 56 days

2. How many days are there in 12 weeks?
   1 week = 7 days
   12 weeks = (12 x 7) days
   = 84 days

Activity

How many days a re there in;

a) 3 weeks b) 7 weeks c) 10 weeks
d) 12 weeks e) 15 weeks f) 20 weeks
g) 24 weeks h) 30 weeks i) 35 weeks
j) 42 weeks k) 49 weeks l) 50 weeks

Changing days to weeks

Examples

1. How many weeks are there in 63 days?
   7 days make 1 week
   63 days make $^{63}/_{7}$ or $63 \div 7$
   = 9 weeks
2. How many weeks are in 105 days?
   7 days = 1 week
   105 days = $^{105}/_{7}$ or $105 \div 7$
   = 15 weeks

Activity

How many weeks are there in;

a) 21 days b) 35 days c) 49 days
d) 70 days e) 910 days f) 91 days
g) 315 days h) 707 days i) 637 days

Addition of days and weeks

Examples

1. Work out;

Weeks	Days	
1	3	3 + 2 = 5
+2	2	1 + 2 = 3
3	5	

2.

Weeks	Days	
5	5	5 + 6 = 11
+	4	6 11 ÷ 7 = 1 rem 4
10	4	1 + 5 + 4 = 10

Assignment

a)

Weeks	Days
2	4
+1	5

b)

Weeks	Days
12	6
+4	5

c)

Weeks	Days
9	5
+ 2	3

d)

Weeks	Days
20	4
+ 11	3

Subtraction of days and weeks

Example

1. Work out:

	Weeks	Days	
	3	2	(2 + 7) – 5
-	1	5	9 – 5 = 4 days
	1	4	(3 – 1) – 1
			2 – 1 = 1 week

2.

	Week	Days	
	6	0	(0 + 7) - 6
-	3	6	7 – 6 = 1
	2	1	(6 – 1) - 3
			5 – 3 = 2

Activity

Work out the following.

a)

	Wks	Days
	4	3
-	1	4

b)

	Wks	Days
	8	2
-	3	5

c)

	Wks	Days
	12	1
-	8	5

d)

	Wks	Days
	7	4
-	2	6

Ordinary year and leap year

- An ordinary year has got 365 days.
- A leap year has got 366 days.
- An ordinary year gives a remainder when divided by 4.
- A leap year gives no remainder when divided by 4.

The days of the months are;

January	31 days
February	28/29 days
March	31 days
April	30 days
May	31 days
June	30 days
July	31 days
August	31 days
September	30 days
October	31 days
November	30 days
December	31 days

In the month of February, if the number of days are 28 then that year is an ordinary year and 29 days is a leap year.

MEASURES (LENGTH)

Changing Metres(M) to centimeters (CM)

Examples

1. Change 3 metres to centimeters

   1m = 100cm

   3m = (3 x 100) cm

   = 300cm

2. Change 3m + 2m + 2m to cm

   3m + 2m + 2m = 7m

   1 m = 100cm

   7m = (7 x 100)cm

   = 700cm

Activity

Change the following to centimeters.

a) 4m b) (2 + 5 + 4)m c) 27m

d) 6m e) 18m f) (4 + 1 + 8)m

g) 14m h) 23m i) (3x5)m

j) Complete the table below.

Cm	100	____	300	___	500	___	700
M	1	2	____	4	____	6	7

Changing centimeters (M) to metres(M)

Examples

1. Change 200cm to m

   100cm = 1m

   200cm = $\frac{200}{100}$

   = 2m

2. Change 800 centimetres to metres

   100cm = 1m

   800cm = $\frac{800}{100}$

   = 8m

Activity

Change the following to metres.

a) 100cm b) 300cm c) 500cm
d) 700cm e) 400cm f) 600cm
g) 900cm h) 1000cm

Addition in metres and centimeters

Examples

1. Add;

	m	cm
	2	45
+	6	36
	8	81

2. Add;

	m	cm
	8	25
+	6	85
	15	10

25 + 85 = 110
110 ÷ 100 = 1 rem 10
1m = 10cm
1 + 8 + 6 = 15m

Activity

1. Work out the following.

a)

	m	cm
	3	42
+	4	17

b)

	m	cm
	19	45
+	14	18

c)

	m	cm
	4	25
+	4	10

d)

	m	cm
	24	40
+	19	17

2. Odyeke has 13m 82cm of wire. His friend has 18m 36cm of wire. What is the total length of both wires?

Subtraction of metres and centimeters

Examples

1. Subtract;

	m	cm
	6	80
-	2	60
	4	20

2. Subtract; m cm

	9	24	100 + 14 = 124
-	5	30	124 – 30 = 94
	3	94	8 – 5 = 3

3. Otim had a ribbon measuring 15m 36cm. HE cut off 9m 21cm. What length remained?

	m	cm	
	15	36	Otim had
-	9	21	He cut off
	6	15	Length that remained

Activity

Work out the following.

a)

	m	cm
	7	30
-	2	10

b)

	m	cm
	9	60
-	4	20

c)

	m	cm
	10	15
-	6	30

d)

	m	cm
	12	70
-	6	40

e) Isa had a string measuring 25m 15cm. He cut off 18m 35cm. What length of the string did he remain with?

f) Subtract 3m 75cm from 11m 20cm

Multiplication of metres and centimeters

Examples

Work out the following.

1. Mary , Joseph and Joan each bought 3m 45cm of cloth. What was the total length of the cloth bought?

m	cm
3	45
x	3
1035	

2. A family of 7 people got 8m 25cm of cloth each. What was the total length of cloth got by the whole family?

m	cm
8	25
x	7
57	75

Activity

1. Find the total height of 4 boys each 1m 52cm tall.
2. Find the total length of 8 roper each 2m 36cm.
3. Opio, Odeke and Odong each had 9m 54cm of cloth. What was the total length of their cloth?
4. Ali, Aisha and Aida shared a ribbon. If each got 5m 35cm long. What was the length of the ribbon shared?
5. 7 boys had pieces of wire measuring 5m 75cm each. Find the total length of the wire which they had.
6. Kate and Regina had 6m 50cm of string each. Find the total length of string they had altogether.

Division of metres and centimeters

Examples

1. The piece of timber Bob and Pablo shared equally was 8m 10cm long. What length and each got?

	m	cm
	4	05
2	8	10
4x2 -	8	
		10
5x2		- 10

Each got 4m 5cm long

2. The length of a string is 15m 24cm. Divide the string into 3 equal pieces. What is the length each piece?

	m	cm
	05	08
3	15	24
		- 15
		24
		- 24

Each piece of string is 5m 8cm

Activity

1. 4 girls shared 36m 28cm of cloth equally. What length of cloth did each girl get?
2. Divide 21m 12cm by 3.
3. Agnes had a string measuring 5m 45cm, if he cut it into 5 equal pieces, how long was each piece?
4. 6 workers divided equally 24m 18cm of a road for cleaning. What part did each clean?
5. 7 boys shared 50m 25cm of cloth equally. Find the length of each piece of cloth?

Changing metres to kilometres

Note: 1000m = 1 kilometres

Examples

1. Work out

   Change 3000 m to km

   1000m = 1km

   3000m = $\frac{3000}{1000}$

   = 3km

2. Change 20000m to km

   1000m = 1km

   20000m = $\frac{20000}{1000}$

   = 20km

Activity

Change the following to kilometres

a) 14000m b) 25000m c) 8000m

d) 1000m e) 30000m f) 5000m

g) 6000m h) 12000m

i) Deo walked a distance of 4000m from home to school. What distance did he walk in kilometres?

Changing kilometres into metres

Examples

Change the following to metres

1. 5km to m

   1km = 1000m

   5km = 5 x 1000

   = 5000m

2. 12km to metres

1km = 1000m

12km = 12 x 1000

= **12000m**

3. Abdul covered 7km while running. What distance did he run in metres.

1km = 1000m

7km = 7 x 1000

= **7000m**

Activity

Change the following measures in metres

a) 4km b) 16km c) 30km

d) 19km e) 24km

f) A cyclist covered a distance of 5km. What is this distance in metres?

Addition of kilometres and metres

Examples

1. Add 15km 880m to 6km 750m

	Km	m	
	15	880	880 + 750 = 1630
+	6	750	1630 ÷ 1000 = 1km 630m
	22	630	

Assignment

a)

	Km	m
	13	530
+	8	670

b)

	km	m
	58	460
+	17	780

c) A road construction company made 24km 855m of the road on Monday and 37km 255m on Tuesday. What distance of the road did they make?

Subtraction of kilometres and metres

Examples

1. Subtract:

	km	m
	46	260
-	12	150
	34	110

2. Subtract 130km 690 from 280km 455m

	Km	m
	280	455
- 130		690
	149	765

Activity

Subtract the following.

a)

	Km	m
	47	290
-	23	280

b)

	km	m
	700	450
-	500	350

c)

	km	m
	90	55
-	35	85

d) Subtract 15km 680m from 23km 750m.

e) From a length of 315km 425m subtract 285km 315m.

Multiplication of kilometres and metres

Examples

1. Work out:

	km	m
	8	350
x		3
	25	50

2.

	Km	m
	15	320
	x	3
	45	960

Activity

Work out the following.

a)

Km	m
7	300
x	8

b)

km	m
9	250
x	6

c)

km	m
13	200
x	3

d)

km	m
8	140
x	5

Division of kilometres and metres

Examples

1. Divide 24km 40km by 4

	Km	m
	6	10
4	24	40
	24	
		40
		40

Activity

Work out the following

a)

	Km	m
5	50	150

b)

	km	m
4	32	240

c)

	km	m
8	16	2400

d)

	km	m
9	81	270

e) Divide 66km 660m by 6

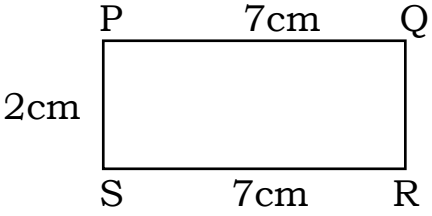
f) 21km 14m ÷ 7

MEASURES (PERIMETER)

Perimeter is the total distance round a figure.

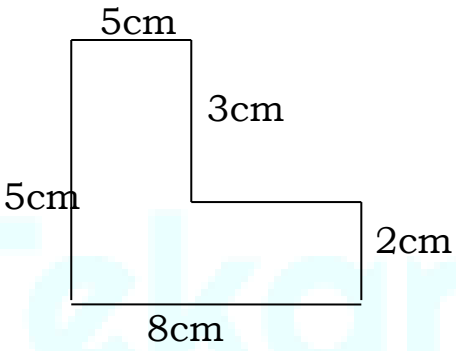
Examples

1. Find the perimeter of the figure below.

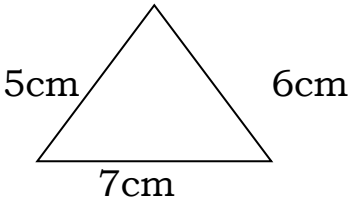


Perimeter = PQ + QR + RS + SP
= 7cm + 2cm + 7cm + 2cm
= **18cm**

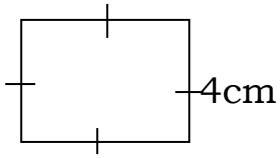
2. Find the perimeter of the figure below.



Perimeter = Add all sides round the figure
= 5cm + 3cm + 2cm + 8cm + 5cm
= 26cm
Perimeter= 26cm

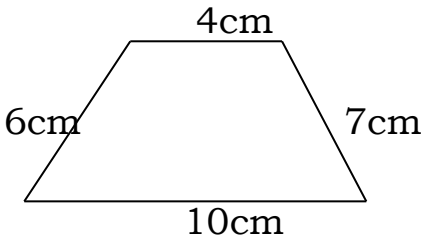
3. 

Perimeter = s + s + s
= 5cm + 6cm + 7cm
= **18cm**

4. 

All sides are equal
Perimeter = s + s + s + s
= 4cm + 4cm + 4cm + 4cm
= **16cm**

5.

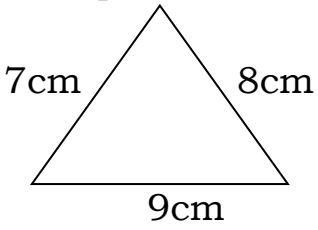


Perimeter = 6cm + 4cm + 7cm + 10cm
= **27cm**

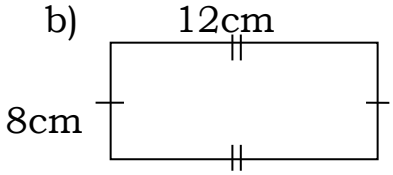
Activity

Find the perimeter of the following figures.

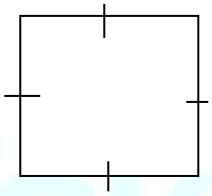
a)



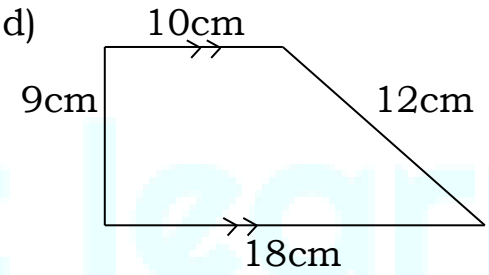
b)



c)



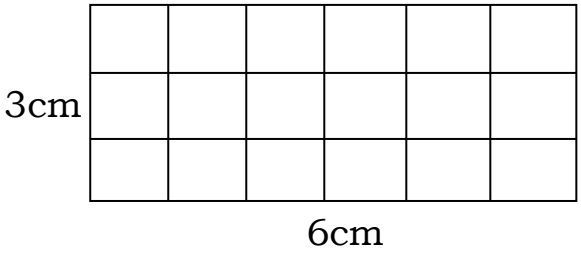
d)



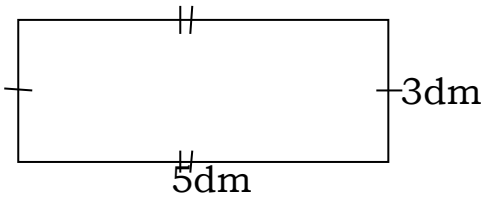
MEASURES (AREA)

Area is the amount of space covered by a flat surface.

Finding the area of figure.



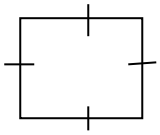
Length(L) = 6cm
Width (W) = 3cm
Area = L x W
= 6cm x 3cm
= 6 x 3 x cm x cm
= **18cm²**
Or 18 square cm

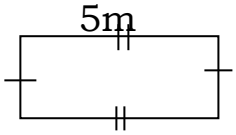


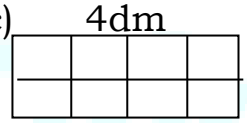
Length(L) = 5dm
Width (W) = 3dm
A = Lx W
= 5dm x 3dm
= 15dm²

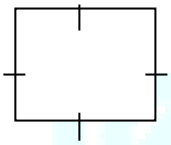
Activity

Find the area of the figures below.

a) 

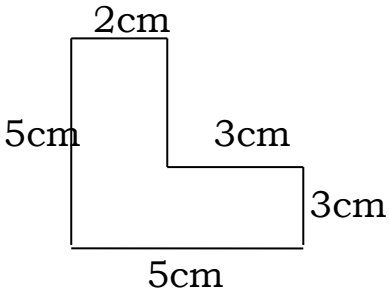
b) 2m 

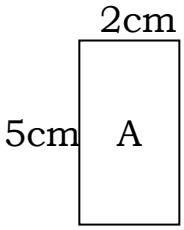
c) 

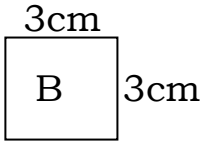
6cm 

Finding the area by separating figures

Find the area of the figure below.







Area of rectangle A = L x W
= 5cm x 2cm
= 5 x 2 x cm x cm
= 10cm²

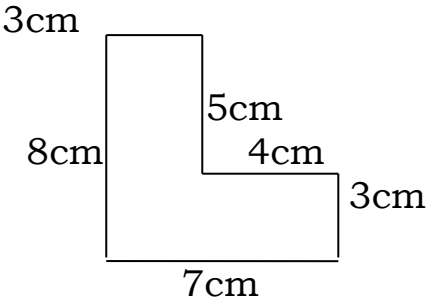
Area of rectangle B = L x W
= 3cm x 3cm
= 3 x 3 x cm x cm
= 9cm²

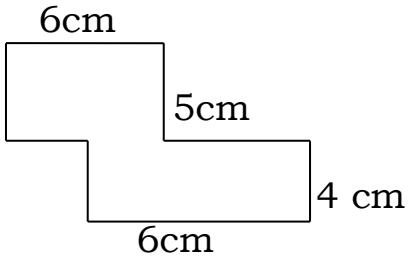
Total area of the figure (A + B)
= (10cm2 + 9cm2)
= 19cm²

Alternatively – separation of figure

Activity

Find the area of the figures below.

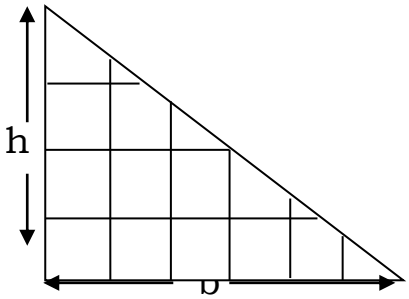
a) 

b) 

Finding the area of a triangle

Examples

1. Find the area of the figures below.



base (b) has 6 units
height (h) has 4 units

Area of a triangle

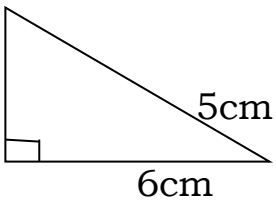
= ½ x base x height

= ½ x 6 x 4 units

= 1 x 3 x 4 units

= 12 units squared

= 12 square units

2. 

base (b) = 6cm

height (h) = 5cm

Area = ½ x b x h

= ½ x 6cm x 5cm

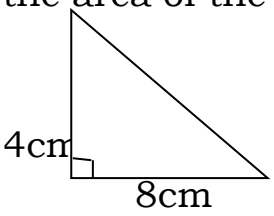
= ½ x $30cm^2$

= $15cm^2$

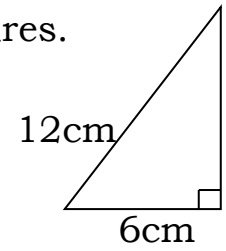
Activity

Find the area of the figures.

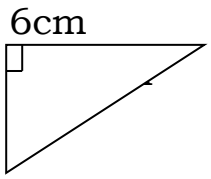
a)



b)



c)



CAPACITY

Finding half and quarter litres

Note:

1 litre = 2 half litres
2 litres = (2 + 2) half litres
3 litres = (2 + 2 + 2) half litres
1 litre = 4 quarter litres
2 litres = (4 + 4) quarter litres
3 litres = (4 + 4 + 4) quarter litres

Examples

Work out the following.

1. How many ½ litre bottles are in 1 litre container?

   1 ÷ ½

   1 x $\frac{2}{1}$

   2 half litre bottles are in 1 litre

2. How many ¼ litres are in 2 litres

   2 ÷ ¼

   2 x $\frac{4}{1}$

   8 quarter litres are in 2 litres

3. How many ½ litre bottles are in a 3 litre container?

   3 ÷ ½

   3 x $\frac{2}{1}$

   6 half litre bottles are in 3 litre container

Activity

1. How many ½ litres are in a 5 litre container?
2. How many ¼ litre bottlea are in a 1 litre container?
3. How many ¼ litre bottles are in 4 litres?
4. Namuddu has 6 litres. How many ½ litres has she got?
5. Divide 4 litres of milk into ½ litres. How many half litres will you get?

Addition of litres and half litres

Examples

1. Add 1 ½ litres and 2 ½ litres

   (1 ½ + 2 ½) litres = 1 + 2 + ½ + ½

   = 3 + $\frac{1 + 1}{2}$

   = 3 + 1

   = 4 litres

2. Mukuli had 2 ½ litres of milk and 4 litres of milk. How much milk does he have altogether?

   (4 + 2 ½) litres = 4 + 2 ½

   = 6 ½ litres

Activity

1. Add ½ a litre to 3 ½ litres.
2. What is the sum of 2 ½ litres and 4 ½ litres?
3. Atwine drank 3 ½ litres of bear. She took another 2 litres. How many litres did she drink altogether?
4. There were 6 ½ litres of petrol in a car fuel tank. If 7 ½ litres were added, how many litres were there altogether?
5. Increase 10 ½ litres by 4 ½ litres
6. Add 5 ½ litres to 3 ½ litres

Addition of litres

Example

1. Add 80 litres of milk to 40 litres of milk.

   80 litres
   + 40 litres
   120 litres

2. A home uses 95 litres of water in the morning and 87 litres in the afternoon. How much water is used in a day?

   Morning 95 litres
   Afternoon + 87 litres
   They use 182 litres

Activity

1. A drum contains 86 litres of juice. Another 46litres is added. How many litres of juice does the drum now hold?
2. Apedo sold 78 litres of milk on Monday and 74 litres on Wednesday. How many litres of milk did he sell altogether?
3. Add 124 litres to 3456 litres.
4. Add 145 litres to 1134 litres and 36 litres.
5. Three families use 70 litres, 80 litres and 111 litres of paraffin respectively. How many litres do they use altogether?

Changing litres to milliliters

Examples

1. Express 2 litres as milliliters

   1 litre = 1000ml
   2 litres = (2 x 1000)ml
   = 2000 ml

2. Express 15 litres as milliliters

   1 l = 1000ml
   15 l = (15 x 1000) ml
   = 15,000ml

Changing milliliters to litres

Examples

1. Convert 400ml to litres

   1000ml = 1l
   1 ml = $\frac{1}{1000}$ l
   4000ml = $\frac{1}{1000}$ x $\frac{4000}{1000}$ l
   = 4 litres

2. Express 500ml as litres.

1000ml = 1 litre

1ml = $\frac{1}{1000}$ l

500ml = $\frac{1}{1000}$ x $\frac{500}{1}$

= **½ litre**

OR = 0.5 litre

Activity

1. Change the following to ml.

a) 2l b) 6l c) 3l

d) 5l e) 12l f) 7l

2. Change the following to litres.

a) 7000ml b) 3000ml c) 15000ml

d) 5000ml e) 10000ml f) 22000ml

Addition of litres and millitres

Examples

1. Add

	L	ml
	7	250
+	2	400
	9	650

2. I have 150 litres 200ml of water. Awiimwe gives me 120 litres 800ml of water. How much water do I have now?

	L	ml	
	150	200	200+ 800 = 1000
+	120	800	1000 ÷ 1000 = 1 rem 0
	171	000	

Activity

1. Add

a)

	L	ml
	3	340
+	8	220

b)

	l	ml
	12	48
+	06	24

2. Add 16 litres 720 ml to 8 litres 250ml.
3. A banker used 4 litres 570ml of cooking oil. She later used another 15 litres 110ml more. How much oil did she use?

Subtraction of litres and millitres

Examples

1. Subtract

	L	ml
	12	48
-	08	36
	04	12

2. From 50l 65ml take away 42 l 58ml.

	L	ml
	59	65
-	42	58
	08	07

3. A taxi driver bought 30 litres 450 millilitres of fuel from the petrol station and used 18 litres 300ml. How much fuel did he remain with?

		L	ml
He bought		30	450
He used	-	18	300
He remained with		12	150

Multiplication of litres and milliliters

Examples

1. Work out

L	ml
14	28
	4
36	112

2.

L	ml
42	50
x	5
210	250

Activity

Work out the following.

a)

L	ml
12	10
x	5

b)

l	ml
36	42
x	6

c)

l	ml
64	48
x	7

d)

l	ml
213	520
x	2

Division of litres and millitres

Examples

a) Divide 14l 24ml by 2.

```
      07l     12ml
   ┌──────────────
 2 │ 14l     24ml
   - 0       24
   ──────────────
     14
     14
     ──
```

b) A factory uses 42l 30ml of fuel in 6days. How much fuel does the same factory use in one day.

```
      07l     05ml
   ┌──────────────
 6 │ 42l     30ml
   - 0
   ──
     42
     42
```

Activity

Work out the following.

a) 2 | 16l 18ml

b) 6 | 12l 24ml

c) 3 | 9l 12ml

d) 7 | 21l 28ml

e) 4 | 12l 16ml

f) 8 | 24l 32ml

WEIGHT

Changing kilograms to grams

Examples

1. Convert 2 kg to grams

   1 kg = 1000g

   2kg = (2 x 1000)g

   = 2000g

2. ½ kg

   1kg = 1000g

   ½ kg = ½ x 1000g

   = 500g

3. 2.5kg

   1kg = 1000g

   2.5kg = (2.5 x 1000)g

   = 2500g

Changing grams to kilograms

Examples

1. Express 2000g as kg

   1000g = 1 kg

   1g = $\frac{1}{1000}$ kg

   2000g = $\frac{1}{1000}$ x 2000

   = 2 kg

2. Change 4500 to kg

   1000g = 1kg

   1g = $\frac{1}{1000}$ kg

   4500g = $\frac{1}{1000}$ x 4500

   = 4.5 kg

Addition of kilograms and grams

Examples

1. Add:

	kg	g
	2	250
+	3	150
	5	400g

2. Find the sum of 104kg 420g and 187kg 350g

	Kg	g
	104	420
+	187	350
	291	770

3. A farmer took 2 sacks of coffee to the store for sell. One weighed 96kg 480g and the other 88kg 776g. Find the total weight of the two bags.

	Kg	g	
	96	480	480 + 776 = 1256
+	88	776	1kg = 1000g
	185	256	1256 ÷ 1000 = 1 rem 256

Activity

1. What is the total weight when you add 40kg 130g to 24kg 243g?
2. Add 12kg 125g to 132kg 820g.
3. Add 136kg 268g to 98kg 75g.
4. What is the sum of 709kg 285g and 98kg 56g.
5. Alice bought 25kg 135g of rice. She later bought 15kg 234g more. How much rice did she buy?

Subtraction of kilograms and grams

Examples

1. Subtract

	Kg	g
	75	640
-	28	450
	47	190

2. Nakato had 40kg 350g of ghee. She sold 26kg 850g of it. How much ghee did she remain with?

		Kg	g	
She had		40	350	1000 + 350 = 1350
She sold	-	26	850	1350 ÷ 850 = 500
She remained with		13	500	

Activity

1. Work out the following.

a)

Kg	g
81	366
- 33	424

b)

kg	g
48	760
- 31	720

2. Subtract 36kg 785 g from 48kg 460g
3. A builder used 10kg of nails from 13kg 72g. What is the total weight of the remaining nails?
4. What weight remains when 26kg 15g is removed from 61kg 16g?
5. Subtract 24kg 490g 72kg 365g.

Multiplication of kilograms and grams

Examples

1. Work out:

kg	g	
32	120	120 x 9 = 1080
x	9	since 1000g = 1kg
289	80	Then 1000g + 80g = 1kg 80g

2. Multiply;

kg	g
12	40
x	4
48	160

Activity

Work out the following

a)

Kg	g
4	310
x	3

b)

kg	g
34	89
x	2

Division of kilograms and grams

Examples

1. Work out the following

	Kg	kg
	06	11
4	24	44
	- 0	
	24	
	24	
		44
		- 4
		4
		4

2. Divide 16kg 240g by 8

	08kg	030g
8	16	240
	-0	
	16	
	16	
		240
		0
		24
		24
		0

Activity

Work out the following.

a)

	Kg	g
4	16	24

b)

	kg	g
5	5	10

c)

	kg	g
6	30	42

d)

	kg	g
2	4	8

e)

	kg	g
3	9	12

f)

	kg	g
7	14	21

g)

	kg	g
2	6	8

h)

	kg	g
8	8	16

P.6 MATHEMATICS

TERM ONE

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❖ SET CONCEPTS.....6
- Meaning of a set and symbols used
- Types of sets
- Describing parts of a venn diagram
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- Representing sets on venn diagrams
- Listing subsets and proper subsets
- Finding number of subsets using the formulae
- Finding number of elements when given subsets and proper subsets
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- Changing non recurring decimals to vulgar fractions
- Changing recurring decimals to vulgar fractions
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- Expressing fractions as percentages

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- Expressing percentages as ratios
- Expressing ratios as percentages
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- Expressing decimals as percentages
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- Expressing one quantity as a percentage of another
- Finding quantities equivalent to percentage
- Sharing quantities using percentages
- Forming and solving equations
- Increasing or decreasing quantities using percentages
- Finding percentage of increase and decrease
- Percentage increase and decrease
- Percentage profit and loss
- Finding (SP) when cost price (CP) percentage profit or loss are given
- Finding cost price(CP) when given selling price (SP) and percentage profit.
- Finding cost price(CP) when given selling price (SP) and percentage loss.
- Percentage discount
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- Converting from 24 hr clock to 12 hr clock
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- Finding perimeter and area of parallelogram
- Comparing sides of polygons
- Circle properties
- Finding circumference of a circle and parts of a circle
- Finding perimeter of a circle and parts of a circle
- Finding radius or diameter when given circumference
- More about perimeter (irregular figures)
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- Finding radius or diameter when given area
- Finding area of combined shapes
- Finding shaded area
- Finding missing sides using Pythagoras' theorem
- Application of Pythagoras' theorem in an isosceles triangle, trapezium and a rhombus

• VOLUME AND SURFACE AREA

- Solid figures their properties and their nets
- Converting from (cm^2) to (cm^2) and viceversa
- Converting from square (km^2) to (m^2) and viceversa
- Converting from (m^3) to (cm^3) and viceversa
- Volume and capacity of a cube
- Volume and capacity of a cuboid
- Finding missing sides when given volume of a cuboid

P.6 Mathematics

- Volume and capacity of cylinders
- Finding missing sides when given volume of a cylinder
- Volume and capacity of triangular prisms
- Finding missing sides when given volume of a triangular prism
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- Names of polygons
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- Finding number of right angles
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- Finding interior angle sum
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- Interior angles of a triangle
- Interior and exterior angles of a triangle
- Angles of an isosceles triangle
- Exterior angles of polygons
- Angles on parallel lines
- More about angles on parallel lines
- Properties of quadrilaterals
- Complementary angles
- Supplementary angles

CONSTRUCTION

- Constructing special angles
- Constructing other angles
- Constructing perpendicular bisectors
- Constructing perpendicular lines from a point
- Construction of parallel lines
- Construction of a pentagon when given side
- Construction of polygons using a centre angle
- Construction of a square when given a side
- Construction of a square in a circle
- Construction of a square using diagonals
- Construction of a rectangle when given sides
- Construction of a triangle when given sides(SSS)
- Construction of a triangle when given two sides and one angle(SAS)
- Construction of a triangle when given two angles and one side(ASA)
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- Addition and subtraction of integers with and without a number line
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- Multiplication of integers with and without a number line.
- Division of integers with and without a number line.
- Application of integers

• **FINITE / MODULAR SYSTEM**

- Writing numbers in finite system
- Equivalences in finite system
- Addition in finite system
- Subtraction in finite system
- Multiplication in finite system
- Division in finite system
- Application of finite system in days of the week.
- Application of finite system in 12 and 24 hour time.
- Application of finite system in months of the year.
- Applying more than one finite in solving problems
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- Algebraic phrases and expressions
- Substitution
- Collecting like terms
- Addition and subtraction of fractional algebraic terms
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- Removing brackets in fractional algebraic terms
- Powers or Indices
- Solving simple equations
- Solving equations involving squares and square roots
- Solving equations involving brackets
- Solving equations involving fractions
- Forming and solving equations
- Application of algebra in ages
- Finding solution sets
- Solving and writing solution sets
- Finding solution sets with compound inequalities
- Solving and writing solution sets with compound inequalities

TERM ONE: SET CONCEPTS

Key words: *universal, complement, subsets, union, intersection, empty, finite, infinite, probability*

SUB TOPIC: MEANING OF A SET AND SYMBOLS USED

A set is a group of defined elements

Symbols used in sets

$=$	*Equal sets*
$\neq$	*un equal sets*
$\cup$	*Union sets*
$\cap$	*Intersection sets*
$\emptyset$	*Empty set*
$\longleftrightarrow$	*Equivalent sets*
$\not\longleftrightarrow$	*Non equivalent*
ε	*Universal sets*
$\subset$	*Is a subset of*
$\not\subset$	*Is not a subset of*
$\supset$	*Is a superset of*
$\not\supset$	*Is not a superset of*
$\in$	*Is a member of*
$\notin$	*Is not a member of*
$'$	*Complement of sets*

SUB TOPIC: TYPES OF SETS(equal sets, equivalent sets and un-equal sets)

1. Equal sets

Equal sets are sets with the same number of elements which are similar.

Compare set A and B below



Set A is equal to set B

Mathematics is the Key

2. Equivalent sets

Equivalent sets are sets with the same number of elements

Compare the sets below

X

1, 2, 3, 4,

Y

a, b, c, d,

Set X and set Y are equivalent sets

3. Non equivalent sets

Non equivalent sets are sets whose elements are not equal in number.

Compare the sets below

P

a,e,i

Z

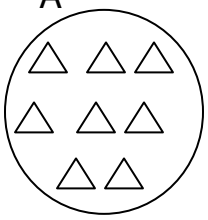
1,2,3,4

Set P and set Z are non equivalent sets

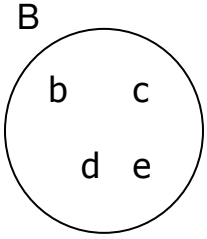
EXERCISE

1. Study the sets below and answer questions that follow:

A



B



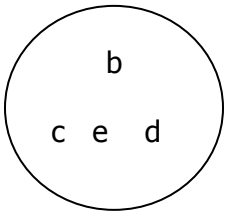
C



D



E



Write true or false.

(a) A and B are unequal.

(b) A and C are equivalent

(c) B and E are equal

(d) B and D are equivalent

(e) A and E are non - equivalent

2. State whether the sets given are equal, equivalent, unequal or non – equivalent.

(i) A = { a, b, c, d}
B = { T, W, K, Y, L }

(ii) K = { b, a, t}
L = { t, a, b}

iii) M = { 3, 6, 10, 12}
N = { 15, 8, 6, 5}

iv) Q = { Even numbers between 0 and 14}
R = { Multiples of 2 less than 14}

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(a) Intersecting sets (∩)

A set of common members from two or more sets.

(b) Union sets (∪)

A set of all elements in the two or more sets.

(c) Universal set (ε)

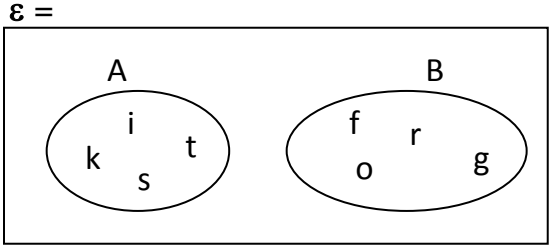
The biggest set from which other smaller sets are got.

(d) Disjoint Sets

These are sets without common members.

A = {s, k, i, t} B = {f, r, o, g}

ε =

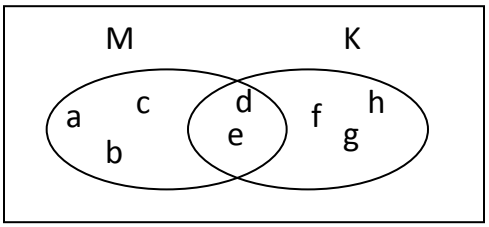


Examples

Sets M = {a, b, c, d, e, }

K = {d, e, f, g, h, }

ε =



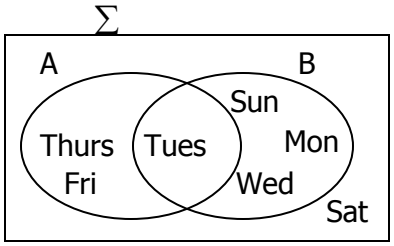
(i) M ∩ K = ***{e, d}***

(ii) K ∪ M = ***{a, b, c, d, e, f, g, h}***

(iii) Universal set (ε) = ***{a, b, c, e, d, f, g, h}***

EXERCISE

Study the venn diagram below and answer the questions given.



List the members of

(a) ∑

(b) A

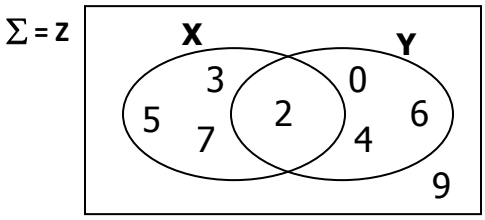
(c) B

(d) A ∪ B

(e) **A ∩ B**

Mathematics is the Key

2. Study the venn diagram below:-

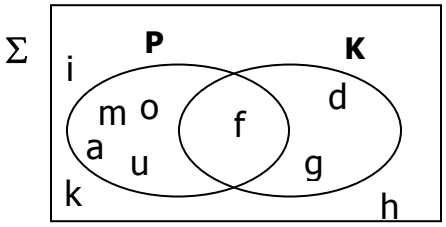


Find

(a) X∩Y
(b) X∪Y
(c) X
(d) Y
(e) ε

3. List the members of the sets:

(i) Σ (ii) P (iii) K



SUBTOPIC: TYPES OF SETS (finite and infinite sets)

A ***finite*** set is a set whose members can be listed down and has an end.
e.g set T = {even numbers between 4 and 12}
T = {6, 8, 10}

An ***infinite*** set is a set whose members are endless.
e.g. a set of odd numbers, a set of all stars in the sky, a set of all integers.
Set K= {all prime numbers}
K= {2, 3, 5, 7, 11, 13…..}

Activity

1. State whether the following sets are finite or infinite:

G = {girls in your class}
B = {boys in your class}
W= {days of the week}
K = {square numbers}
P= {pupils who like football}
T = {multiples of three}
H = {all alphabetical letters}

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F = {months of the yea}

SUBTOPIC:DIFFERENCE OF SETS

This is a set showing the elements in one set only.

1. Given the sets

M={a, b, c, d, e, f}

N={b, e, a, n, s}

Find;

(a) M – N (M only)

$\underline{\boldsymbol{M - N = \{c, d, f\}}}$

(b) N – M (N only)

$\underline{N - M = \{n, s\}}$

2. Study the sets below

A = {m, a, n, g, o, e, s}

B = {p, e, n, c, i, l}

Find;

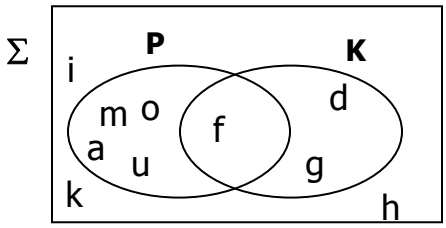
(a) A – B

$A - B = \{m, a, g, o, s\}$

(b) B – A

$B - A = \{p, c, i, l\}$

3. Study the venn diagram below

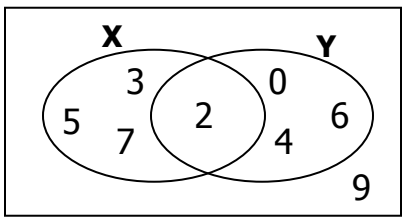


Find;

(a) P – K

(b) K – P

4. Study the venn diagram below.



Find;

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(a) X – Y

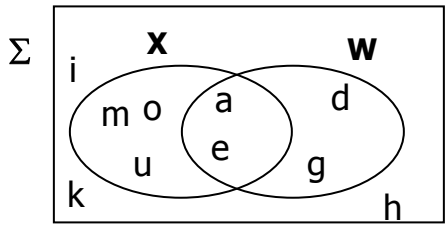
(b) Y – Z

SUBTOPIC:COMPLEMENT OF SETS

Complement of a set is a set of elements outside the given set.

Examples

1. Study the venn diagram below



Find;

(a) Set X complement

$\boldsymbol{X^I = \{d, g, h, i, k\}}$

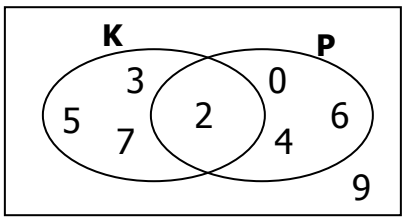
(b) Set W complement

$\boldsymbol{W^I = \{m, o, u, i, k\}}$

(c) The complement of $\boldsymbol{X \cap W}$

$\boldsymbol{X \cap W = \{m, o, u, d, g, h, i, k\}}$

2. Study the venn diagram below.



Find;

(a) $The\ complement\ of\ P$

(b) $The\ complement\ of\ K$

(c) $The\ complement\ of\ K \cap P$

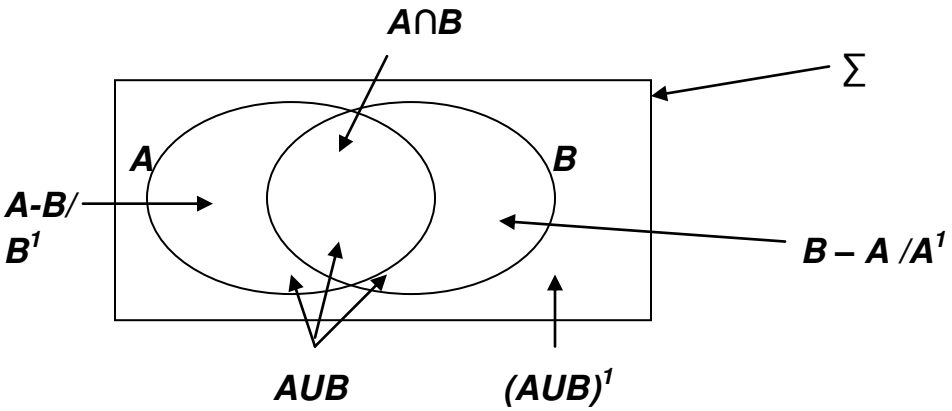
(d) $(K \cup P)^I$

(e) $The\ complement\ of\ K - P$

(f) $The\ complement\ of\ P\ only$

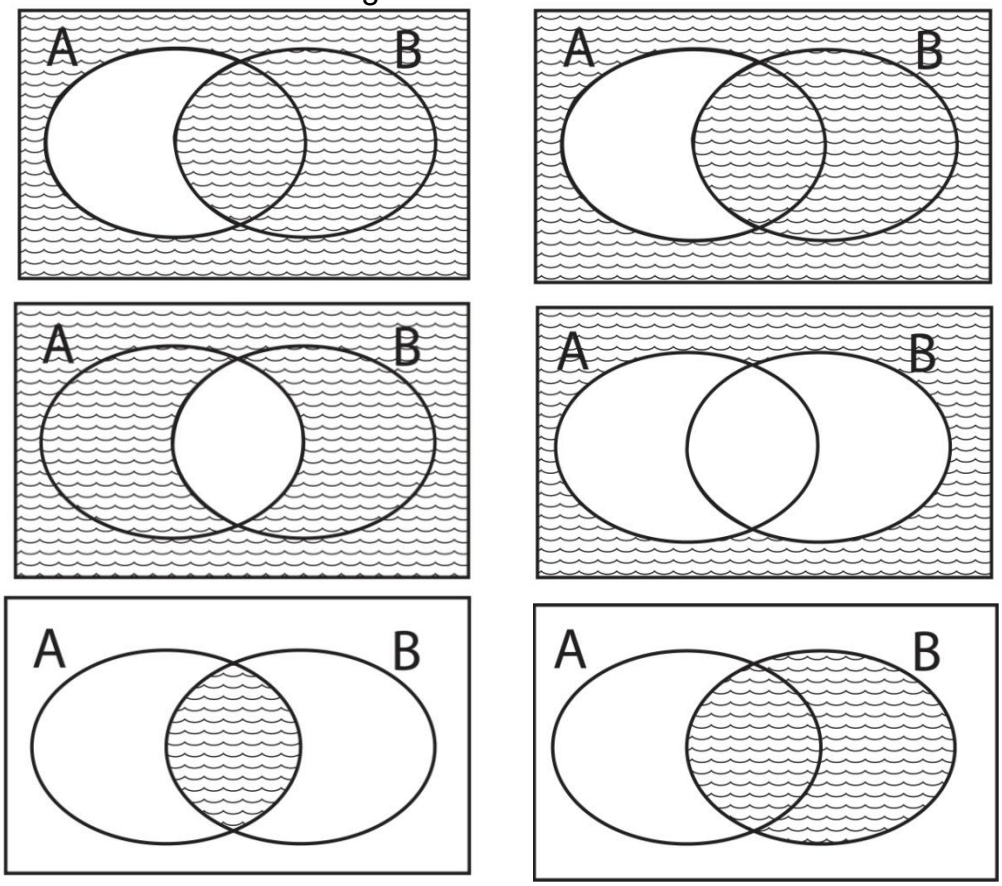
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SUBTOPIC:Regions/describing points of Venn diagram



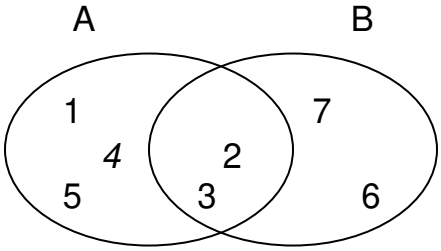
Activity

Describe the shaded regions



SUBTOPIC:LISTING ELEMENTS FROM A VENN ADIAGRAM

1. Given the venn diagram below:



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List members of the following using the above venn diagram:

(i) Set B
(ii) Set A^1
(iii) (B∩A)
(iv) (AUB)
(v) A – B
(vi) The complement of (AUB)

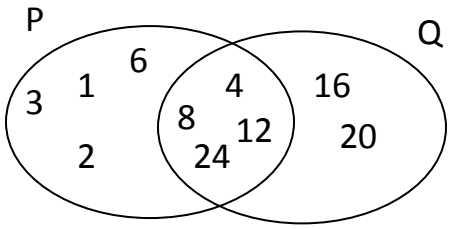
SUBTOPIC:REPRESENTING SETS ON VENN DIAGRAMS

Example:

If P = {Factors of 24}
Q= {Multiples of 4 less than 25}

(i) List elements of P and Q : P = {1, 2, 3, 4, 6, 8, 12, 24, }
Q = {4, 8, 12, 16, 20, 24}

(ii) Represent the above sets on a venn diagram below:



(iii) What is: (a) P ∩ Q (b) n(P∪Q)

Activity:

1. Given that set A = {Even numbers less than 15}
B = {Composite numbers less than 15}
(a) List down the members of the above sets.
(b) Represent the above sets on a venn diagram

2. Given that ε = {whole numbers less than 15}
Set P = {4, 6, 14, 8, 0, 12, 3, 7}
Set Q = {1, 3, 5, 7, 9, 11, 13}
(a).Write down the numbers of P∩Q
(b).Represent the above sets on a venn diagram

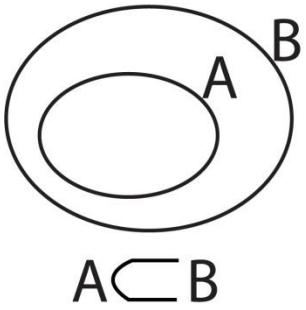
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SUB TOPIC : SUBSETS

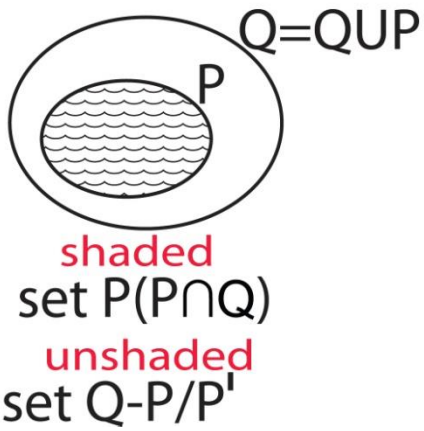
A subset is a set that can be got from another set.

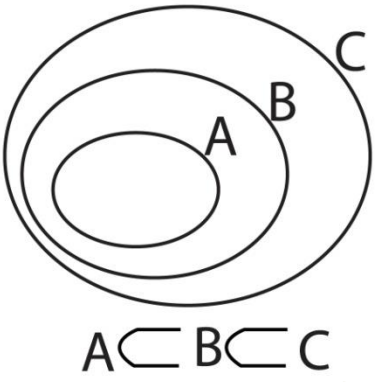
The symbol for **"is a subset of"** is $\subset$

Subsets on venn diagram



$A \subset B$





$A \subset B \subset C$

Activity

1. Draw a venn diagram to show that;
(a). all dogs(D) are animals (A)
(b) all girls(G) are females(F)
(c) teachers(T) and pupils(P) are found in a school(S)

SUBTOPIC: LISTING SUBSETS AND PROPER SUBSETS

1. Given that set A= { a, b}

a) List all subsets of set A

{ }, { a }, { b }, { a, b }

b) Write down all proper subsetsof set A

{ }, { a }, { b }

2. List the subsets for each of the following sets:

B = {p, q } b) C= {x, y, z} c) D= { t } d) E={ p, q, r, s}

3. List all possible proper subsets of the sets below.

M={1, 3, 4} P={a, g, o} K={6, 9, 0, 8}

Mathematics is the Key

SUBTOPIC: FINDING THE NUMBER OF SUBSETS AND PROPER SUBSETS

1. Given that set A= { a, b}.

a) Find the number of subsets in set A

By listing: { }, { a }, { b }, { a, b }

No. of subsets in (A) = 4 subsets

Using: ***No. of subsets = 2^n*** *(Where 'n' = number of elements)*

$= 2^2$

$= 2 \times 2$

= 4 subsets

b) Find the number of proper subsets in set A

By listing: { }, { a }, { b }

No. of proper subsets in set A = 3 subsets

Using : ***No. of proper subsets = $(2^n) - 1$***

$= 2^2$

$= 2 \times 2 - 1$

$= 4 - 1$

=3 proper subsets

2. How many subsets are in each of the sets below?

B = {p, q} ***C= {x, y, z}*** ***D= { t }*** ***n(E)=4***

3. Find the number of proper subsets in each of the following sets.

M={1, 3, 4} ***P={a, g, o}*** ***K={6, 9, 0, 8}***

SUBTOPIC: Finding number of elements when given subsets and proper subsets.

1. Set A has 8 subsets. Find the number of elements in set A.

Using 2^n = no. of subsets

2^n = 8

$2^n = 2^3$

n= 3

n (A)= 3

2	8
2	4
2	2
	1

$8=2^3$

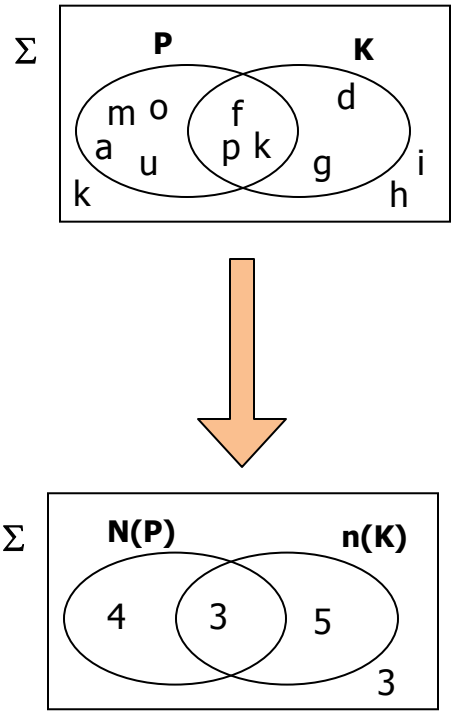
2. ***Find the number of elements in a set with 16 subsets***
3. ***Set P has 15 proper subsets. How many elements are in set P?***
4. ***Find the number of elements in a set with the following number of subsets***

a) 4 subsets ***b) 32 subsets*** ***c) 64 subsets***

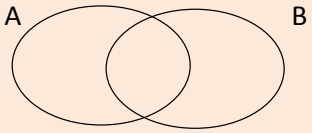
Mathematics is the Key

SUB TOPIC: NUMBER OF ELEMENTS ON VENN DIAGRAMS

The diagrams below show the relationship between a venn diagram with elements and number of elements.



REMEMBER



$(AUB)=A^1 + A\cap B + B^1$

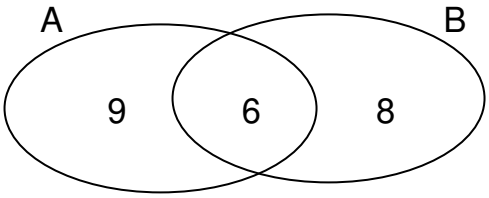
$A = A\ only + A\cap B$

$B = B\ only + A\cap B$

$\sum = A\ only + A\cap B + B\ only + (AUB)^1$

Example

1. The diagram below shows the number of pupils who eat apples (A) and beans (B). Use it to answer questions that follow:



(i) How many pupils eat both apples and beans?
6 pupils

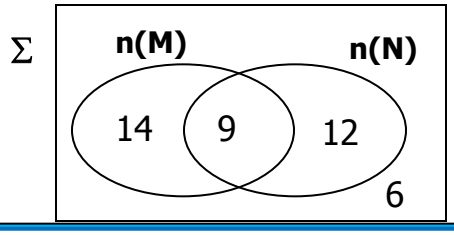
(ii) How many pupils eat beans?
n(B) = 6 + 8 = 14

(iii) How many pupils eat apples?
9 + 6 = 15 pupils

(iv) How many pupils eat only one type of food?
9 + 8 = 17 pupils

(v) Find the number of pupils in the whole class.
9 + 6 + 8 = 23 pupils

2. Study the venn diagram below and use it to answer the questions that follow



Mathematics is the Key

Find

(a) n(M)
(b) n(N)
(c) n($M \cup N$)
(d) n($M \cap N$)^{I}
(e) n(Σ)

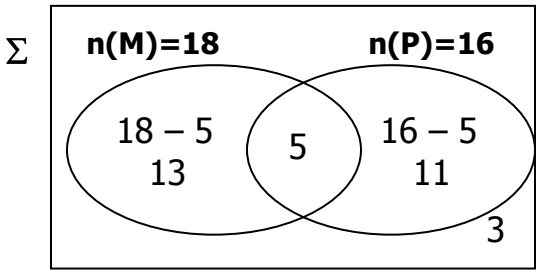
REFERENCE

A New MK Maths Revised Edition Bk 7 Pg 9

SUB TOPIC: SOLVING PROBLEMS USING VENN DIAGRAMS

1. Given that n(M)=18, n(P)=16, n(M∩P)=5 and n($P \cup M^{I}$)=3

(a) Complete the venn diagram below

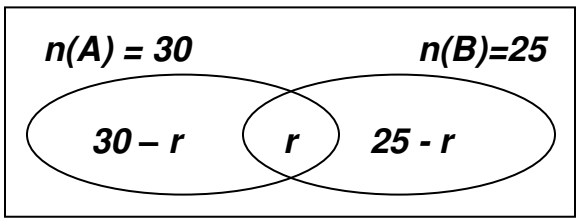


(b) Find n($\mathcal{E}$)

$$n(\mathcal{E}) = 13 + 5 + 11 + 3$$
$$= 18 + 14$$
$$= 32$$

2. Given that n(A) = 30, n(B) = 25 and n(AUB) = 45.

(a) Draw a venn diagram to show the above information.



n(AUB)=n(∑)= 45

(b) Find n(A∩B)

Let the number in (A∩B) be r.

$$30 - r + r + 25 - r = 45$$
$$30 + 25 + r - r - r = 45$$
$$55 - r = 45$$
$$55 - 55 - r = 45 - 55$$
$$-r = -10$$
$$\frac{-r}{-1} = \frac{-10}{-1}$$

Mathematics is the Key

r = 10

(ii) n(A only)

n(A only) = 30 – r

= 30 – 10

= 20

(c).If a member is picked at random, find the probability of selecting a member in $(A \cap B)^{I}$

$n(A \cap B)^{I} = (30 - r) + (25 - r)$

$= (30 - 10) + (25 - 10)$

$= 20 + 15$

$= 35$

$n(E) = 35$

$SS = 45$ $\quad$ $Probability = \frac{35}{45}$

REFERENCE

A New MK Primary Maths ppls Bk 7 Pg 10 – 11

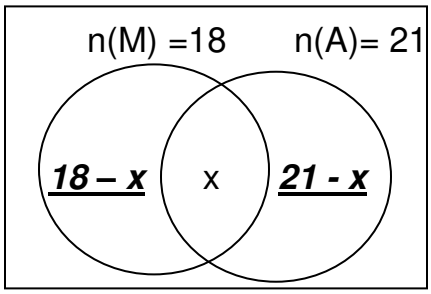
SUB TOPIC: APPLICATION OF SETS

Examples

1. In a class of 30 pupils 18 like music (M), 21 like Art (A) and some like both.

a) Represent the above information on a Venn diagram.

$n(\sum) = 30$



b) How many pupils like both subjects?

$18 - x + x + 21 - x = 30$

$18 + 21 - x = 30$

$39 - x = 30$

$39 - 39 - x = 30 - 39$

$-x = -9$

$\frac{-x}{-1} = \frac{-9}{-1}$

$x = 9$

:. 9 Pupils like both subjects

(c).How many pupils like one subject ?

$18 - x + 21 - x$

$18 - 9 + 21 - 9$

$9 + 12$

21pupils

(d).What is the probability of selecting a pupil who likes one subject?

$n(E) = 21$

$SS = 30$

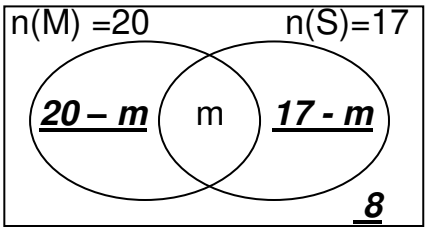
Mathematics is the key

Probablity = $\frac{21}{30}$

2. In a class of 40 pupils, 20 like mathematics (M), 17 like science (S), m like both subjects while 8 do not like any of the subjects.

a) Represent the above information on a Venn diagram.

n(∑)=40



b) How many pupils like both subjects?

$8 + 20 - m + m + 17 - m = 40$

$28 + 17 - m = 40$

$45 - m = 40$

$45 - 45 - m = 40 - 45$

$-m = -5$

$\frac{-m}{-1} = \frac{-5}{-1}$

$m = 5$

:. 5 Pupils like both subjects

c) What is the probability of selecting a pupil who likes only one subject?

(20 –x) + (17 – x)

(20 - 5) + (17 - 5) ***Prob (only one subject) =*** $\frac{27}{40}$

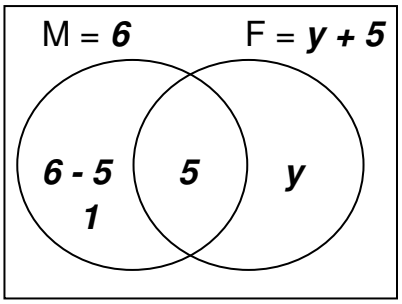
15 +12

27 pupils

3. In a family of 10 members, 6 members eat meat (M), 5 members eat both meat and fish (F) while 'y' members eat only fish.

i) Represent the above information on a Venn diagram

n(∑)=***10***



ii) How many members eat only fish?

$y + 5 + 1 = 10$

$y + 6 = 10$

$y + 6 - 6 = 10 - 6$

Mathematics is the Key

y = 4

iii) Find the number of pupils who eat fish.

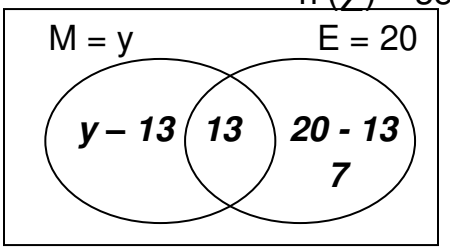
(y + 5) Pupils

4 + 5

9 Pupils

4. In a class of 35 pupils, y like mathematics (M), 20 like English (E) while 13 like both subjects.

a) Using a Venn diagram, show the above information



b) Find the number of pupils who like mathematics.

y – 13 + 13 + 20 – 13 = 35

y + 7 = 35

y + 7 - 7 = 35 – 7

y = 28

OR

y + 20 – 13 = 35

y + 7 = 35

y + 7 – 7 = 35 – 7

y = 28

OR

y – 13 + 20 = 35

y + 7 = 35

y + 7 – 7 = 35 -7

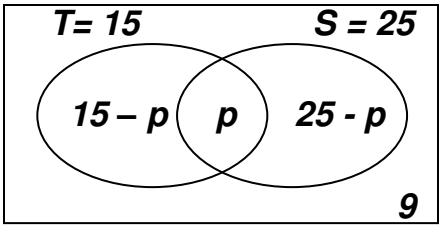
y = 28

∴ 28 Pupils like mathematics

5. In a group of 40 people, they all play football(F), 9 play football only, 15 play tennis(T) and football, 25 swim(S) and play football and some enjoy all the three games.

a. Draw a Venn diagram to represent the above information

n (ε) = n(F)= 40



Mathematics is the Key

b. How many people participate in all the three activities?

$$15 - p + p + 25 - p + 9 = 40$$
$$15 + 25 - p + 9 = 40$$
$$49 - p = 40$$
$$49 - 49 - p = 40 - 49$$
$$-p = -9$$
$$\frac{-p}{-1} = \frac{-9}{-1}$$
$$p = 9$$

TOPICAL QUESTIONS ON SET CONCEPTS

1. Given that:

Set P = {1, 2, 3, 4, 5, 6, 7}
K = {0, 2, 4, 8, 9, 10}
Find (i) P∩K
(ii) n(PUK)
(iii) P – K
(iv) K^1
(v) $(P \cap K)^1$

2. Draw a venn diagram to show that all dogs (D) are animals (A)

3. Given that Set A = {all pri me numbers less than 20} B = {all factors of 16}

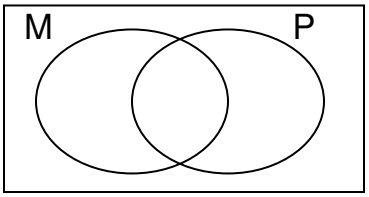
4. Given that a set has 32 subsets. How many elements has it?

5. In a class of 30 pupils, 10 pupils Like History (H) 14 like Geography(G) and 12 do not like either of the subjects.

(i) Draw a venn diagram to represent this information.
(ii) How many pupils like both subjects?
(iii) How many pupils like History?
(iv) How many pupils like one subject?

6. Seventy children were taken to a clinic for immunization,
45 children were immunized against Measles (M)
X children were immunized against Polio (P)
6 children were immunized against measles and Polio.
1 child was not immunized at all.

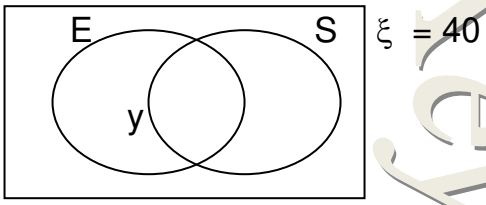
(a) Represent the information in the venn diagram



(b) Find the number of children who were immunized against Polio only.

7. In a class of 40 pupils, 25 like English (E),15 like Science (S) Y pupils like both English and Science and 8 do not like any of the 2 subjects.

(a) Complete the venn diagram.



(b) Find the value of y.

Mathematics is the key

(c) What is the probability of picking a pupil who likes only one subject?

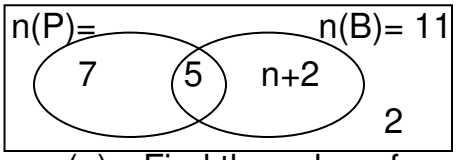
8. In a class of 20 pupils where two languages are spoken, 14 speak Luganda (L), 15 speak Kiswahili (K).

(a) .Draw a venn diagram and show the information given.

(b) Find the number of pupils who speak both Luganda and Kiswahili.

(c) Find the number of pupils who speak only one language.

9. Use the venn diagram below.



n (ξ) =

(a) Find the value of

(i) n

(ii) Universal set

(iii) $n(P \cap B)^1$

10. In a class of 60 pupils, all enjoy eating beans, 33 enjoy eating meat (M), 35 enjoy eating fish (F), If P pupils enjoy all the three while 2 enjoy eating beans only.

(a) Represent the information on a venn diagram.

(b) Find the value of P.

(c) How many pupils enjoy only fish?

11. Given that Set X = {a, d, c, d}
Find the number of:

(i) Sub sets

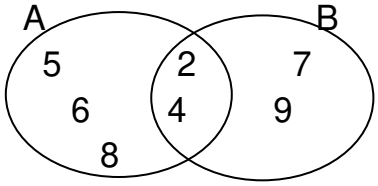
(ii) Proper subsets

12. Write two examples of empty sets

13.Draw a symbol for equivalent set

14.Given that K= {a,b,c,d,e,f }
KUL={ a,b,c,d,e,f,g,h,i,j }. Find n(L)

15.In the figure below find A'B

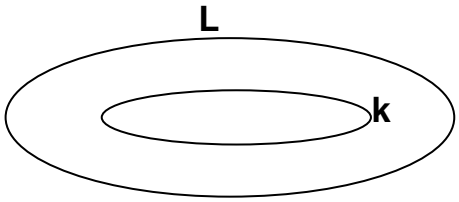


16.Set k = {a,b,c }. List all subsets of set k

17. Given that M = {all prime numbers less than 15 }.Find n(M)

18. Given that A= {1,2,3,4,5} and B = {1,3,5,7,9}. Find the number of subsets in A∩B.

19. Describe the shaded part on the venn diagram

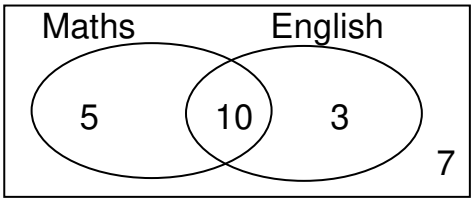


20. Draw a venn diagram to show that all cows are animals

21. Given that.
Set A={all counting numbers less than 10}
B = {all odd numbers from 1 to 10}.
Find n(AUB)

22.Set T has 16 subsets. How many elements has set T?

23.Study the venn diagram below and use it to answer the questions



(a).How many pupils study mathematics?

(b)How many pupils do not study mathematics?

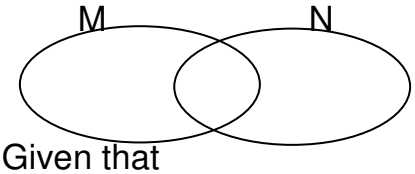
(c).Find the probability of selecting a pupil who studies either Mathematics or English.

Mathematics is the key

24.Express the number of pupils who study one subject as a percentage of the whole class

25.Set K has 31 proper subsets. How many elements are in set K?

17.Shade M'∩N



18. Given that

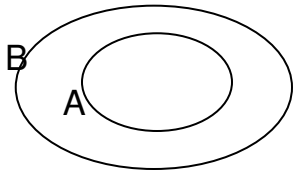
X={p, q, r, s, t}

Y={o, p, a, q, u, e}

Find n(X-Y)

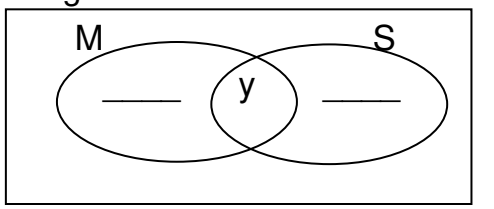
19. How many subsets are in a set with six elements?

20. What is the relationship between A and B as shown in the venn diagram below?



21. In a class of **50 boys**, **40** like mathematics **(M)** and **25** like science **(S)**.some boys **y** like both subjects and **2** do not like any of the **two** subjects.

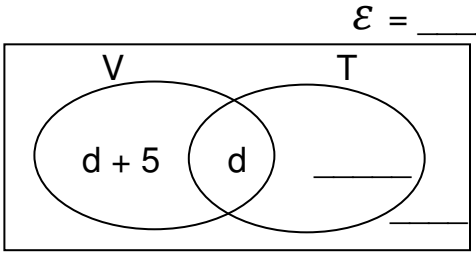
(a) Show the information in the venn diagram below. $\mathcal{E}$ = 50



(b).How many boys like mathematics only?

22. In a class, **31**pupils play tennis **(T)** and **(d+5)** play volley ball **(V)** only. **d** pupils play both games while **3** play neither of the games.

(a).Complete the venn diagram.



23.Given than n(Ɛ) = 25, n (A) = 15, n(B) = 18 and n (AUB)' = 2

(a) Draw a venn diagram to show the above information.

(b)Find n(A∩B)

Mathematics is the Key

WHOLE NUMBERS

SUBTOPIC: FORMING NUMERALS USING GIVEN DIGITS

CONTENT: Using digits to form smallest and largest numbers.
Finding the sum of/product/difference/quotient between the smallest and largest numbers formed from the given digits.

Examples:

- Write down all 3-digit numerals that can be formed using the digits; 4, 6, 7
  476 467 647 674 746 764
- Find the difference between the smallest and highest numerals formed.
  Smallest = 467
  Biggest = 764
  Difference = 7 6 4
  - 4 6 7
  2 9 7

Activity:

- ✓ Using digits **3, 0, 6 ,**form all 3 - digit numerals that can be formed.
- ✓ Find the product of the smallest and the biggest numerals formed.

- ❖ Write down all three digit even numerals that can be formed from ***8, 3, 4.***
- ❖ Find the sum of all 3-digit odd numbers that can be formed

SUBTOPIC: PLACE VALUES AND VALUES OF DIGITS UP TO MILLIONS

The place value chart

Million			Thousands			Units		
H	T	O	H	T	O	H	T	O
		7	6	5	4	3	2	9

The table below shows the place values and values of the numeral above

Digit	***Place value in words***	***Place value in figures***	***Value (digit × P.V)***
9	Ones	1	$9 \times 1 = 9$
2	Tens	10	$2 \times 10 = 20$
3	Hundreds	100	$3 \times 100 = 300$
4	Thousands	1,000	$4 \times 1{,}000 = 4{,}000$
5	Ten thousands	10,000	$5 \times 10{,}000 = 50{,}000$
6	Hundred thousands	100,000	$6 \times 100{,}00 = 600{,}000$
7	Millions	1,000,000	$7 \times 1{,}000{,}000 = 7{,}000{,}000$

Mathematics is the key

Example: Find the value of 6 in the number 2602

2 6 0 2
- 2 → Thousands (1000)
- 6 → Hundreds (100)
- 0 → Tens (10)
- 2 → One (1)

Value of 6 = 6 x 100 = 600

Activity:

1. Write the place value and value of 9 in
   (a). 345987
   (b).26490321
   (c).689458345
2. Find the sum of the value of seven and the place value of 9 in 23745893

SUB TOPIC: WRITING IN WORDS (UP TO MILLION)

Examples:

(i) Write 20,480 in words.

Thousand	Units
20	480

Twenty thousand, four hundred eighty.

(ii) 6,808,040

Million	Thousand	Units
6	808	040

Six million, eight hundred eight thousand forty.

Activity:

Write the following in words.

- 34567
- 9999999
- 3,230,203
- 67,045
- 2,999,087

Mathematics is the Key

SUB TOPIC: WRITING NUMERALS IN FIGURES

Examples:

Write in figures:

(i) seven million, four hundred twenty one thousand, nine hundred five.

7 million = 7,000,000

421 thousand + 421,000

905 905

7,421,905

(ii) A quarter of a million

A million = 1,000,0000

$\frac{1}{4}$ *of* $1,000,000$

$\frac{1}{4} \times 1,000,000$

$= 250,000$

(iii) Write " six hundred thirty nine thousand, seven" in figures

(iv) Write " three million, thirty nine thousand, eight" in figures

(v) Write " nine million, four hundred thirty nine thousand, six" in figures

(vi) Write "thirty nine thousand, fifty seven" in figures

SUB TOPIC: EXPANDED NOTATION

CONTENT: Expanding numerals using:

- **Place values**
- **Values**
- **Powers of ten/exponents**

Examples:

Expand: 5624 using:

Place values: **5624 = (5 x 1000) + (6 x 100) + (2 x 10) + (4 x 1)**

Values: **5624 = 5000 + 600 + 20 + 4**

Powers:

10^3	10^2	10^1	10^0
5	6	2	4

5624 = (5 x 10^3) + (6 x 10^2) + (2 x 10^1) + (4 x 10^0)

Mathematics is the Key

Activity:

Expand the following as instructed

a) 2,354 (place values)
b) 40,369 (place values)
c) 45,689 (values)
d) 29,542(values)
e) 890765 (exponents)
f) 2354 (powers)

SUB TOPIC: FINDING THE EXPANDED NUMBERS (SHORT FORM)

Examples:

Write as a single number.

(i) (6 x 10,000 + (4 x 10) + (5 x 1)

(6 x 10000) + (4 x 100) + (5 x 1)

= 60,000 + 400 + 5

= 60000

400

\+ 5

60405

(ii) 9000000 + 700 00 + 50000 + 1000 + 30 + 8

= 9 000 000

700 000

50 000

1 000

30

\+ 8

9 750 038

(iii) $(2 \times 10^5) + (4 \times 10^3) + (6 \times 10^0) + (7 \times 10^2)$

(2 x 10 x 10 x 10 x 10 x 10) + (4 x 10 x 10 x 10) + (6 x 1) + (7 x 10 x 10)

200,000 + 4000 + 6 + 700

200 000

4000

700

\+ 6

204706

Mathematics is the Key

Activity

What number has been expanded to give?

a) $3000 + 200 + 3$

b) $(5 \times 1000) + (9 \times 100) + (2 \times 10) + (8 \times 1)$

c) $(9 \times 10^4) + (9 \times 10^2) + (2 \times 10^1) + (8 \times 10^0)$

SUB TOPIC: ROUNDING OFF WHOLE NUMBERS

Examples:

Round off the following as instructed.

(i) 3864 to the nearest hundreds.

TH	H	T	0
3	8	~~6~~	~~4~~
+	1		
3	9	0	0

(ii) 214 (nearest tens

H	T	O
2	1	~~4~~
+	0	
2	1	0

(iii) 4.78516 to the nearest thousandths.

0	T^{th}	H^{th}	TH^{th}	T/TH^{th}
4	. 7	8	5	~~1~~
+ 0	. 0	0	0	
4.	7	8	5	

(i) 75.634 to the nearest whole number nearest whole number

T	0	Tth	Hth	THth
7	5 .	~~6~~	~~3~~	~~4~~
+	1			
7	6 .			

Activity:

1. **Round off the following as instructed in brackets**
   a) **45637 (nearest hundreds)**
   b) **99999 (nearest thousands)**
   c) **780937887 (nearest millions)**
   d) **89.58(nearest tenths)**
   e) **23.786(nearest hundredths)**
   f) **7.239(nearest two d.p)**

Mathematics is the Key

SUB TOPIC: ROMAN NUMERALS (converting Hindu Arabic numerals to roman numerals)

BASIC ROMAN NUMERALS

1	***=I***
5	***=V***
10	***= X***
50	***=L***
100	***=C***
500	***=D***

NOTE:
All other numerals are got from basic roman numerals by adding or subtracting .

Example

1. Write the following in roman numerals

1 2 4

100 + 20 + 4

100 = C

20 = XX

4 = IV

∴ 124 = ***CXXIV***

ii) 1962

1000 + 900 + 60 +2

1000 = M

900 = CM

60 = LX

2 = II

∴ 1962= ***MCMLXII***

Activity

Write the following in roman numerals

a) 49
b) 235
c) 333
d) 78
e) 140
f) 999
g) 1449

SUBTOPIC: ROMAN NUMERALS (conversion of Roman numerals to Hindu Arabic)

Write the following numbers in Hindu Arabic numerals

(i) MXLV

M + XL + V

M = 1000

XL = 40

V = 5

MXLV = 1045

(ii) CD XCIV

Mathematics is the Key

CD + XC + IV

CD = 400

XC = 90

IV = 4

CDXCIV = 494

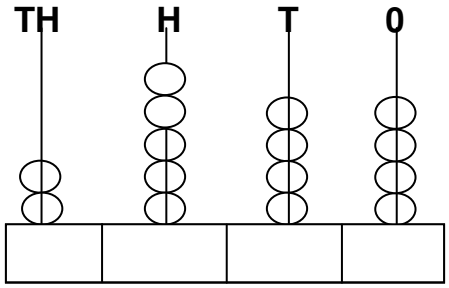
(iii) Write the following in Hindu Arabic numerals

- *XLIV*
- *CVIII*
- *XCIX*
- *CDXCIV*
- *MXCIV*

(iv) A church was built in MDCCLXIV. Which year is this in Hindu Arabic?

END OF TOPIC EXERCISE

1. Show 2843 on the abacus.
2. Write the number shown on the abacus in roman numerals.



3. Write the place value of each digit in 486349334.
4. Workout the sum of the value of 6, 8 and 7 in 4638047.
5. Workout the difference between that value of 7 and the place value of 9 in 49834734.
6. Write the product of the value of 6 and 3 in 8469 in roman numerals.
7. Write 4009009 in words.
8. Write "Two hundred thirty six thousand forty nine" in expanded form using exponents.
9. Expand 963.07 using values.
10. Which number was expanded to give $(6x10^{4}) + (8 \times 10^{2}) + (3 \times 10^{-1}) + (7x10^{-2})$
11. Round off 9999 to the nearest thousands.
12. Round off 67.987 to the nearest hundredths.
13. Round off 99.999 to the nearest hundredth.
14. Round off 16.873 to the nearest whole number.
15. Expand 635.057 using exponents.
16. St. Mary's college was constructed in MCMLXXXVII. In which year was it constructed?
17. Write 18.487 in words.
18. Find the sum of the value of 7 and the value of 3 in 3.467.
19. Write forty six and eighty seven thousandths in figures.

Mathematics is the Key

OPERATION ON NUMBERS

SUB TOPIC: ADDITION OF LARGE NUMBERS

Examples:

Add correctly:

(i)

$$\begin{array}{r} 5\ 146\ 144 \\ +\ 0\ 005\ 614 \\ \hline 5\ 151\ 758 \end{array}$$

(ii) The population in four countries of a district shows that county A is 23,467, county B is 21 602, county C is 19466 and county D is 25 102. What is the total population in the district?

County A	***23 467***
County B	***21 602***
County C	***19 466***
County D	***+25 012***
	89 547

Emphasis on place value arrangement and re-grouping.

(iii) Add correctly

- $23,456 + 89,045$
- $668,433 + 998,765$
- $4,677 + 78,890$

(iv) In a certain country, 467,883 patients contracted COVID-19 in March and 349,277 patients in April and 89,898 patients in May. How many patients contracted COVID-19 in the three months of the year 2020?

SUB TOPIC: SUBTRACTION OF LARGE NUMBERS

CONTENT: Examples:

Subtract correctly:

(i)

$$\begin{array}{r} 596\ 148\ 320 \\ -\ 239\ 610\ 510 \\ \hline 356\ 537\ 810 \end{array}$$

(ii) What is the difference between 3060 and 186?

$$\begin{array}{r} 3\ 060 \\ -\ 186 \\ \hline 2\ 874 \end{array}$$

Emphasis on place value arrangement and regrouping.

(iii) Subtract correctly

- $4657 - 2379$
- $100{,}000 - 46{,}575$
- $87{,}565 - 7{,}389$

Mathematics is the Key

(iv) 78,377 patients contracted COVID-19 in April 2020 in a certain country. If 2,567 died and 45,671 recovered. How many patients remained with Corona Virus Disease 2019 (COVID-19)

SUB TOPIC: MULTIPLICATION OF LARGE NUMBERS

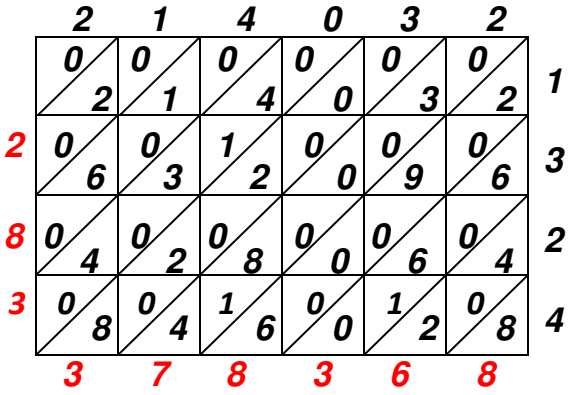
Examples:

Multiply:

(i) 214 032 x 1324

214 032
X 1 324
856 128
4 280 640
64 209 600
+ 214 032 000
283 378 368

Lattice method(Napier's rod method)



∴214,032 x 1,324 = 283 378 368

(ii) A store can hold 1973 boxes each containing 34 pairs of shoes. How many pairs of shoes are in the store?

1 973
X 34
7 892
+59 190
67 082 pairs

(iii) Multiply the following

- 458×234
- 24307×45

Mathematics is the Key

(iv) 134 MPs contributed 9,570 kilograms of posho each on average during the time COVID-19. How many kilograms of posho did they contribute altogether?

SUB TOPIC: DIVISION OF LARGE NUMBERS

Examples:

(i) Divide 3816648 by 132

```
        2 8 9 1 4
   ┌──────────────
132 | 3 8 1 6 6 4 8
    -2 6 4
      1 1 7 6
     -1 0 5 6
        1 2 0 6
       -1 1 8 8
           1 8 4
         - 1 3 2
             5 2 8
           - 5 2 8
```

3816648 ÷ 132= 28914

(ii) There are 6315 books to be packed in 15 boxes. How many books should be packed in each box?

```
      4  2 1 books
   ┌──────────
15 | 6 3 1 5
     6 0
       3 1
     - 3 0
         1 5
        -1 5
```

(iii) Divide the following

- $650075 \div 5$
- $5868 \div 12$

(iv) The RDC of a certain district shared sh.982,500 amongst 15 members on the COVID-19 task force in 2020. How much did each member get?

SUB TOPIC: PROPERTIES OF NUMBERS

DISTRIBUTIVE PROPERTY

Examples:

Use the distributive property to work out:

(i) (379 x 27) + (27 x 21)

Re-arrange(27 x 379) + (27 x 21)
= 27 x (379 + 21)
= 27 x (400)
= 27 x 400
= 10800

(ii) (137 x 42) – (37 x 42)

(137 x 42) – (37 x 42)
= (42 x 137) – (42 x 37)
= 42 x (137 – 37)
= 42 x 100
= 4200

Mathematics is the Key

Workout the following;

1. $(2 \times 17) + (2 \times 13)$
2. $(75 \times 29) - (75 \times 19)$
3. $(129 \times 37) - (129 \times 27)$
4. $(290 \div 70) - (10 \div 70)$
5. $(179 \div 13) - (10 \div 13)$

ASSOCIATIVE PROPERTY

Example

The alteration of the position of the brackets does not change the result.

Use the associative property to workout

(5+8)+2 = 5+(8+2) = (5+2)+8

13+2 = 5+10 = 7 +8

15 = 15 = 15

The alteration of the position of the brackets does not change the result.

(5x8) x 2 = 5x(8x2) = (5x2)+8

40x2 = 5x16 = 10x8

80 = 80 = 80

Conclusion : *Associative property works with both addition and multiplication only.*

COMMUTATIVE PROPERTY

Example

4+3 = 3+4 (What you start with does not affect the result)

7 7

4x3 = 3x4 (What you start with does not affect the result)

12 = 12

Conclusion: *Commutative property works with both addition and multiplication*

END OF TOPIC EXERCISE

1. A wire of length 161 metres was shared by some boys the average length of wire each boy got was 23 metres. Find the number of boys which shared the wire.
2. In a village there are 680 males, 328 females and 462 children. How many people are in that village altogether?
3. Workout 23 – 48 + 37
4. In a league tournament, **3** points were awarded for a win, **1** point for a draw and **0** points for a loss. Five tournaments and the results were recorded as shown below.

Team	P	W	D	L	PTS
BURAMA FC	6	3	2	1	
BURUMA FC	6	4	0	2	

Mathematics is the Key

GADAMA FC	6	5	1	0	
ENDAKO FC	6	2	2	2	
PHILIPS FC	6	4	2	0	

P = played **W**= win **D**= Draw **L**= loss

Complete the table with the points for each team.

5. Musa's farm produces 1500 eggs everyday. If a tray of eggs is sold at sh.12000 and it holds 30 eggs.

(a) How many trays does he get everyday?

(b) How much money does he get every day?

(c) A trader bought ten trays of eggs from the farm and sold each at sh. 450.

(i)Calculate the profit made.

(ii) A trader bought other ten trays and 75 eggs got broken. If he sold the remaining eggs at sh. 500 each. Calculate the loss he made.

6. Write 0.0867 in standard form.
7. Write 187000 in standard form
8. Use distributive property to workout the following. (81 x 17) + (19 x 17)
9. Workout. (3.6 x 5) + (6.4 x 5)
10. Workout using distributive property.
    (65 ÷ 5) – (20 ÷ 5)

PATTERNS AND SEQUENCES

SUB TOPIC: DIVISIBILITY TESTS

Test for 2.

A Number is divisible by 2 if the digit in the one's place is 0, 2, 4, 6, or 8 eg 1460

Test for 3:

A number is divisible by 3 if the sum of its digits is divisible by 3 eg 741 = 7 + 4 + 1 = 12

Test for 4:

A number is divisible by 4 if the number formed by its last two digits is divisible by 4. eg 572. The last two digits are 7 and 2 therefore the number formed is 72 which is divisible by 4. Hence 572 is divisible by 4.

Test for 5

A number is divisible by 5 if the last digit in the ones place is either 0 or 5. eg 360 or 805.

Activity

1. Write any two numbers divisible by 2
2. Which of the numbers is divisible by 3
   34 236 11190 2783
3. Which of the numbers is divisible by 4
   4612 139 8500 7869

Mathematics is the Key

Test for 6:
A number is divisible by 6 if it is divisible by 2 and 3. In other words a number is divisible by 6 if it is even and the sum of its digits is divisible by 3.
Example:
618 is divisible by 6 since it is an even number and the sum of its digits 6 + 1 + 8 = 15 is divisible by 3.

738 is divisible by 6 since it is an even number and the sum of its digits 7 + 3 + 8 = 18 is divisible by 3. Therefore 738 is divisible by 6.

Test for 7:
When the last digit of a number is doubled and the result is subtracted from the number formed by the remaining digits, the outcome is divisible by 7.

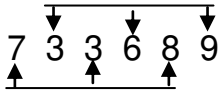
Example: Take the number 861. the last digit is 1 and the number formed by the remaining digits is 86, double 1 to give (1+1)= 2
Subtract 2 from 86 to give (86 – 2) = 84
84 is divisible by 7. Hence 861 is also divisible by 7.

Test for 8:
A number is divisible by 8 if the number formed by the last three digits is divisible by 8.
Example:
In the number 7960,760 is number formed by the last three digits. It is divisible by 8 therefore 7960 is divisible by 8.

Test for 9:
A numbers is divisible by 9 if the sum of its digits is divisible by 9.
Example: 198 the sum of 198 is 1+9+8 = 18
18 is divisible by 9 therefore 198 is divisible by 9.

Test for 10:
A number is divisible by 10 if the digit in the ones place is 0 eg 70, 60, 120, 3010.
A number which is divisible by 10 is also divisible by 2 and 5.

Test for 11:
A number is divisble by 11 if the difference between the sum of the digits in even places and the sum of the digits in the odd place is zero (0) or divisible by 11.

eg Even position: 

Odd position

Mathematics is the Key

Sum of the numbers in odd positions = 7 + 3 + 8 = 18
Sum of the numbers in even positions = 3 + 6 + 9 = 18
Difference between sums =18 – 18 = 11
Since difference is divisible by 11
∴ the number 676390 is divisible by 11.

Activity

1. Which of the following numbers is divisible by 6
   456 1476 129
2. Circle the numbers divisible by10
   34 290 190 2789
3. Which of the following numbers is divisible 9
   1476 91099 189 4567

SUB TOPIC: WHOLE, NATURAL, ODD, EVEN AND PRIME NUMBERS

(i) Whole numbers:
All positive numbers with zero (0) inclusive form a set of whole numbers
eg 0, 1, 2, 3, 4, 5, 6, 7, 8, 9,……

(ii) Natural numbers:
Natural numbers are counting numbers. The first natural number is 1
eg 1, 2, 3, 4, 5, 6, 7, 8, 9, …..

(iii) Odd numbers:
Any number which I not exactly divisible by 2
eg 1, 3, 5, 7, 9, …..

(iv) Even numbers:
Any number which is exactly divisible by 2. The first even number is 0
eg 2, 4, 6, 8,

(v) Prime numbers:
Numbers with only two factors. One and itself. The first prime number is 2. 2 is the only even/prime number.
eg 2, 3, 5, 7, ….

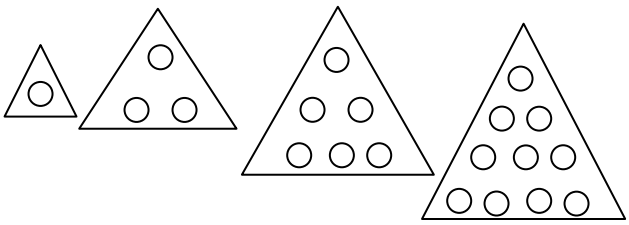
Activity

1. Find the sum of the first five;
   (a) Prime numbers
   (b) Even numbers
   (c) Odd numbers
2. Find the product of the fourth prime number and the third whole number.

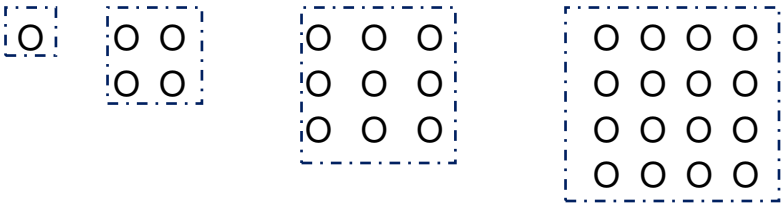
Mathematics is the Key

(i) Composite numbers:
Numbers with more than two factors. Eg 4, 6, 8, 9 , 10, 12,……

(ii) Triangular numbers:
Numbers got by adding consecutive counting numbers eg 1, 3, 6, 10, ….



(iii) Square numbers:
Numbers got by adding consecutive odd numbers starting from 1.



1 1 + 3 1 + 3 + 5 1 + 3 + 5 + 7

1 4 9 16

OR
Numbers got after multiplying consecutive counting numbers by themselves.

1 x 1	2 x 2	3 x 3	4 x 4	5 x 5
1	4	9	16	25

(iv) **Cube numbers**:
Numbers got by multiplying a number by itself three times.

Eg $1 \times 1 \times 1 = 1^3 - 1$
$2 \times 2 \times 2 = 2^3 = 8$
$3 \times 3 \times 3 = 3^3 = 27$
$4 \times 4 \times 4 = 4^3 = 64$
$5 \times 5 \times 5 = 5^3 = 125$

1. Find the sum of the first 8 composite numbers.
2. Find the sum of the third and the seventh triangular numbers.
3. Find the product of the fourth square number and the sixth cube number.

Mathematics is the Key

SUB TOPIC: finding sum of consecutive counting numbers using the formula

Sum of consecutive counting numbers

$$n(\frac{n+1}{2})$$

Examples .

1. Find the sum of the first 20 counting numbers.

$$n(\frac{n+1}{2})$$

$$20(\frac{20+1}{2})$$

$$20 \times \frac{21}{2}$$

$$10 \times 21$$

$$\underline{210}$$

2. Find the sum of the first 15 counting numbers.
3. Find the sum of the first 40 counting numbers
4. What is the 100th triangular number?

SUB TOPIC: MULTIPLES AND FACTORS

(i) Multiples:

These are numbers which are obtained by multiplying a number by consecutive counting numbers ie. x1 x 2 x 3 , etc

Examples:

(i) M6 = {6 x 1, 6 x 2, 6 x 3, 6 x 4, 6 x 5, 6 x 6, 6 x 7……}
6 12 18 24 30 36 42

(ii) M8 = {8 x 1, 8 x 2, 8 x 3, 8 x 4, 8 x 5, 8 x 6, 8 x 7 ….}
8 16 24 32 40 48 56 ….

(ii) M9 = {9 x 1, 9 x 2, 9 x 3, 9 x 4, 9 x 5, 9 x 6, 9 x 7…..}
9 18 27 36 45 54 63 ….

(ii) Factors:

Any one of a pair of numbers which when multiplied gives the same multiple is called a Factor.

Mathematics is the Key

List examples:

All factors of 6

6 ÷ 1 = 6

6 ÷ 2 = 3

6 ÷ 3 = 2

6 ÷ 6 = 1

F_6 = {1, 2, 3, 6}

Note F_6 means factors of 6.

1 x 6 = 6

2 x 3 = 6

F_6 = {1, 2, 3, 6}

Find factors of 9.

1 x 9 = 9

3 x 3 = 9

F_9 = {1, 3, 9}

Activity

1. ***Find the first 10 multiples of;***
   - ***5***
   - ***6***
   - ***12***
   - ***9***
2. ***Find the 20th multiple of 5***
3. ***Find all factors of;***
   - ***12***
   - ***15***
   - ***24***
   - ***29***
   - ***36***

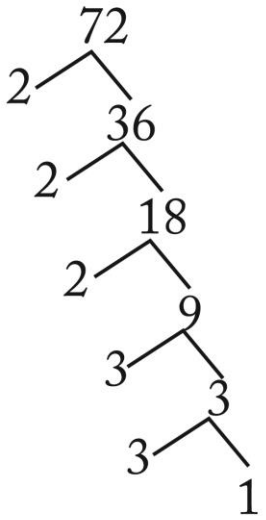
SUB TOPIC: PRIME FACTORISATION

Prime factorise 72

Ladder method

2	72
2	36
2	18
3	9
3	3
	1

factor tree method



The answer can be written in three ways.

(a) Multiplication form

$2 \times 2 \times 2 \times 3 \times 3$

Mathematics is the Key

(b) Power/exponent form/superscript form

$2^3 \times 3^2$

(c) Set notation/subscript form

$\{2_1, 2_2, 2_3, 3_1, 3_2\}$

Activity

1. ***Prime factorise the following as instructed***

(a) 36

(b) 48(multiplication form)

(c) 100(set notation)

(d) 80(power form)

(e) 64(multiplication form)

SUB TOPIC: Lowest common Multiple(L.C.M) AND Highest Common Factor(H.C.F)

(i) Find the LCM of 24, 36 and 40.

2	*24*	*36*	*40*
2	*12*	*18*	*20*
2	*6*	*9*	*10*
3	*3*	*9*	*5*
3	*1*	*3*	*5*
5	*1*	*1*	*5*
	1	*1*	*1*

LCM = 2 x 2 x 2 x 3 x 3 x 5

= 4 x 6 x 15

= 4 x 90

= 360

(ii) Find the HCF of 6, 8 and 12.

2	*6*	*8*	*12*
	3	*4*	*6*

GCF = 2

Activity

1. **Find the LCM of 4 and 12**
2. **Find the LCM of 12 and 16**
3. **Find the GCF of 15 and 18**
4. **Find the GCF of 24 and 36**

Mathematics is the Key

SUB TOPIC: APPLICATION OF LCM AND GCF

REMEMBER

The least number that is divided by more than one numbers in called LCM.

The biggest number that divides more than one number at ago is called GCF.

The product of the LCM and GCF is equal to the product of the two numbers.

TRY THESE

(i) Find the least number which is exactly divisible by 6, 8 and 12.

(ii) What is the smallest number of sweets that can be shared by 3, 4 or 6 pupils leaving 5 sweets as a reminder?

(iii) Two bells are used in Star p/s at intervals of 30 minutes and 40 minutes respectively. They are first rung together at 8:45 am, when will the two bells ring together again?

(iv) The product of two numbers is 240. One of them is 60, work out their:

(a) LCM

(b) GCF

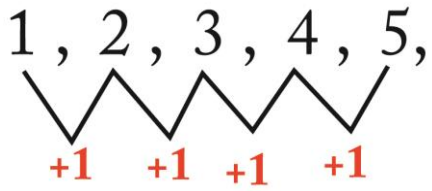
(v) The LCM of x and y is 48 and HCF is 4. If x=16 find y.

SUB TOPIC: CONSECUTIVE NUMBERS

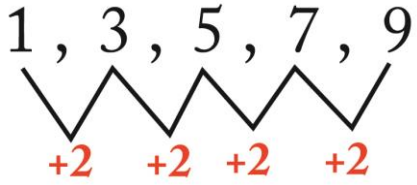
Consecutive numbers are numbers which follow each other using a defined pattern.

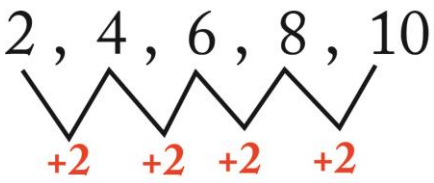
NOTE THE FOLLOWING

- ***Counting number, integers and whole numbers have a range / a pattern of one.***



- ***Even numbers and odd numbers have a range of two.***





Mathematics is the Key

Examples:

(i). *The sum of three consecutive counting numbers is 18. Find the numbers.*

Let the first number be r.

1st	2nd	3rd	Sum
R	R + 1	R + 2	18

$$R + R + 1 + R + 2 = 18$$
$$R + R + R + 1 + 2 = 18$$
$$3R + 3 = 18$$
$$3R + 3 - 3 = 18 - 3$$
$$3R = 15$$
$$\frac{3R}{3} = \frac{15}{3}$$
$$\underline{R = 5}$$

1ST NO.

$R = 5$

2ND NO.

$R + 1$ *but* $R = 5$

$5 + 1 = 6$

3RD NO.

$R + 2$ *where* $R = 5$

$5 + 2 = 7$

The numbers are

5, 6, AND 7

Example ii.

(ii).The sum of 3 consecutive odd numbers is 15. Find the numbers

Let the first number be y.

1st No.	2nd No.	3rd No	Total
Y	Y + 2	Y + 4	15

$$Y + Y + 2 + Y + 4 = 15$$
$$Y + Y + Y = 2 + 4 = 15$$
$$3Y + 6 = 15$$
$$3Y + 6 - 6 = 15 - 6$$
$$3Y = 9$$
$$\frac{3Y}{3} = \frac{9}{3}$$
$$\underline{Y = 3}$$

1st No.

$y = 3$

2nd No.

$y + 2 = y$

Where $y = 3$

$3 + 2 = 5$

3rd No.

$y + 4$

where $y = 3$ $3 + 4 = 7$

The numbers are

3, 5, and 7

(iii) The sum of 4 consecutive even numbers is 76. What are the numbers?

(iv) The sum of three consecutive integers is 84. Find the numbers

(v) The sum of 3 consecutive odd numbers is 39. Find the numbers

Mathematics is the Key

SUB TOPIC: FINDING SQUARES

Examples:

a) Find the square of 4.

$$42 = 4 \times 4 = 16$$

b) Find the square of 25

$$25^2 = 25 \times 25 = 625$$

c) Find the square of the following numbers

- 6
- 10
- 16
- 30
- 0.25

SUB TOPIC: FINDING SQUAREROOTS

(i) Find the square root of 4.

$\sqrt{4} = 2$	4
2	2
	1

$= \sqrt{2 \times 2} = 2$

(ii) Find the square root of $7\ ^1/_9$

$$\sqrt{7\frac{1}{9}} = \sqrt{\frac{64}{9}}$$

2	64
~~2~~	32
2	16
~~2~~	8
2	4
~~2~~	2
	1

3	9
~~3~~	3
	1

$\sqrt{9} = 3$

$$\sqrt{7\frac{1}{9}} = \sqrt{\frac{64}{9}} = \frac{8}{3} = 2\frac{2}{3}$$

$\sqrt{64} = 2 \times 2 \times 2 = 8$

(iii) Find the square root of the following

- 81
- 196
- 400
- $20\frac{1}{4}$

(iv) Find the square root of 0.36

Mathematics is the Key

SUB TOPIC: **FINDING MISSING NUMBERS WHEN GIVEN SSEQUENCES**

REMEMBER:

- Increasing sequences use addition patterns and multiplication patterns
- Reducing sequences use subtraction patterns and division patterns
- Some sequences fall under types of numbers
- Only prime numbers and composite numbers are the only types of numbers without defined patterns.

Examples

1. Find the next numbers in the sequences below.

   a) 2, 3, 5, 8, 12, **17, 23**

   $2 + 1 = 3$

   $3 + 2 = 5$

   $5 + 3 = 8$

   $8 + 4 = 12$

   $12 + 5 = \mathbf{17}$

   $17 + 6 = \mathbf{23}$

   b) 18, 17, 14, 9, **2** , **-7**

   $18 - 1 = 17$

   $17 - 3 = 14$

   $14 - 5 = 9$

   $9 - 7 = \mathbf{2}$

   $2 - 9 = \mathbf{-7}$

   c) 2, 3, 5, 7, 11, **13**, **17**

   They are prime numbers

2. Find the next numbers in the following sequences.

   A) 2, 3, 6, 12, 22, _____, _____

   B) 64, 32, 16, 8, 4, _____,_____

   C) 1, 3, 6, 10, _____, _____

   D) 81, 64, 49, 36, _____, _____

   E) 3, 4, 12, 39,_____,_____

Mathematics is the Key

TOPICAL EXERCISE:

1. Add: 426 + 1519 + 3
2. Subtract 105 from 200
3. Evaluate $3^x \div 3^2 = 27$
4. $5^3 \times 5^{-2} \div 5^1$
5. There were 32 apples in each box and 12 boxes in each carton. How many apples did Annet get if she bought 124 cartons?
6. What is the sum of 8456 litres of petrol and 45631 litres?
7. There were 38600 chicken on the teacher's farm. 12364 were sold on Idd day. How many remained?
8. At a party, 4848 people were served with sodas each. How many crates of soda were bought if each crate contains 24 bottles?
9. Work out (a) 2.5 x 13 + 2.5 x 7
10. 4.5 x 75 – 4.5 x 25
11. What number must be added to 54068 to give 60000?
12. Find the sum of even numbers between 13 and 31.
13. List down all the composite numbers between 2 and 15.
14. Find the G.C.F of 8 and 12.
15. What is the Lowest Common Multiple of 6, 8 and 16?
16. Workout the square root of 961.
17. The sum of 3 consecutive natural numbers is 63. Find the numbers.
18. Find the next number in the sequence: 4, 7, 6, 9, 8, 11, …
19. What is the Smallest number which when divided by 9 and 11 leaves a remainder of 2?
20. Bulangiti buses leave for Kasese every 3 hours and Gateway buses leave for Soroti every four hours. Two buses set off from Kampala's bu park at 7:30am. When will the two buses leave together again?
21. The G.C.F of two numbers is 2 and their L.C.M is 24. If one of the numbers is 8, find the second number.
22. The sum of 3 consecutive even numbers is 36. Find their range.
23. Find the cube root of 64.
24. The area of a square garden is 169m2. Fin d its perimeter.
25. Find the square root of 0.81

Mathematics is the Key

SUB TOPIC: OPERATIONS OF FRACTIONS(Addition and subtraction)

Examples:

1. ***workout*** $\frac{1}{3}+\frac{1}{2}$

$$\frac{1}{3}+\frac{1}{2}=\frac{2+3}{6}$$
$$=\frac{5}{6}$$

2. ***Workout***: $1\frac{3}{4}+1\frac{5}{6}$

$$1\frac{3}{4}+1\frac{5}{6}$$
$$\frac{7}{4}+\frac{11}{6}$$
$$\frac{21\ +\ 22}{12}=\frac{43}{12}$$
$$3\ \frac{7}{12}$$

3. ***Workout:*** $\frac{3}{4}-\frac{1}{3}$

$$\frac{3}{4}-\frac{1}{3}$$
$$\frac{9-4}{12}$$
$$\frac{5}{12}$$

4. **Workout:** $3\ \frac{5}{6}-1\frac{4}{5}$

$$3\ \frac{5}{6}-1\frac{4}{5}$$
$$\frac{23}{6}-\frac{9}{5}$$
$$\left(\frac{23}{6}\times\frac{5}{5}\right)-\left(\frac{9}{5}\times\frac{6}{6}\right)$$
$$\frac{115-54}{30}$$
$$\frac{61}{30}$$
$$2\ \frac{1}{30}$$

Workout the following

(a) $\frac{1}{5}+\frac{2}{3}$

(b) $\frac{7}{8}-\frac{3}{5}$

(c) $2\frac{1}{2}+3\frac{4}{7}$

(d) $5\frac{4}{5}-3\frac{2}{7}$

Mathematics is the Key

SUB TOPIC: OPERATION ON FRACTIONS(multiplication of fractions)

Examples:

1. *Workout*: $\frac{1}{5} \times 3$

$\frac{1}{5} \times 3$

$\frac{3}{5}$

2. ***Workout:*** $\frac{1}{3} \times \frac{3}{4}$

$\frac{1}{3} \times \frac{3}{4}$

$\frac{1}{4}$

3. ***Workout:*** $2\frac{1}{4} \times 1\frac{1}{5}$

$\frac{9}{4} \times \frac{6}{5}$

$\frac{27}{10}$

$2\frac{7}{10}$

4. ***Workout the following***

(a) $\frac{3}{7} \times 35$

(b) $\frac{2}{3} \times \frac{3}{10}$

(c) $\frac{5}{11} \times 1\frac{1}{5}$

(d) $4\frac{3}{7} \times 3\frac{2}{3}$

SUB TOPIC: OPERATION ON FRACTIONS (Division of fractions)

Examples:

1. ***Workout:*** $\frac{2}{5} \div 2$

$\frac{2}{5} \div 2$

$\frac{2}{5} \times \frac{1}{2}$

$\frac{1}{5}$

2. ***Workout:*** $\frac{3}{4} \div \frac{1}{2}$

$\frac{3}{4} \div \frac{1}{2}$

$\frac{3}{4} \times \frac{2}{1}$

$\frac{3}{2}$

$1\frac{1}{2}$

Try these:

1. ***Workout the following.***

(a) $\frac{3}{4} \div \frac{1}{3}$

(b) $\frac{4}{5} \div \frac{1}{8}$

(c) $\frac{5}{11} \div \frac{7}{22}$

(d) $5\frac{3}{4} \div 3\frac{1}{2}$

Mathematics is the Key

Brackets
Of
Division
Multiplication
Addition
Subtraction

Examples:

1. Workout : $\frac{2}{3} of \frac{3}{4} - \frac{1}{3}$

$$\frac{2}{3} of \frac{3}{4} - \frac{1}{3}$$
$$\left(\frac{2}{3} \times \frac{3}{4}\right) - \frac{1}{3}$$
$$\frac{1}{2} - \frac{1}{3}$$
$$\left(\frac{1}{2} \times \frac{3}{3}\right) - \left(\frac{1}{3} \times \frac{2}{2}\right)$$
$$\frac{3}{6} - \frac{2}{6}$$
$$\frac{3-2}{6}$$
$$\frac{1}{6}$$

2. : $\boldsymbol{Workout \frac{5}{6} - \frac{3}{4} \div \frac{3}{2}}$

$$\boldsymbol{\frac{5}{6} - \frac{3}{4} \div \frac{3}{2}}$$
$$\boldsymbol{\frac{5}{6} - \left(\frac{3}{4} \div \frac{3}{2}\right)}$$
$$\boldsymbol{\frac{5}{6} - \frac{3}{4} \times \frac{2}{3}}$$
$$\boldsymbol{\frac{5}{6} - \frac{1}{2}}$$
$$\boldsymbol{\frac{\left(\frac{5}{6} \times 6\right) - \left(\frac{1}{2} \times 6\right)}{6}}$$
$$\boldsymbol{\frac{5-3}{6}}$$
$$\boldsymbol{\frac{2}{6}}$$
$$\boldsymbol{\frac{1}{3}}$$

Activity

1. **Workout the following.**
   - **(a)** $\boldsymbol{\frac{1}{2} - \frac{3}{4} + \frac{5}{6}}$
   - **(b)** $\boldsymbol{\frac{2}{3} \times \frac{1}{3} \div \frac{3}{4}}$
   - **(c)** $\boldsymbol{\frac{3}{7} of \frac{5}{6} + 3\frac{1}{3}}$

Mathematics is the Key

SUB TOPIC: APPLICATION OF FRACTIONS IN REAL LIFE SITUATION

Word problems

Examples:

1. ***A boy had a jerry can full of water. He used $\frac{13}{20}$. What fraction remained?***

$$1 - \frac{13}{20} = \frac{20}{20} - \frac{13}{20} = \frac{7}{20}$$

2. Mary bought a cake and she ate $\frac{1}{3}$ in the morning, $\frac{5}{12}$ in the afternoon and the rest in the evening. What fraction of the cake did she eat in the evening.

$$1 - \left(\frac{1}{3} + \frac{5}{12}\right)$$

$$1 - \left[\left(\frac{1}{3} \times \frac{4}{4}\right) + \frac{5}{12}\right]$$

$$1 - \left(\frac{4}{12} + \frac{5}{12}\right)$$

$$1 - \frac{9}{12}$$

$$\frac{12}{12} - \frac{9}{12}$$

$$\frac{3}{12}$$

$$\frac{1}{3}$$

3. If $\frac{2}{3}$ of a number is 40. What is the number?

Let the number be m

$$\frac{2}{3} of\ m = 40$$

$$\frac{2}{3} \times m = 40$$

$$\frac{2m}{3} = 40$$

$$3 \times \frac{2m}{3} = 40 \times 3$$

$$2m = 120$$

$$\frac{2m}{2} = \frac{120}{2}$$

$$\underline{m = 40}$$

4. $\frac{3}{4}$ of a number is 180. Find the number.
5. How many half litre cups of water can fill a 20 litre jerrycan?
6. In a class, $\frac{2}{5}$ are boys and the rest are girls.

Mathematics is the Key

(a) Find the fraction of girls.

(b) If there are 45 girls, how many pupils are in the class?

(c) If $\frac{1}{3}$ of the pupils have black shoes, how many pupils do not have black shoes?

7. The tank was $\frac{2}{3}$ full of water. One day , James used $\frac{1}{4}$ of the water for washing and 100 litres remained.

(a) What fraction of the tank was used for washing?

(b) How many litres of water can it hold when full?

8. A, B and C contributed to start a Company. A paid $^{3}/_{10}$ of the cost and B contributed $^{5}/_{10}$ of the cost.

i. What fraction did C contribute?

ii. If C contributed shs 30,000 what was their total contribution?

DECIMALS

SUB TOPIC: CHANGING VULGAR FRACTIONS TO DECIMALS

Examples

1. Convert $\frac{5}{8}$ to a decimal fraction

$$
\begin{array}{r}
0.625 \\
8\overline{)\,50} \\
-48 \\
\hline
20 \\
-16 \\
\hline
40 \\
-40 \\
\hline
00 \\
\hline
\end{array}
$$

$\frac{5}{8} = 0.625$

Try these

1. Convert the following fractions to decimals

(a) $\frac{1}{2}$ ***(b)*** $\frac{1}{4}$ ***(c)*** $\frac{1}{8}$

Mathematics is the Key

SUB TOPIC: CHANGING DECIMALS TO VULGAR FRACTIONS

Examples:

1. Convert the following decimals to fractions

(a) 0.125

$$0.125 = \frac{\cancel{125}^{1}}{\cancel{1000}_{8}}$$

$$0.125 = \frac{1}{8}$$

$(b)\ 7.25$

$$7.25 = 7 + \frac{\cancel{25}^{1}}{\cancel{100}_{4}}$$

$$0.25 = 7 + \frac{1}{4}$$

$$0.25 = 7\frac{1}{4}$$

Activity

1. Convert the following decimals to fractions
   - **(a) 0.5**
   - **(b) 0.75**
   - **(c) 0.45**
   - **(d) 1.4**
   - **(e) 12.08**

SUB TOPIC: CHANGING VULGAR FRACTIONS TO RECURRING DECIMALS

Examples: Convert the following to decimal

(b) $\frac{3}{11}$

$$\begin{array}{r|l} 11 & 0.2727\ldots \\ \hline & 30 \\ & -22 \\ \hline & 80 \\ & -77 \\ \hline & 30 \\ & -22 \\ \hline & 80 \\ & -77 \\ \hline & 30 \end{array}$$

$\frac{5}{8} = 0.2727\ldots$

(a) $\frac{1}{12}$

$$\begin{array}{r|l} 12 & 0.8333\ldots \\ \hline & 100 \\ & -96 \\ \hline & 40 \\ & -36 \\ \hline & 40 \\ & -36 \\ \hline & 40 \\ & -36 \\ \hline & 4 \end{array}$$

$\frac{5}{8} = 0.8333\ldots$

Convert the following to decimal

(a) $\frac{4}{11}$

(b) $\frac{1}{15}$

Mathematics is the Key

(c) $\frac{7}{9}$ (d) $\frac{9}{11}$

SUB TOPIC: CHANGING RECURRING DECIMALS TO VULGAR FRACTIONS

Examples:

- Changing recurring decimals to rational numbers:

1. $0.333\ldots$

$Let\ the\ No.be\ y$

$y = 0.333\ldots$

$10 \times y = 0.333\ldots \times 10$

$10y = 3.33\ldots$

$10y = 3.33\ldots.$

$-y\ -0.33\ldots$

$\frac{9y}{9} = \frac{3}{9}$

$y = \frac{1}{3}$

2. $0.4545\ldots..$

$Let\ the\ No.be\ t$

$t = 0.4545\ldots..$

$100 \times t = 0.4545\ldots \times 100$

$100t = 45.45\ldots$

$\underline{-t \quad -0.45\ldots}$

$99t = 45$

$\frac{99t}{99} = \frac{45}{99}$

$y = \frac{5}{11}$

3. $0.1666\ldots..$

$Let\ the\ No\ be\ a$

$a = 0.1666\ldots$

$10 \times a = 0.1666\ldots \times 10$

$10a = 1.666\ldots..$

$100 \times a = 0.166\ldots. \times 1000$

$100\,a = 16.666\ldots$

$100a = 16.666\ldots.$

$\underline{-10a = -1.666\ldots.}$

$90a = 15$

$\frac{90a}{90} = \frac{15}{90}$

$a = \frac{1}{6}$

Mathematics is the Key

Activity.

Convert the following recurring decimal fractions to vulgar fractions.

(a) 0.333… **(c) 0.6363…**

(b) 0.1212.... **(d) 0.01666…**

SUB TOPIC: DECIMALS (Addition and of decimals)

Examples:

Workout the following

1. 3.4 + 0.23

$$\begin{array}{r} 3.4 \\ +0.23 \\ \hline 3.63 \end{array}$$

2. 5 – 0.03

$$\begin{array}{r} 5.00 \\ -0.03 \\ \hline 4.97 \end{array}$$

Activity

Workout the following

(a) $4.57 + 4.94$

(b) $4.01 - 2.97$

(c) $5.47 + 23.98$

(d) $2 - 0.45$

SUB TOPIC: DECIMALS (Multiplication of decimals)

Examples:

Workout the following

1. 27.36 x 6

$$\begin{array}{r} 27.36 \\ \times \quad 6 \\ \hline 164.16 \end{array}$$

2. 11.9 x 0.3

$$\frac{119}{10} \times \frac{3}{10}$$

$$\frac{357}{100}$$

$$3.57$$

Multiply the following.

(a) 4.25×0.08

(b) 12.45×3.6

(c) 90.06×1.5

Mathematics is the Key

SUB TOPIC: DECIMALS (Division of decimals)

Examples:

1. $0.72 \div 9$

$\frac{72}{100} \div \frac{9}{1}$

$\frac{72}{100} \times \frac{1}{9} = \frac{8}{100}$

0.8

2. $0.12 \div 0.3$

$\frac{12}{100} \div \frac{3}{10}$

$\frac{12}{100} \times \frac{10}{3} = \frac{4}{10}$

0.4

Workout the following

(a) $6.4 \div 0.08$

(b) $1.25 \div 2.5$

(c) $1.6 \div 1.2$

SUB TOPIC: DECIMALS (using BODMAS)

Examples

1. **Workout**. $8 - 5.16 + 3.07$

Re-arrange first 8 + 3.07 – 5.16

8 .0 0	***11 . 0 7***
+ 3. 0 7	***- 5. 1 6***
11.0 7	***5. 9 1***

2. Workout :$0.2 \times 1.6 - 2.7$

$(0.2 \times 1.6) - 1.7$

$3.2 - 1.7$

1.5

3. $Workout$: $2.4 \div 1.2\ of\ 0.2$

$2.4 \div (1.2\ of\ 0.2)$

$2.4 \div (1.2 \times 0.2)$

$\frac{24}{10} \div \left(\frac{12}{10} \times \frac{2}{10}\right)$

$\frac{24}{10} \div \left(\frac{24}{100}\right)$

$\frac{24}{10} \times \frac{100}{24}$

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Mathematics is the Key

Activity

Workout the following

(a) $5.6 - 7.8 + 6.12$

(b) $1.6 + 0.6 \times 1.2$

(c) $3.5 \times 0.12 \div 0.4$

(d) $1.0\ of\ 6.4 \div 0.08$

SUB TOPIC: DECIMALS (mixed operation)

Examples:

Simplify the following

1. $\frac{0.24\ x\ 0.3}{0.8}$

$\left(\frac{24}{100} \times \frac{3}{10}\right) \div \left(\frac{8}{10}\right)$

$\frac{24}{100} \times \frac{3}{10} \times \frac{10}{8}$

$\frac{3 \times 3}{100} = \frac{9}{100}$

$\underline{0.09}$

2. $\frac{0.06 \times 2.4}{1.2}$

3. $\frac{0.24 \times 1.6}{3.6}$

4. $\frac{2.7 \times 0.54}{1.63 + 0.17}$

SUBTOPIC: Word problems on decimals

1. A carpenter bought 3 pieces of timber each measuring 1.97m.Find the total length of the timber he bought.

$1.97 \times 3m$

$\frac{197}{100} \times \frac{3}{1} m$

$\frac{591}{100} m$

$\underline{5.91\ m}$

Mathematics is the Key

2. How many 0.5 litre cups can be got from a 20 litre jerry can?

$$20 \div 0.5$$
$$20 \div \frac{5}{10}$$
$$20 \times \frac{10}{5}$$
$$4 \times 10$$
$$40\ cups$$

3. **How many 0.25 cups can fill a 15 jerry can of water?**
4. **James cut 2.5 m pieces of cloth from a 40 metre piece of cloth. How many pieces did he get?**

RATIOS AND PROPORTIONS

A ratio is a comparison of objects. A ratio is written as 1:2 and it is read as one to two. If the ratio of boys to girls in the class is 2:3, it means that where there are two boys in the class there are three girls.

SUB TOPIC: Expressing quantities as ratios

Examples:

1. A class has 20 boys and 30 girls. What is the ratio of boys to girls?

$$\textit{The ratio of boys to girls.}$$
$$\underline{\textit{Number of boys}}$$
$$\textit{Number of girls}$$
$$\frac{20}{30}$$
$$\frac{2}{3}$$

$$\underline{\textit{The ratio of boys to girls is } 2:3 \textit{ and the ratio of girls to boys is } 3:2}$$

Activity

2. On Mr.Okello's farm, there are 40 cows, 25 goats, 60 hens and 15 pigs. Find the;
   (a) Ratio of goats to cows
   (b) Ratio of hens to pigs
   (c) Ratio of pigs to cows
   (d) Ratio of cows to the total number
   (e) Cows to goats to pigs to hens

Mathematics is the Key

SUB TOPIC: Sharing quantities in ratios

Examples:

1. Bob, Bonny and Ben shared 60 oranges in the ratio of 2:3:5 respectively. How many oranges did each boy get?

$\underline{\boldsymbol{Total\ ratio}}$

$\boldsymbol{2+3+5=10}$

$\underline{\boldsymbol{Bob}}$

$\boldsymbol{\frac{2}{10}\times 60 = 2\times 6 = 12\ Oranges}$

$\underline{\boldsymbol{Bonny}}$

$\boldsymbol{\frac{3}{10}\times 60 = 3\times 6 = 18\ Oranges}$

$\underline{\boldsymbol{Ben}}$

$\boldsymbol{\frac{5}{10}\times 60 = 5\times 6 = 30\ Oranges}$

2. Share 18 in the ratio 4:5

$\boldsymbol{Total\ ratio = 4+5=9}$

$$\boldsymbol{1st\ share = \frac{4}{9}\times 18 = 4\times 2 = 8}$$

$$\boldsymbol{2nd\ share = \frac{5}{9}\times 18 = 5\times 2 = 10}$$

3. In a class of 80pupils,the ratio of boys to girls is 3:5
   (a) Find the number of girls
   (b) Find the number of boys
   (c) If $\frac{3}{4}$ of the girls have school uniform, how many girls don't have uniform?
4. James, Jack and Oscar shared sh.24,000 in the ratio of 3:7:2 respectively. How much money did each get?

SUB TOPIC: Finding the number shared in the given ratio

Examples:

1. Mary, Jane and shared money in the ratio 2:3:1 respectively. If Mary got shs 12,000. How much money did they share?

$\boldsymbol{Total\ ratio = 2+3+1=6}$

$$\boldsymbol{Mary\ had\ 2\ parts\ rept\ sh.12,00}$$

$$\boldsymbol{1\ part\ repts\ \frac{sh.12000}{2}}$$

$$\boldsymbol{6\ parts\ rept\ \frac{sh.12000}{2}\times 6}$$

$$\boldsymbol{sh.12000\times 3}$$

$$\boldsymbol{sh.36,000}$$

$\underline{\boldsymbol{They\ shared\ sh\ 36,000}}$

Mathematics is the Key

2. The ratio of boys to girls in a class is 2:3. If there are 45 girls, how many pupils are in the class?
3. The number of goats, cows and sheep on a certain farm are in the ratio of 4:3:5 respectively. There are 40 sheep than on the farm. Find the number of each type of animal on the farm

SUB TOPIC: Increasing quantities in a given ratio

Example1: Increase 80kg in the ratio of 5:4

$$\frac{5}{4} \times 80kg$$
$$5 \times 20kg$$
$$\underline{100kg}$$

Example 2: Increase sh.2,000 in the ratio of 2:5

$$\frac{5}{2} \times sh.2,000$$
$$5 \times sh.1,000$$
$$\underline{sh.5,000}$$

Increase the following as instructed

a) 400g in the ratio of 1:4
b) Sh.10,000 in the ration of 5:13
c) 8,000g in the ratio of 2:3
d) Sh.28,000 in the ration of 7:20

SUB TOPIC: Finding ratio of increase

$$Ratio\ of\ increase = \frac{New\ no.}{old\ no.}$$

$$Ratio\ of\ increase\ =\ new\ number\ :\ old\ number$$

Examples:

1. In what ratio must 30 be increased to 50?

$$New : old$$
$$50 : 30$$
$$\frac{50}{10} : \frac{30}{10}$$
$$\underline{5 : 3}$$

Mathematics is the Key

2. The number of pupils in a school increased from 480 by 60. In what ratio did it increase?

   $\boldsymbol{Old\ no.} = 480$

   $\boldsymbol{New\ no.} = 480 + 60 = 540$

   $\boldsymbol{New : old}$

   $\boldsymbol{540 : 480}$

   $\boldsymbol{\frac{540}{60} : \frac{480}{60}}$

   $\underline{\boldsymbol{9 : 8}}$
3. In what ratio must 90 be increased to 120
4. Allen's salary increased from sh.90,000 to sh.115,000. In what ratio did Allen's salary increase?
5. The number of pupils in the class increased by 20 to 85. In what ratio did it increase?

SUB TOPIC: Finding numbers increased in ratios

1. **What number becomes 54 when increased in the ratio of 9:8?**

   Let the number becomes k

   $\boldsymbol{\frac{9}{8} \times k = 54}$

   $\boldsymbol{\frac{9k}{8} = 54}$

   $\boldsymbol{8 \times \frac{9k}{8} = 54 \times 8}$

   $\boldsymbol{9k = 54 \times 8}$

   $\boldsymbol{\frac{9k}{9} = \frac{54 \times 8}{9}}$

   $\boldsymbol{k = 6 \times 8}$

   $\underline{\boldsymbol{k = 48}}$
2. The number of pupils in a class increased in the ratio of 3:4 to 120. How many pupils were in class before?
3. What number becomes 30 when increased in the ratio of 4:5?
4. Peters new salary is sh.300,000. Find his old salary if it was increased in the ratio of 15:13.

SUB TOPIC: Decreasing quantities in a given ratio

Example1: Decrease 80kg in the ratio of 5:4

$\boldsymbol{\frac{4}{5} \times 80kg}$

$\boldsymbol{4 \times 16kg}$

$\underline{\boldsymbol{64kg}}$

Mathematics is the key

Example 2: Decrease sh.2,000 in the ratio of 2:5

$$\frac{2}{5} \times sh.2,000$$
$$2 \times sh.400$$
$$\underline{sh.800}$$

Decrease the following as instructed

a) 400g in the ratio of 1:4
b) Sh.10,000 in the ration of 13:20
c) 8,000g in the ratio of 3:4
d) Sh.28,000 in the ration of 9:14

SUB TOPIC: FINDING RATIO OF INCREASE

$$Ratio\ of\ decrease = \frac{New\ no.}{old\ no.}$$

$$Ratio\ of\ decrease\ = \ new\ number : \ old\ number$$

Examples:

1. In what ratio must 30 be decreased to 24?

$$New: old$$
$$24:30$$
$$\frac{24}{6}:\frac{30}{6}$$
$$\underline{4:5}$$

2. The number of pupils in a class decreased from 480 by 60. In what ratio did it decrease?

$$Old\ no. = 480$$
$$New\ no. = 480 - 60 = 420$$
$$New: old$$
$$420:480$$
$$\frac{420}{60}:\frac{480}{60}$$
$$\frac{42}{6}:\frac{48}{6}$$
$$\underline{7:8}$$

3. In what ratio must 90 be decreased to 75?
4. Dan's salary reduced from sh.90,000 to sh.85,000. In what ratio did Dan's salary reduce?
5. Jamada had 200 mangoes and later he sold 80 oranges. In what ratio did his oranges reduce?

Mathematics is the Key

SUB TOPIC: Finding numbers decreased in ratios

1. **What number becomes 64 when increased in the ratio of 8:11?**
   Let the number becomes k

$$\frac{8}{11} \times m = 64$$
$$\frac{8m}{11} = 64$$
$$11 \times \frac{8m}{11} = 64 \times 11$$
$$8m = 64 \times 11$$
$$\frac{8m}{8} = \frac{64 \times 11}{8}$$
$$m = 11 \times 8$$
$$\underline{m = 88}$$

2. The number of pupils in a class reduced in the ratio of 2:3 to 60. How many pupils were in class before?
3. What number becomes 63 when decreased in the ratio of 7:13?
4. After having an accident, Ann's eggs got broken and reduced in the ratio of 3:7 if she remained with 45 eggs, how many eggs did she have at first?

SUB TOPIC: Direct proportion

Examples:

1. Two books cost sh. 2000. Find the cost of 6 similar books.

$$2\ books\ cost\ sh\ 2000$$
$$1\ book\ costs\ \frac{sh\ 2000}{2}$$
$$6\ books\ cost\ \frac{shs\ 2000}{2} \times 6$$
$$2000\ \times\ 3$$
$$\underline{Shs\ 6,000}$$

2. The cost of 4 rulers is sh.2,800. Find the cost of 13 similar rulers.
3. A bicycle can cover a distance 20 km in just 40minutes. What distance can it cover in 120 minutes moving at the same speed?
4. Find the cost of 12 pencils if 8 pencils cost sh.1,200.
5. The cost of 3 pairs of stockings is sh.7,500. Find how pairs of stockings can one buy with sh.12,500.

Mathematics is the Key

SUB TOPIC: Indirect/inverse proportion

Examples:

1. 4 men take 9 days to complete a job. How long will 12 men take to finish the job at the same rate?

$$4\ men\ take\ 9\ days$$
$$1\ man\ takes\ 9 \times 4\ days$$
$$12\ men\ take\ \frac{9 \times 4}{12}\ days$$
$$\underline{3\ days}$$

2. If 12 girls can sweep the compound in 90 minutes, how long will 15 girls take to sweep the same compound?
3. 8 boys can slash the compound in 6 hours. How many boys are needed to slash the compound in 16 hours?
4. A taxi can cover a distance in 4 hours at a speed of 60km/hour, at what speed can a taxi move in order to cover the same distance in 3hours

PERCENTAGES

Percentage means every out of one hundred.

The symbol for percentage is %

If the percentage of girls is 60%, this means that if there are 60 girls in a class of 100.

SUB TOPIC: Expressing percentages as fractions

Examples

1. **Express 50% as a vulgar fraction**

$$50\% = \frac{50}{100}$$
$$= \frac{5}{10}$$
$$= \frac{1}{2}$$

2. **Convert 35% to a fraction**

$$35\% = \frac{35}{100}$$
$$= \frac{7}{20}$$

Mathematics is the Key

3. **Change $33\frac{1}{3}\%$ to a fraction.**

$$33\frac{1}{3}\% = \frac{33\frac{1}{3}}{100}$$
$$= \frac{100}{3} \div 100$$
$$= \frac{100}{3} \times \frac{1}{100}$$
$$= \frac{1}{3}$$

Activity

Convert the following percentages to fractions

(a) 40%

(b) 20%

(c) 75%

(d) $16\frac{1}{2}\%$

(e) 5.75%

SUB TOPIC: Expressing fractions as percentages

Examples

1. Convert $\frac{1}{4}$ to percentage.

$$\frac{1}{4} = \frac{1}{4} \times 100\%$$
$$= 25\%$$

2. **Express $\frac{2}{5}$ as a percentage.**

$$\frac{2}{5} = \frac{2}{5} \times 100\%$$
$$= 2 \times 20\%$$
$$= 40\%$$

3. **Express $\frac{2}{3}$ as a percentage.**

$$\frac{2}{3} = \frac{2}{3} \times 100\%$$
$$= \frac{200}{3}\%$$
$$= 66\frac{2}{3}\%$$

Mathematics is the Key

4. **Express the following as percentages**

(a) $\frac{3}{4}$

(b) $\frac{3}{5}$

(c) $\frac{7}{10}$

(d) $\frac{1}{3}$

(e) $\frac{1}{8}$

SUB TOPIC: Expressing percentages as ratios

Examples

4. **Express 50% as a vulgar fraction**

$$50\% = \frac{50}{100}$$
$$= \frac{5}{10}$$
$$= \frac{1}{2}$$
$$\underline{50\% = 1:2}$$

5. **Convert 35% to a fraction**

$$35\% = \frac{35}{100}$$
$$= \frac{7}{20}$$
$$\underline{35\% = 7:20}$$

6. **Change $33\frac{1}{3}\%$ to a fraction.**

$$33\frac{1}{3}\% = \frac{33\frac{1}{3}}{100}$$
$$= \frac{100}{3} \div 100$$
$$= \frac{100}{3} \times \frac{1}{100}$$
$$= \frac{1}{3}$$
$$33\frac{1}{3}\% = 1:3$$

Mathematics is the Key

Activity

Convert the following percentages to fractions

(a) $\mathbf{40\%}$

(b) $\mathbf{20\%}$

(c) $\mathbf{75\%}$

(d) $\mathbf{16\frac{1}{2}\%}$

(e) $\mathbf{2.5\%}$

SUB TOPIC: Expressing ratios as percentages

Examples

5. Convert $1:4$ to percentage.

$$1:4 = \frac{1}{4}$$

$$\frac{\mathbf{1}}{\mathbf{4}} = \frac{\mathbf{1}}{\mathbf{4}} \times \mathbf{100\%}$$

$$= \mathbf{25\%}$$

6. Express $2:5$ as a percentage.

$$\mathbf{2:5} = \frac{\mathbf{2}}{\mathbf{5}}$$

$$\frac{\mathbf{2}}{\mathbf{5}} = \frac{\mathbf{2}}{\mathbf{5}} \times \mathbf{100\%}$$

$$= \mathbf{2} \times \mathbf{20\%}$$

$$= \mathbf{40\%}$$

7. Express $2:3$ as a percentage.

$$2:3 = \frac{2}{3}$$

$$\frac{\mathbf{2}}{\mathbf{3}} = \frac{\mathbf{2}}{\mathbf{3}} \times \mathbf{100\%}$$

$$= \frac{\mathbf{200}}{\mathbf{3}}\%$$

$$= \mathbf{66}\frac{\mathbf{2}}{\mathbf{3}}\%$$

8. **Express the following as percentages**

(f) $\mathbf{3:4}$

(g) $\mathbf{3:5}$

(h) $\mathbf{7:10}$

(i) $\mathbf{1:3}$

(j) $\mathbf{1:8}$

Mathematics is the Key

SUB TOPIC: Expressing percentages as decimals

7. Express 50% as a vulgar fraction

$$50\% = \frac{50}{100}$$
$$= \frac{5}{10}$$
$$= 0.5$$

8. Convert 35% to a fraction

$$35\% = \frac{35}{100}$$
$$= 0.35$$

9. **Change $33\frac{1}{3}\%$ to a fraction.**

$$33\frac{1}{3}\% = \frac{33\frac{1}{3}}{100}$$
$$= \frac{100}{3} \div 100$$
$$= \frac{100}{3} \times \frac{1}{100}$$
$$= \frac{1}{3}$$
$$= 0.333\ldots$$

Activity

Convert the following percentages to fractions

(f) 40%

(g) 20%

(h) 75%

(i) $16\frac{1}{2}\%$

SUB TOPIC: Expressing decimals as percentages

9. Convert 0.25 to percentage.

$$0.25 = \frac{25}{100} \times 100\%$$
$$= 25\%$$

10. Express 0.4 as a percentage.

$$0.4 = \frac{4}{10} \times 100\%$$
$$= 4 \times 10\%$$
$$= 40\%$$

Mathematics is the Key

11. Express 0.53 as a percentage.

$$0.53 = \frac{53}{100} \times 100\%$$
$$= 53\%$$

12. Express the following as percentages

(k) 0.75
(l) 0.6
(m) 0.7
(n) 0.333 ...
(o) 0.125

SUB TOPIC: Expressing quantities as percentages

1. In a school, there are 150 boys and 100 girls. Express the number of;

(a) girls as a percentage

$$\frac{100}{100 + 150} \times 100\%$$
$$\frac{10}{25} \times 100\%$$
$$10 \times 4\%$$
$$40\%$$

(b) boys as a percentage

$100\% - 40\% = 60\%$

2. On a farm, there are 20 goats and 15 sheep.

(a) Find the percentage of sheep on the farm

(b) Find the percentage of goats on the farm

3. James spent sh.5,000 and saved the rest of his sh.20,000 which he had.

(a) calculate the percentage of the money he spent.

(b) calculate the percentage of the money he saved.

4. Write 20 as a percentage of 80.

5. Amos got 12 out of 25 in a Math test. Express his mark as a percent.

SUB TOPIC: Expressing one quantity as percentage of another

Example I

1. Express 15 minutes as percentage of an hour.

$$\frac{15}{60} \times 100\%$$
$$\frac{1}{4} \times 100\% = 25\%$$

2. Express 60cm as a percentage of 2m

Mathematics is the Key

3. **Express 9 items as a percentage of $2\frac{1}{2}\ dozens$.**
4. **What is 400m as a percentage of a kilometre?**
5. **Express 40 minutes as a percentage of 2 hours**

SUB TOPIC: Finding quantities equivalent to a percentage

Examples

1. **What is 20% of 60 mangoes?**

$$20\%\ of\ 60\ mangoes$$
$$\frac{20}{100}\times 60\ mangoes$$
$$2\times 6\ mangoes$$
$$12\ mangoes$$

2. **What is $33\frac{1}{3}\ of\ 45\ books$?**

$$33\frac{1}{3}\%\ of\ 45\ books$$
$$33\frac{1}{3}\%\times 45\ books$$
$$\frac{33\frac{1}{3}}{100}\times 45\ books$$
$$\left(\frac{100}{3}\div 100\right)\times 45\ books$$
$$\left(\frac{100}{3}\times\frac{1}{100}\right)\times 45\ books$$
$$\frac{1}{3}\times 45\ books$$
$$\underline{15\ books}$$

3. **What is 78% of sh.40,000?**
4. **What is 34% of 250?**
5. **What is 60% of 50?**
6. **What is 12% of sh.69,000?**

SUB TOPIC: Sharing quantities using percentage

Examples

1. Tom and Jerry shared 120 sweets. If Tom got 60%;
   (a) What percentage did Jerry get?

$$100\% - 60\% = 40\%$$

Mathematics is the key

(b) How many oranges did each get?

$\underline{Tom}$

$\frac{60}{100} \times 120\ sweets$

6×12

$\underline{72\ sweets}$

$\underline{Jerry}$

$\frac{40}{100} \times 120$

4×12

$\underline{48\ sweets}$

2. In a school of 600 pupils,25% were absent and the rest were present on a certain day.

a) How many pupils were present?

$\mathbf{100\% - 25\% = 75\%}$

$\mathbf{75\%\ of\ 600}$

$\frac{\mathbf{75}}{\mathbf{100}} \times \mathbf{600}$

$\mathbf{75 \times 6}$

$\mathbf{450\ pupils}$

b) How many pupils were absent?

$\mathbf{600 - 450 = 250\ pupils}$

3. Three boys Peter , James and Boaz shared sh.50,000.Peter got 30%, James got 45% and Boaz got the rest.
   (a) What percentage did Boaz get?
   (b) How much money did Peter get?
   (c) How much money did James get?
   (d) How much money did Boaz get?

4. In a class of 80 pupils, 45% are boys and the rest are girls
   (a) Find the percentage of girls.
   (b) Find the number of boys in the class.
   (c) Find the number of girls in the class.

5. Nanyonjo earns sh. 12,000. She spends 75% and saves the rest.
   - How much does she spend?
   - How much does she save?

Mathematics is the Key

Examples:

1. If 20% of a number is 40, what is the number?

$$\textbf{Let the number be } m$$
$$20\% \text{ of } m = 40$$
$$\frac{20}{100} \times m = 40$$
$$\frac{m}{5} \times 5 = 40 \times 5$$
$$\underline{m = 200}$$

2. If 80% of the children at the health centre were immunized against measles in the month of April,

(a) what percentage of the children were immunized in other months?

$$100\% - 80\% = 20\%$$

(b) How many children were immunized altogether given that 1600 children were immunized in April?

$$\textbf{Let the total number of children be } y$$
$$80\% \text{ of } y = 1600$$
$$\frac{80}{100} \times y = 1600$$
$$\frac{8y}{10} = 1600$$
$$10 \times \frac{8y}{10} = 1600 \times 10$$
$$8y = 1600 \times 10$$
$$\frac{8y}{8} = \frac{16000}{8}$$
$$y = 2,000 \text{ children}$$

(c) How many children were immunized in other months?

$$\frac{20}{100} \times 2000 \text{ children}$$
$$20 \times 20$$
$$400 \text{ children}$$

Activity

1. If 30% of my salary is spent on food and I save sh. 21,000. What is my salary?
2. If 15% of a number is 90. Find the number.

Mathematics is the Key

3. If 40% of a class is absent;
    a. What percentage is a present?
    b. How many pupils are in class if 24 pupils are absent in class?
4. 35% of the pupils in a school like rice while 10% like potatoes. If the rest like posho,
   (a) What percentage of pupils like posho?
   (b) How many pupils are in school if 63 pupils like posho?

SUB TOPIC: Forming and solving equations involving percentages

1. There are 20% more boys than girls in a class.

a) Find the percentage of girls.

Let the %ge of girls be m

boys	girls	TL
m+20	m	100

$$\boldsymbol{m + m + 20 = 100\%}$$
$$\boldsymbol{2m + 20 = 100}$$
$$\boldsymbol{2m + 20 - 20 = 100 - 20}$$
$$\boldsymbol{2m = 80}$$
$$\boldsymbol{\frac{2m}{2} = \frac{80}{2}}$$
$$\boldsymbol{\underline{m = 40\%}}$$

b) Find the percentage of boys.

$$\boldsymbol{m + 20\%}$$
$$\boldsymbol{40 + 20\%}$$
$$\boldsymbol{60\%}$$

c) If there are 90 boys in the class, how many pupils are in the class?

Let the total number of pupils be w

$$\boldsymbol{\frac{60}{100} \times w = 90}$$
$$\boldsymbol{100 \times \frac{60w}{100} = 90 \times 100}$$
$$\boldsymbol{60w = 90 \times 100}$$
$$\boldsymbol{\frac{60w}{60} = \frac{90 \times 100}{60}}$$
$$\boldsymbol{\underline{w = 150\ pupils}}$$

d) How many girls are in the class?

$$\boldsymbol{150 - 90 = 60\ girls}$$

Mathematics is the Key

2. On Kashande's farm, there are 10% more goats than cows. If there are 36 cows,
   (a) find the percentage of goats on the farm.
   (b) find the number of animals on the farm.
   (c) how many goats are on the farm
3. In a certain meeting, there were 30% more males than females. If there were 130 males,
   (a) find the percentage of females.
   (b) how many people attended the meeting?
   (c) how many females attended the meeting?

SUB TOPIC: Increasing quantities using percentages

Examples:

1. Increase 800 by 20%

$$\textbf{New amount} := \ 100\% + 20\% \ of \ old \ amount$$
$$= \ 120\% \times 800$$
$$= \frac{120}{100} \times 800$$
$$= \underline{960}$$

2. Increase 800 pupils by 12 ½ %:

$$New \ number \ = \ 100\% + 12\ ½\ \% \ of \ old \ number$$
$$= \ 112\ ½\ \% \ of \ 800 \ pupils$$
$$= \frac{225\%}{2} \times 800 \ pupils$$
$$= \frac{225}{2} \div 100 \times 800$$
$$= \frac{225}{2} \times \frac{1}{100} \times 800$$
$$= (225 \ x \ 4) \ pupils$$
$$= \underline{900 \ pupils}$$

3. **Increase the following as instructed**
   - **90 by 15%**
   - **400 by 60%**
   - **Sh.20,000 by 20% by 30%**

Mathematics is the Key

$$Percentage\ increase\ = \frac{increase}{old\ no.} \times 100\%$$

Examples:

1. By what percentage will 480 be increased to become 540?

Old number = 480
New number = 540
Increase = 540 – 480
= 60

Percentage increase:

$\frac{60^{1}}{480_{8}}$ **x 100%**

$\frac{100\ \%}{8}$

12 ½ %

2. When 240 is increased, it becomes 288. Calculate the percentage increase

Old number = 240
New number = 288
increase = 288 – 240
= 48

Percentage increase = $\frac{48}{240} \times 100\%$

= 20%

3. The number of pupils in a school increased from 500 to 650 in just one term. Calculate the percentage increase
4. Mary's salary increased from sh.400,000 by sh.50,000. Calculate her percentage increase.

Mathematics is the Key

SUB TOPIC: FINDING THE ORIGINAL NUMBER AFTER %age INCREASE

Examples:

1. What amount of money when increased by 20% becomes Sh.1440?

$$\textbf{Let the amount be } x.$$
$$\textbf{New amount } = (100\% + 20) \textit{ of } x$$
$$120\% \times x = sh.1440$$
$$\frac{120\,x}{100} = sh.1440$$
$$10 \times \frac{12x}{10} = sh.1440\ x\ 10$$
$$12x = sh.14400$$
$$\frac{12x}{12} = \frac{sh.14400}{12}$$
$$\underline{x = sh.1,200}$$

2. The number of pupils in a class increased by 10% to 44 pupils. Find the number of pupils before the increase.
3. What number becomes 10400 when increased by 30%?

SUB TOPIC: DECREASING QUANTITIES USING PERCENTAGES

1. Decrease sh. 1,500 by 10%

$$\textbf{New amount as percentage}$$
$$100\% - 10\% = 90\%$$
$$\textbf{New amount}: = 90\% \textit{ of } sh.1500$$
$$\frac{90}{100} \times sh.1500$$
$$90 \times 15$$
$$\underline{sh.1350}$$

2. Decrease 720 dollar a by $33\frac{1}{3}\%$

$$\textbf{New percentage} = 100\% - 33\frac{1}{3}\% = 66\frac{2}{3}\%$$
$$\textbf{New amount} = 66\frac{2}{3}\% \textit{ of } 720\ dollars$$
$$\frac{200}{3}\% \textit{ of } 720\ dollars$$
$$\frac{200}{3} \times \frac{1}{100} \times 720\ dollars$$
$$2 \times 240\ dollars$$
$$\underline{480\ dollars}$$

Mathematics is the Key

Decrease the following as instructed

(a) 800 by 15%
(b) 200 goats by 20%
(c) 480 pupils by 40%
(d) Sh.200,000 by 5% then 30%

SUB TOPIC: FINDING PERCENTAGE DECREASE

$$\textbf{Percentage decrease} = \frac{\textbf{decrease}}{\textbf{old no.}} \times 100\%$$

Examples:

1. When 240 is decreased, it becomes 192. Calculate the percentage decrease.

$\textbf{Old number} = 240$
$\textbf{New number} = 192$
$\textbf{Decrease} = 240 - 192$
$= 48$

Percentage decrease $= \frac{48}{240} \times 100\%$

= 20%

2. By what percentage will 540 be decreased to become 480?

$\textbf{Old number} = 540$
$\textbf{New number} = 480$
$\textbf{decrease} = 540 - 480$
$= 60$

Percentage increase:

$$\frac{\cancel{60}^{1}}{\cancel{540}_{9}} \times 100\%$$

$$\frac{100}{9}\%$$

$11\frac{1}{9}\%$

3. The number of pupils in a school decreased from 500 to 650 in just one term. Calculate the percentage increase
4. Mary's salary decreased from sh.4,000,000 by sh.500,000. Calculate her percentage decrease.

Mathematics is the Key

SUB TOPIC: FINIDNG THE ORIGINAL NUMBER AFTER THE DECREASE

Examples:

1. A worker's salary was decreased by 35% to sh.1560.

$$\textbf{Let the old salary be } x.$$
$$\textbf{New salary} = (100\% - 35\%) \textit{ of } x$$
$$1560 = \frac{65x}{100}$$
$$1560 \times 100 = \frac{65x}{100} \times 100$$
$$\frac{\cancel{65}\, x}{\cancel{65}} = \frac{1560 \times 100}{65}$$
$$\underline{x = shs.\,2400}$$

2. What number when decreased by 25% becomes 30,000?
3. What amount of money becomes sh.sh.7,200 when decreased by 10%?

SUB TOPIC: PERCENTAGE PROFIT

$$\textbf{Percentage profit} = \frac{profit}{CP} \times 100\%$$
$$\boldsymbol{PROFIT = SP - CP}$$

Examples:

1. An article was bought at sh.100,000 and sold at sh.120,000. Calculate the percentage profit.

$$Cost\ price = sh.100{,}000$$
$$Selling\ price = sh.120{,}000$$
$$Profit = 120{,}000 - 100{,}000$$
$$= 20{,}000$$
$$\textbf{Percentage profit}$$
$$\frac{sh.20{,}000}{sh.100{,}000} \times 100\%$$
$$\frac{2}{10} \times 100\%$$
$$2 \times 10$$
$$\underline{20\%}$$

2. Alison bought a hankie at sh.1,600 and later sold it at sh.2,000. Find his percentage profit.
3. A man sold a goat at sh. 120,000 making a profit of sh.20,000. Calculate his percentage profit.
4. Moses bought a shirt for sh.6,000 and sold it making a profit of sh.2,000.
   (a) Find his selling price.
   (b) Find his percentage profit.

Mathematics is the Key

SUB TOPIC: PERCENTAGE LOSS

$$Percentage\ loss\ = \frac{loss}{CP} \times 100\%$$

$$LOSS = CP - SP$$

1. I bought a radio at sh.100,000 but I was forced to sell it at sh.80,000. Find my percentage loss.

$Buying\ price\ = sh.100,000$

$Selling\ price\ = sh.80,000$

$Loss\ = BP - SP$

$sh.100,000 - sh.80,000$

$sh.20,000$

$Percentage\ loss$:

$$\frac{loss}{CP} \times 100\%$$

$$\frac{20,000}{100,000} \times 100\%$$

$$\frac{100\%}{5} = 20\%$$

2. Kakuru bought a book for sh.5,000 and sold it for sh.4,500. Calculate his percentage loss.
3. Mugisha sold a rabbit for sh.15,000 making a loss of sh.4,000.calculate his percentage loss.
4. Mercy bought a blouse for sh.15,000 and sold it at a loss of sh.3,000.
   (a) At what price did he sell the blouse?
   (b) Find her percentage loss

SUB TOPIC: Finding SP when percentage profit/loss and CP are given

REMEMBER

- **The cost price (CP) is the old number.**
- **The selling price(SP) is the new number.**
- **When given percentage increase(%ge profit), increase the old number(CP) to get the new number(SP).**

$$If\ the\ \%ge\ profit\ is\ k\%$$

$$\frac{100\% + k\%}{100} \times CP = SP$$

Mathematics is the Key

- **When given percentage decrease(%ge loss), decrease the old number(CP) to get the new number(SP).**

$$\boldsymbol{If\ the\ \%ge\ loss\ is\ m\%}$$
$$\boldsymbol{\frac{100\% - m\%}{100} \times CP = SP}$$

Examples

1. After selling a shirt which he bought at sh.8,000, the shopkeeper made a profit of 20%. How much money did he sell the shirt?

   $\boldsymbol{SP = \frac{100 + 20}{100} \times sh.8,000}$

   $\boldsymbol{\frac{120}{100} \times sh.8,000}$

   $\boldsymbol{120 \times sh.80}$

   $\boldsymbol{\underline{sh.9,600}}$

2. James bought a goat at sh.120,000 and later sold it at a loss of 10%, how much did he get after selling the goat?

   $\boldsymbol{SP = \frac{100 - 10}{100} \times sh.120,000}$

   $\boldsymbol{\frac{90}{100} \times sh.120,000}$

   $\boldsymbol{90 \times sh.1,200}$

   $\boldsymbol{\underline{sh.108,s000}}$

3. A skirt was bought at sh.10,000. How much was it sold if a profit of 20% was raised?
4. After selling a tray of eggs, a farmer made a profit of 5%. At what price did he sell the tray of eggs if the cost price of the tray of eggs is sh.9,000?
5. Ashraf bought a phone for sh.200,000. If he sold it at a loss of 15%, how much did he sell the phone?

Mathematics is the Key

SUB TOPIC: Finding CP when percentage profit and SP are given

Examples:

1. After selling a pair of shoes at sh. 21,000, a trader made a profit of 20%. Find the buying price of the pair of shoes.

$Cost\ price\ as\ a\ percentage\ = 100\%$

$Selling\ price\ as\ a\ percentage\ = 100\% + 20\% = 120\%$

$\mathbf{120\%\ represents\ = sh.21,000}$

$\mathbf{1\%\ represents\ = \frac{shs.21000}{120}}$

$\mathbf{100\%\ represents\ = \frac{shs.700}{4} \times 100}$

$= (25 \times 700)$

$\underline{= shs.17,500}$

2. By selling a blanket at sh. 36000, a trader made a profit of 20%. Calculate the cost price of the blanket
3. By selling a radio at sh. 66,000, Amos got a profit of 10%. Find the cost price of the radio.

SUB TOPIC: Finding CP when percentage loss and SP are given

1. By selling his cow at sh. 34,000, Obala made a loss of 15%. At what price had he bought the cow?

Loss = 15%

CP = 100%

SP = 100% - 15%

= 85%

85% of CP = shs.34,000

$\frac{85}{100}\ cp = shs.34,000$

$\cancel{100} \times \frac{85cp}{\cancel{100}} = shs.34,000 \times 100$

$85cp = shs.3,400,000$

$\frac{85cp}{85} = \frac{shs.3,400,000}{85}$

CP = shs.40,000

2. .A dealer sold a bicycle for sh. 45000 making a loss of 10%.
   (a) Calculate the original price of the bicycle.
   (b) How much did he lose?
3. A man made a loss of 20% after selling a sheep for sh.16,000. Find the cost price of the sheep.

Mathematics is the Key

Terms used

- **PRINCIPAL:**
  Money borrowed, money banked and money lent .
- **RATE:**
- **TIME:**
- **SIMPLE INTEREST:**
- **AMOUNT:**

$$SIMPLE\ INTEREST = PRINCIPAL \times RATE \times TIME$$
$$SI = P \times R \times T$$
$$AMOUNT = PRINCIPAL + SI$$

Example:

1. A man deposited sh.40,000 for 5 years at a simple interest rate of 2% per year.
   (a) Calculate his simple interest.

$$SI = PTR$$
$$= 40,000 \times 5 \times 2\ \%$$
$$= 40,000 \times 5 \times \frac{2}{100}$$
$$= 400 \times 5 \times 2$$
$$= 400 \times 10$$
$$= shs\ 4,000$$

   (b) Find the total amount after 5 year

$$Amount = Principle + Interest$$
$$shs\ (40,000 + 4,000)$$
$$shs\ (44,000)$$

7. Calculate the simple interest on sh.8000 for 2yrs at 10% per annum
8. Calculate the simple interest on sh.24000 for 8 months at simple interest rate of 15% per year.
9. Calculate the simple interest on sh. 24000 for 8 months at a simple interest rate of 2% per month.

Mathematics is the Key

SUB TOPIC: FINDING INTEREST RATE

Example:

1. Calculate the rate of interest if shs 30,000 can yield a simple interest of shs 1,125 in 9 months.

$$PTR = SI$$

$$\frac{shs.30,000}{1} \times \frac{9}{12} \times \frac{R}{100} = shs, 1, 125$$

$$\frac{shs.2700R}{12} = Shs. 1, 125$$

$$12 \times \frac{shs.2700R}{12} = shs. 1, 125 \times 12$$

$$shs. 2700R = shs. 1, 125 \times 12$$

$$\frac{\cancel{shs.2700R}}{\cancel{shs.2700}} = \frac{\cancel{shs.}13,\cancel{500}}{\cancel{shs.}2\cancel{700}}$$

$$R = 5\%$$

2. Nabifo deposited sh.50000 on her saving s account. At the end of 3yrs the simple interest earned was sh.15000. Calculate the rate of interest.

REFERENCE

A New MK Primary Mathematics Bk 7 Pg 138 - 139

SUB TOPIC: CALCULATING PRINCIPAL

Example:

1. What principal will yield shs 6,000 at 5% per year for 3 years?

SI = 6000
R = 5% per year
T = 3 years
P x R x T = Simple interest

$$P \times \frac{5}{100} \times 3 = 6000$$

$$\frac{15P}{100} = 6000$$

$$100 \times \frac{15P}{100} = 6000 \times 100$$

$$\frac{15P}{15} = \frac{600,000}{15}$$

P = shs.40,000

Principal = shs.40,000

Mathematics is the Key

2. A farmer borrowed money at 12 ½ per year. After 2 years, a simple interest of shs 8,000 was paid. Find the amount borrowed.

Solution:

SI = shs.8,000
T = 2 years
R = 12 ½ %
$P = \frac{SI \times 100}{R \times T}$
$P = shs.\frac{8,000 \times 100}{12\frac{1}{2} \times 2}$
$P = shs.800,000 \div \frac{25}{2} \times 2$
$P = shs.\frac{800,000}{25}$
P = shs.32,000
Principal = shs.32,000

3. Ali borrowed money from a bank that offers a 10% p.a rate for 4 years. If he paid sh.32,000 after 4 years. How much did he borrow?
4. What sum of money will yield sh.4,800 in 4 years at 3% p.a?

REFERENCE
A New MK Primary Mathematics Bk 7 Pg 140

SUB TOPIC: CALCULATING TIME

Example:

1. In what time will shs 12,000 yield an interest of shs 1,800 at 5% per year.

P x T x R = SI
SI = 1800=
P = 12,000
R = 5%
P x R x T = SI
$12,000 \times \frac{5}{100} \times T = shs.1800$
$\frac{600}{600} T = \frac{\cancel{1800}^{3}}{\cancel{600}_{1}}$
T = 3 years

2. How long will sh.48,000 take to yield sh.5400 at 15% per year?

P = sh.48,000
R = 15% per year
SI = sh.5400
P x R x T = SI
$Shs.48,000 \times \frac{15}{100} \times T = sh.5400$
shs.480 x 15T = shs.5400
$shs.\frac{7200T}{7200} = \frac{shs.5400}{shs.7200}$
T = ¾ years
$= (\frac{3}{4} \times 12)$
= 9 months

3. **How long will sh.48,000 take to yield sh.7,200 at a rate of 5% per year?**

REFERENCE
A New MK Primary Mathematics Bk 7 Pg 142

Mathematics is the Key

TOPICAL EXERCISE ON FRACTIONS

1. Name the types of fractions and give an example on each.
2. Divide: $^{2}/_{3} \div {}^{1}/_{3}$
3. Simplify: ½ - ¼ - $^{1}/_{3}$
4. Salim's bicycle got spoilt after he had covered a distance of 20km which was ¼ of his journey. How long was the journey?
5. In a class of 120 pupils, the ratio of girls to boys is 4:2. Find the number of boys.
6. Work out: ¼ + $^{3}/_{5}$.
7. Simplify: $\frac{0.27 \times 0.06}{0.9 \times 0.3}$
8. Work out: ¼ - $^{1}/_{8}$
9. Otim had 30km still to cover after traveling 3/5 of the journey. How was the journey?
10. Simplify: ½ ÷ ¼
11. Subtract: ½ - ¼
12. In Sir Apollo Schools, ¾ of the pupils who sat for the Primary Leaving Examination passed.
    (a) If those who failed were 30, find the number of pupils who passed.
    (b) What percentage of pupils failed the examination?
13. $^{2}/_{3} - ½$
14. Add: 35.7 + 0.35
15. A bus broke down after covering 5/7 of the journey. The remaining distance to complete the journey was 140km. How long was the whole journey?
16. Divide: 4.2 ÷ 0.03
17. Add: 4.05 + 11.4 + 2.36
18. Usamah spent ¼ of his salary on food, 1/3 of the remainder on debts and saved shs 3,600= .
    (a) How much did he spend on paying debts?
    (b) What are his earnings per month?
19. Arrange in ascending order: ½, ¾, 0.03 and 2/3.
20. The cost of 4 rules is shs 800. What is the cost of 6 similar rulers?
21. 5 handkerchiefs take 30 minutes to dry when exposed to the sunshine. How long will 12 handkerchiefs take to dry if exposed to the same sunshine?
22. 12 men can build a classroom in 5 days.
    (a) How many men are needed to do the whole job in 1 day?
    (b) How long will 10 men take to do the job?

FRACTIONS (PERCENTAGES) TOPICAL QUESTIONS:

1. Express 2:5 as a percentage.
2. Change 0.8 as a percentage
3. Express 66.6% as a fraction to the lowest terms.
4. Express 40cm as a percentage of 2M.
5. What is 10% of 2200 pencils?
6. A bag of cement cost shs 5,600. How much will it cost after a 30% increase?

Mathematics is the Key

7. Asiimwe deposited shs 50,000 in Uganda Commercial Bank which offers an interest of 30% per year. How much money will Asiimwe have in the Bank after six months?
8. Okello bought a car at shs 2,500,000 and sold it to Otim at a profit of 20%. Otim then sold it to Tumwine at a loss of 15%. How much did Tumwine pay for the car?
9. If 280 is increased by x it become 392. Find the value of x.
10. Decrease 65kg by 5.
11. A farmer has the following animals:
    Chicken = 30
    Goats = 35
    Sheep = 15
    Rabbits = 10
    What percentage of the total animals are rabbits.
12. Mugisha bought about at shs 200,000 and sold it as shs 180,000 what was his percentage loss?
13. (a) Okello's wage was increased by 10% to shs 77,000 per month. Find his salary?
    (b) If his new wage of shs 77,000 was decreased by 5%, find his final wage.
14. A man spent 20% of his salary on food, 10% on transport, 40% on medical care and the rest on rent.
    (i) Find the percentage of his salary spent on rent.
    (ii) How much does he spend on medical care if he earns 800,000 as his salary?
    (iii) How much more is spent o food than transport?
15. Fatuma had shs 5,000 if she used 10% of her money to buy soap what was her balance?
16. The cost price of a 50kg bag of sugar is shs 45,000. At what price must he sell each kilogram in order to make a profit of 20%.
17. Kakeeto bought three bags of soya beans at shs. 21,000 each. If each bag weighed 70kg and sold each kg at shs 250.
    (a) Calculate his percentage gain or loss.
    (b) At what price must he sell each kg in order to make a profit of 20%?

Mathematics is the Key

DATA HANDLING

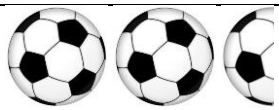
SUB TOPIC: PICTO GRAPHS(review)

Definition:

A picto graph is where we use pictures to represent quantities of actual items.

Example:

The graph below shows the number of balls that were given to different schools.

Upper P/s	
Rukondo P/S	
Lower P/s	
Star Parents' P/s	
Rukungiri P/s	

Given that  stands for 80 balls.

(a) How many more balls did Rukungiri p/s get than Rukondo p/s?

$\mathbf{5-1=4}\ \boldsymbol{pictures}$

$\mathbf{4\times 80}$

$\underline{\mathbf{320}\ \boldsymbol{more\ balls}}$

(b) Which schools had the same number of balls?

Star Parents' Primary School and Upper Primary School

(c) Find the total number of balls that were given out to the five schools.

$\mathbf{16\frac{1}{2}\times 80}$

$\mathbf{\frac{33}{2}\times 80}$

$\mathbf{33\times 40}$

$\mathbf{1320}\boldsymbol{balls}$

Mathematics is the Key

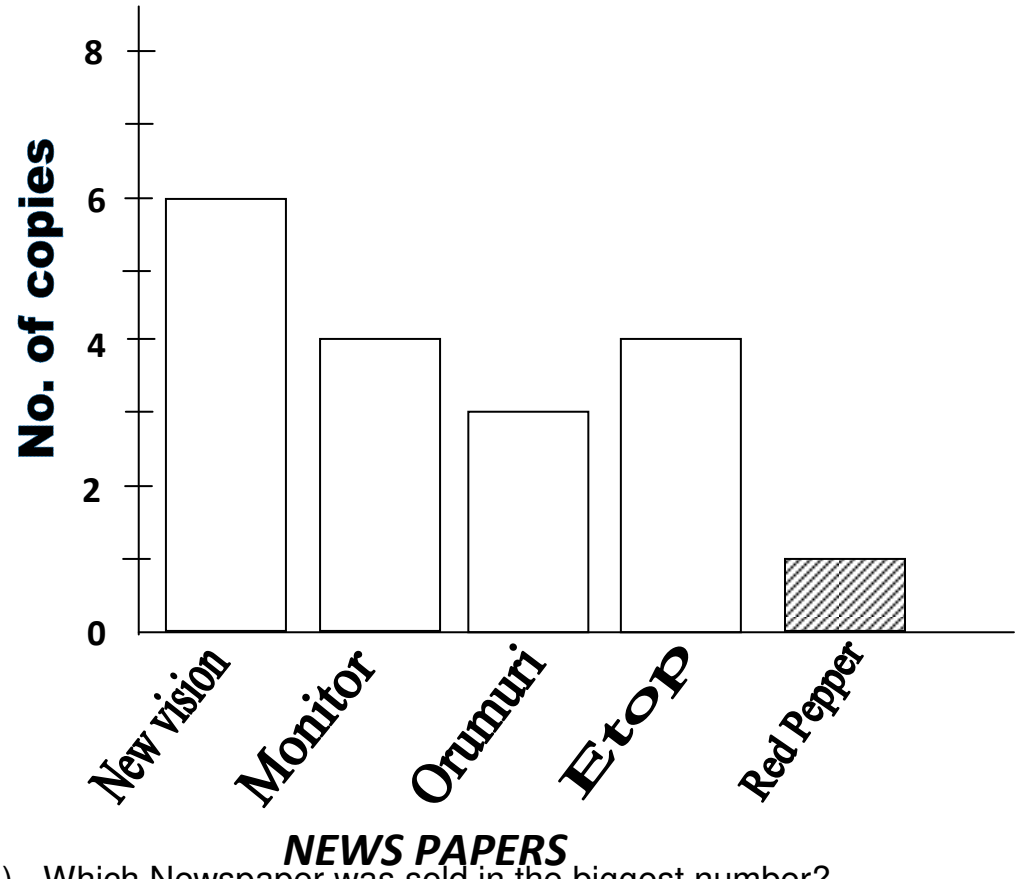
(d) Calculate the average number of books that were distributed to the five schools.

$$Average = \frac{sum\ of\ items}{number\ of\ items}$$
$$= \frac{1320}{5}$$
$$= 265\ balls$$

SUB TOPIC: BAR GRAPHS(review)

Example:

The bar graph represents the copies of Newspapers which were sold to the Education Manager's office on a certain day. Use it to answer the questions that follow:



(a) Which Newspaper was sold in the biggest number?
New vision

(b) How many copies were sold altogether?
6 + 4 + 3 + 4 + 1
18 copies

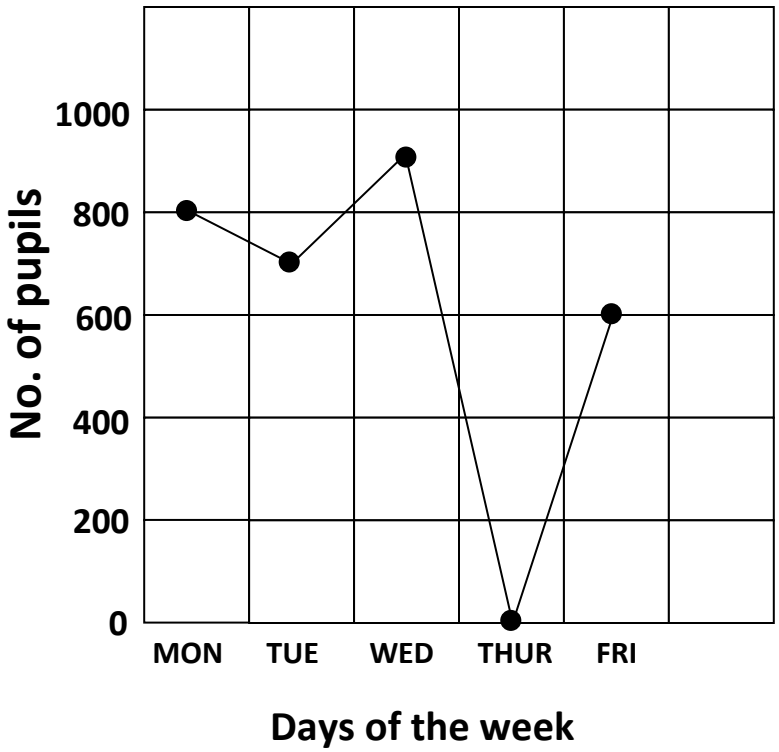
(c) Which newspaper was sold in the least number ?
Red pepper

(d) How many more copies of New Vision were sold than the Red Pepper?
6 – 1 = 5 more copies

Mathematics is the Key

Example 1:

The graph represents the schools' daily attendance for a week. Use the information on the graph to make a table showing the daily attendance.



Questions

(i) On which day was the attendance high?

$\boldsymbol{On\ Wednesday}$

(ii) On which day was the attendance 600?

$\boldsymbol{On\ Friday}$

(iii) How many pupils attended on Tuesday?

$\boldsymbol{700\ pupils}$

(iv) What was the average attendance that week?

$$\boldsymbol{Average} = \frac{\boldsymbol{sum\ of\ items}}{\boldsymbol{number\ of\ items}}$$

$$= \frac{800 + 700 + 900 + 0 + 600}{5}$$

$$= \frac{3000}{5}$$

$$= \boldsymbol{600\ pupils}$$

(v) How many more pupils attended on Wednesday than Tuesday?

$\boldsymbol{900 - 700 = 200\ more\ pupils}$

Mathematics is the Key

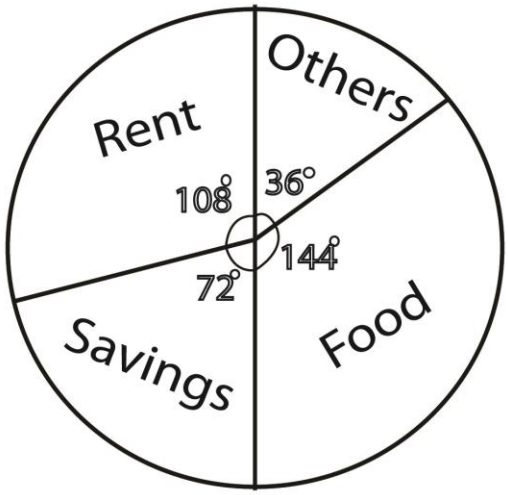
SUB TOPIC: **PIE CHARTS INVOLVING DEGREES**

REMEMBER:

Angles in all sectors of a pie chart add up to $360°$

Example:

1. The pie chart below shows the monthly expenditure and savings of Mr. Mugisha who earns sh.72,000



(a) How much does he spend on each item?

Savings

$\frac{72°}{360°} \times sh.72,000$

$72 \times sh.200$

Sh.14,400

Rent

$\frac{108°}{360°} \times sh.72,000$

$108 \times sh.200$

Sh.21600

Food

$\frac{144°}{360°} \times sh.72,000$

$144 \times sh.200$

Sh.28,800

Others

$\frac{36°}{360°} \times sh.72,000$

Sh.7,200

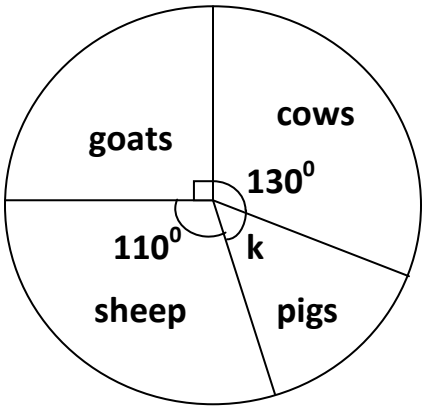
(b) Change the sector angle for others and percentages.

$\frac{36°}{360°} \times 100\%$

10%

Mathematics is the Key

2. The pie chart below shows how 72 animals are distributed on Mr. Kato's farm. Use it to answer the questions that follow.



(a) Find the value of k

$$\mathbf{k + 110° + 130° + 90° = 360°}$$
$$\mathbf{k + 330° = 360°}$$
$$\mathbf{k + 330° - 330° = 360° - 330°}$$
$$\underline{\underline{\mathbf{k = 30°}}}$$

(b) How many cows are on the farm?

$$\frac{\mathbf{130°}}{\mathbf{360°}} \times \mathbf{72}$$
$$\frac{\mathbf{13}}{\mathbf{36}} \times \mathbf{72}$$
$$\mathbf{13 \times 2}$$
$$\mathbf{26\ cows}$$

(c) How many more sheep than goats are on the farm?

$$\mathbf{110° - 90° = 20°}$$
$$\frac{\mathbf{20°}}{\mathbf{360°}} \times \mathbf{72}$$
$$\frac{\mathbf{2}}{\mathbf{36}} \times \mathbf{72}$$
$$\mathbf{2 \times 2}$$
$$\mathbf{4}\ \boldsymbol{more\ sheep}$$

(d) Express the sector angle for goats as a percentage.

$$\frac{\mathbf{90°}}{\mathbf{360°}} \times \mathbf{100\%}$$
$$\frac{\mathbf{1}}{\mathbf{4}} \times \mathbf{100\%}$$
$$\mathbf{25\%}$$

Mathematics is the Key

(e) What is the ratio of cows to pigs?

$$\frac{130^\circ}{30^\circ} = \frac{13}{3}$$

$$\underline{13:3}$$

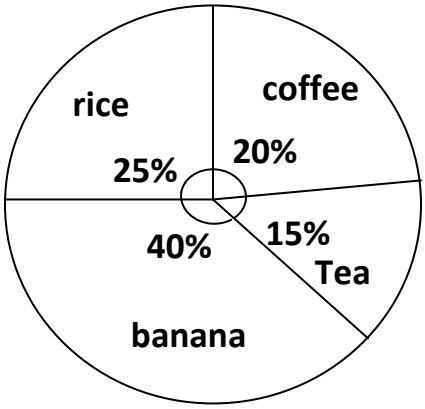
SUB TOPIC: PIE CHARTS INVOLVING PERCENTAGES

REMEMBER:

Percentages in all sectors of the pie chart add up to 100%

Examples

1. Study the pie chart below which shows how 60 acres of land were cultivated



a. What area of the land was used for Tea planting?

$$\frac{15}{100} \times 60\ acres$$

$$\frac{3}{2} \times 6$$

$$3 \times 3$$

$$\underline{9\ acres}$$

b. What area of the land was used for coffee planting?

$$\frac{20}{100} \times 60\ acres$$

$$2 \times 6$$

$$\underline{12\ acres}$$

c. What area of the land was used for rice planting?

$$\frac{25}{100} \times 60\ acres$$

$$\frac{5}{2} \times 6$$

$$5 \times 3$$

$$\underline{15\ acres}$$

Mathematics is the Key

d. Express the area of land for banana planting as a fraction

$\frac{40}{100}$

$\frac{4}{10}$

$\frac{2}{5}$

e. How many more acres of land were used for banana planting than tea planting?

$40\% - 15\% = 25\%$

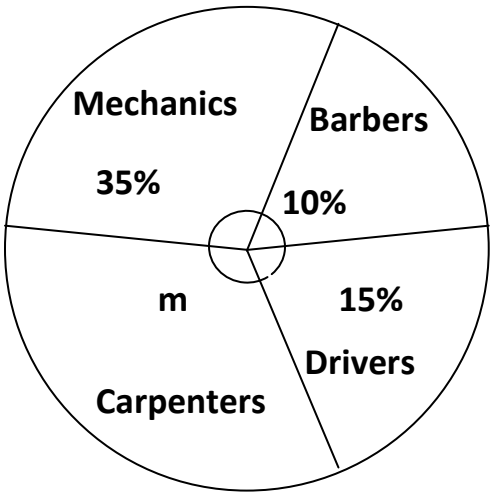
$\frac{25}{100} \times 60\ acres$

$\frac{5}{2} \times 6$

5×3

$15\ more\ acres$

2. The pie chart below shows how the COVID-19 task force of a certain district shared 40,000kg of posho flour to different groups of people who were stopped from working. Use it to answer the questions that follow.



a. Find the value of m

$$m + 10\% + 35\% + 15\% = 100\%$$
$$m + 60\% = 100\%$$
$$m + 60\% - 60\% = 100\% - 60\%$$
$$m = 40\%$$

Mathematics is the Key

b. How many kilograms of posho were given to drivers?

$$\frac{15}{100} \times 40,000\text{kg}$$
$$15 \times 400\text{kg}$$
$$60,00\text{kg}$$

c. How many more kilograms of posho were given to carpenters than barbers?

$$40\% - 10\% = 30\%$$
$$\frac{30}{100} \times 40,000kg$$
$$30 \times 400$$
$$12,000kg$$

d. What is the ratio of the mechanics' share to the total share?

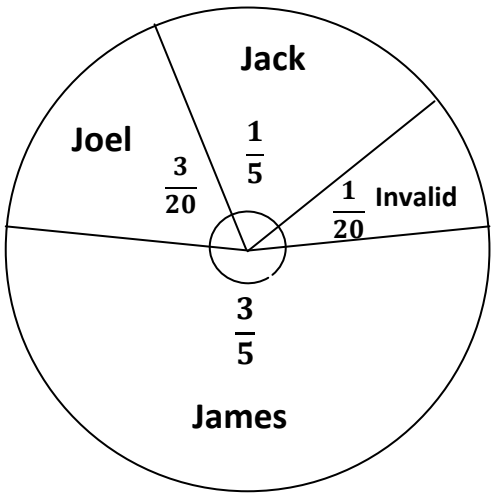
$$\frac{35}{100}$$
$$\frac{7}{20}$$
$$7:20$$

SUB TOPIC: PIE CHARTS INVOLVING FRACTIONS

REMEMBER:

Fractions in all the sectors add up to 1 whole.

1. The pie chart below shows how three boys got their votes in Boona fm p/s given that 720 votes were cast altogether. Use it to answer the questions that follow.



(a) How many votes did James get?

$$\frac{3}{5} \times 720$$
$$3 \times 144$$
$$432\ votes$$

Mathematics is the Key

(b) How many votes did Jack get?

$$\frac{1}{5} \times 720$$
$$1 \times 144$$
$$144\ votes$$

(c) How many votes were invalid?

$$\frac{1}{20} \times 720$$
$$1 \times 36$$
$$36\ votes$$

(d) How many more votes did James get than Joel?

$$\underline{Joel}$$
$$\frac{3}{20} \times 720$$
$$3 \times 36$$
$$108\ votes$$

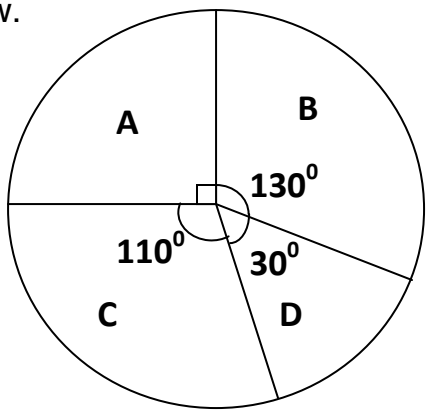
$$\underline{432\ votes - 108\ votes = 324\ more\ votes}$$

(e) Who won the election?

James

SUB TOPIC: SOLVING PROBLEMS INVOLVING PIE-CHARTS

1. Study the pie-chart below which shows the number of COVID-19 testing kits that were distributed in different countries in 2020 and use it to answer the questions that follow.



Mathematics is the Key

(a) How many kits were distribute altogether if country D got 15 million kits?

$$let\ the\ total\ number\ of\ kits\ be\ P$$
$$\frac{30^\circ}{360^\circ} \times P = 15,000,000$$
$$\frac{36}{3} \times \frac{3P}{36} = 15,000,000 \times \frac{36}{3}$$
$$P = 15,000,000 \times 12$$
$$\underline{P = 180,000,000\ kits}$$

(b) How many kits were distributed to country B?

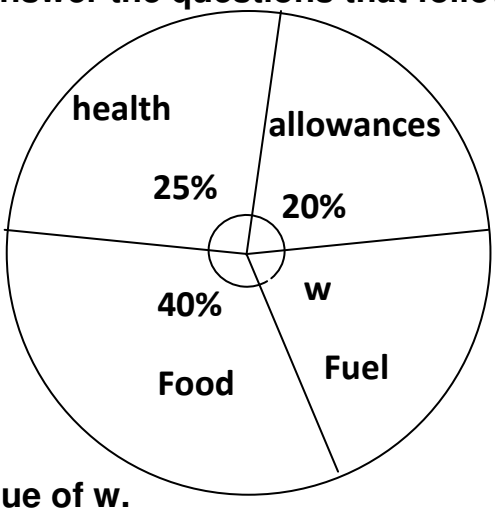
$$\frac{130^\circ}{360^\circ} \times 180,000,000\ kits$$
$$130 \times 500000$$
$$\underline{65,000,000\ kits}$$

(c) How many more kits were distributed to country C than country A?

$$110^\circ - 90^\circ = 20^\circ$$
$$\frac{20^\circ}{360^\circ} \times 180,000,000\ kits$$
$$20 \times 500000$$
$$\underline{10,000,000\ more\ kits}$$

Your turn

The pie chart below shows how the District COVID-19 task force distributed money. Use it to answer the questions that follow.



(a) Find the value of w.
(b) Find the total amount of money distributed if sh.60m was given the health sector.
(c) Find the amount of money for food?
(d) How much money was paid to the workers as allowances?
(e) Express the amount of money for fuel as a fraction.

Mathematics is the Key

SUB TOPIC: CONSTRUCTION OF PIE-CHARTS

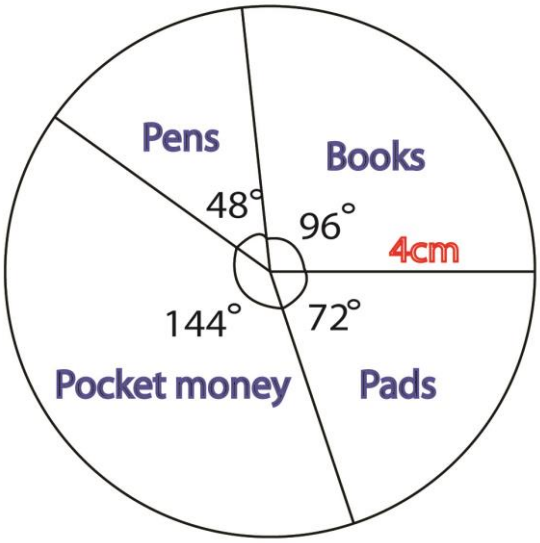
The table below shows how Allen spent her money on the first day of the term

Item	Money
Books	sh.8,000
Pens	Sh.4,000
Pads	Sh.6,000
Pocket money	Sh.12,000

Construct a pie chart using a radius of 3.5cm showing the above information

$$Total: sh.8,000 + sh.4,000 + sh.6,000 + 12,000 = sh.30,000$$

Books	Pens	Pads	Pocket money
$\frac{sh.8,000}{sh.30,000} \times 360°$	$\frac{sh.4000}{sh.30,000} \times 360°$	$\frac{sh.6000}{sh.30,000} \times 360°$	$\frac{sh.12000}{sh.30,000} \times 360°$
$8 \times 12°$	$4 \times 12°$	$6 \times 12°$	$12 \times 12°$
$96°$	$48°$	$72°$	$144°$



$$check$$
$$96° + 48° + 72° + 144° = 360°$$

Try these

1. On Adam's farm there are 9 goats, 6 cows, 3 pigs and 7 sheep. Using a radius of 4 cm, construct an accurate pie chart.
2. Father shared his land as follows

   $\frac{1}{3}$ *to the first born*

   $\frac{2}{9}$ *to the second born*

   $\frac{1}{9}$ *to the last born*

   The rest to the wife

   Use the information to construct a pie chart
3. In a certain town, 40% of the population are Baganda, 10% are Basoga, 30% are Bagisu and the rest are Acholi. Draw an accurate pie-chart for the above information

Mathematics is the Key

4. Nambooze spends her monthly salary as follows ;
   sh. 12,000 on school fees
   sh. 6000 on transport and
   sh. 18,000 on food
   Draw an accurate pie chart for this information

SUB TOPIC: Measures of central tendency and range (STATISTICS)

NOTE THESE:

- **Mode**
  The most frequent value in an observation.
- **Model frequency**
  The number of times the mode appear.
- **Median**
  This is the middle number got after arranging in either ascending or descending order.
- **Mean / Average**
  The measure of central tendency of a set of values computed by dividing the sum of the values by their number.
- **Range**
  The difference between the smallest and the largest observation in a sample
- **Frequency**
  The number of times an event appears in an experiment.

Example:

1. Amuza scored the following marks in MID term exams

$$SST - 60$$
$$MTC - 85$$
$$ENG - 82$$
$$SCI - 60$$
$$RE - 53$$

(a) Calculate his mode

Marks	Freq
85	1
82	1
60	2
53	1

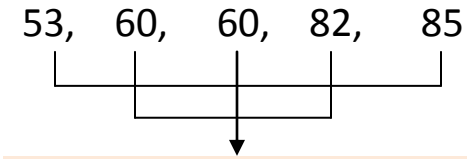
$\boldsymbol{Mode = 60}$

(b) Find his range

$$\boldsymbol{Range = H - L}$$
$$\boldsymbol{= 85 - 53}$$
$$\boldsymbol{= 32}$$

Mathematics is the Key

(c) What is his median mark?



$Median = 60$

(d) Find his mean mark

$$\boldsymbol{Mean} = \frac{\boldsymbol{sum\ of\ items}}{\boldsymbol{no.\ of\ items}}$$

$$= \frac{\mathbf{53 + 60 + 60 + 82 + 85}}{\mathbf{5}}$$

$$= \frac{\mathbf{340}}{\mathbf{5}}$$

$$= \mathbf{68}$$

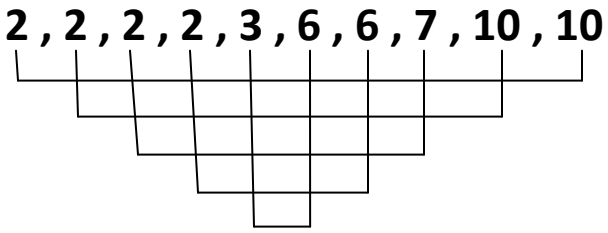
2. The table below represents the goals scored by different teams.

Goals scored	2	3	6	7	10
Number of teams	4	1	2	1	2

(a) Find the mode.
2 goals

(b) What was the modal frequency?
4

(c) Calculate the median



Median = $\frac{\mathbf{3+6}}{\mathbf{2}}$

$= \frac{\mathbf{9}}{\mathbf{2}}$

= 4.5

Mathematics is the Key

(d) Calculate the mean

$$Mean = \frac{SI}{NI}$$
$$= \frac{2\times4+3+6\times2+7+10+10}{4+1+2+1+2}$$
$$= \frac{50}{10}$$
$$= 5$$

3. Find the medium of the following scores 3, 1, 2, 0, 6, 1, 4
4. The table below shows the performance of pupils in a P.7 class in mathematics exam.

Marks	100	90	80	70	60	50	40	30
Freq	0	2	1	1	6	4	4	2

(a).How many pupils are in P.7 class?
(b).What was the highest mark obtained in this exam?
(c).Workout the range
(d)Calculate the average mark.

SUB TOPIC: COMPLEX AVERAGE/INVERSE OF AVERAGE

Examples

1. The average weight of 7 boys is 32kg.find their total weight

$$\boldsymbol{Mean = \frac{Total}{Number\ of\ boys}}$$
$$\boldsymbol{Total\ weight = Mean \times number\ of\ boys}$$
$$\boldsymbol{= 32 \times 7}$$
$$\boldsymbol{= 224\ kg}$$

2. The average of 10 numbers is 16. Find their total

$$\boldsymbol{Mean = \frac{Total}{Number}}$$
$$\boldsymbol{Total = Mean \times number}$$
$$\boldsymbol{= 16 \times 10}$$
$$\boldsymbol{= 160\ years}$$

3. The average mark of Gideon in 4 exams is 82. Find his total mark.
4. The mean age of 5 girls is 13 years. Find their total age.
5. What is the total weight of 12 children if their average weight is 27kg.
6. Calculate the total height of 8 pupils if their average height is 115cm.

Mathematics is the Key

Examples

1. The average of 4 boys in a group is 12 years. A young boy of 7 years joined the group. Find the average age of the 5 boys.

$$Mean = \frac{Total}{Number\ of\ boys}$$

$$Total\ age = Mean\ age \times number\ of\ boys$$
$$= 12 \times 4$$
$$= \underline{48\ years}$$

$$Mean\ age\ of\ 5\ boys = \frac{Sum\ of\ ages}{Number\ of\ boys}$$
$$= \frac{48 + 7}{5}$$
$$= 55$$
$$= 11\ years$$

2. The average of weight of 6 pupils is 30kg. when the teacher joins them, their average becomes 36kg. Find the weight of the teacher.

$$\underline{total\ weight\ of\ 6\ pupils}$$
$$Total\ weight = Mean \times number$$
$$= 30 \times 6$$
$$= \underline{180\ kg}$$

$$\underline{Total\ weight\ of\ 6\ pupils\ and\ the\ teacher}$$
$$Total\ weight = Mean \times number$$
$$= 36 \times 7$$
$$= \underline{252\ kg}$$

$$\underline{weight\ of\ the\ teacher}$$
$$252kg - 180kg = 72kg$$

Try these

1. The average mark of 36 pupils in a class is 5. Two pupils whose marks are 20 and 24 leave the group. Find the average mark of the remaining pupils.
2. The mean age of 5 children is 12years, if a sixth child joins them, the mean age becomes 11years, find the age of the 6th child.
3. The average weight of 6pupils is 40kg; the average weight of other 4 pupils is 30kg. Find the average weight of all the pupils

Mathematics is the key

3. The table below shows the marks obtained by some pupils in a test. Use the information to answer the questions that follow.

Marks	40	m	60	70
Number of pupils	2	6	3	3

If the mean mark is 55, find the value of m

$$\boldsymbol{Mean = \frac{sum\ of\ items}{number\ of\ items}}$$

$$\frac{40 \times 2 + m \times 6 + 60 \times 3 + 70 \times 3}{2 + 6 + 3 + 3} = 55$$

$$\frac{80 + 6m + 180 + 210}{14} = 55$$

$$14 \times \frac{6m + 470}{14} = 55 \times 14$$

$$6m + 470 = 770$$

$$6m + 470 - 470 = 770 - 470$$

$$6m = 300$$

$$\frac{6m}{6} = \frac{300}{6}$$

$$\underline{m = 50}$$

Example 3

The mean of y + 1, 5 and y is 6. Find the value of y.

$$\frac{(y + 1) + 5 + y}{3} = 6$$

$$\frac{y + y + 5}{3} = 6$$

$$3 \times \frac{2y + 6}{3} = 6 \times 3$$

$$2y + 6 = 6 \times 3$$

$$2y + 6 - 6 = 18 - 6$$

$$\frac{2y}{2} = \frac{12}{2}$$

$$\underline{y = 6}$$

Try these

1. The table below represents the goals scored by different teams.

Goals scored	2	3	k	7	10
No. of teams	4	1	2	1	2

Mathematics is the Key

(a) Find the value of k if thee mean number of goals is 5
(b) Find the modal number of goals.
(c) What was the modal frequency?
(d) Calculate the median

2. The average of a, a-7, 3 and 2a is 8.Find the value of a.

SUB TOPIC: PROBABILITY

Probability is a measure of the likelihood of an event happening. Probability ranges from 0 to 1

REMEMBER

Probability of zero (0) means that there is no chance at all.
Probability that is less than a half means that it is a bad chance.
Probability that is a half means that the chances are 50 50.
Probability that is greater than a half means that it is a good chance.
Probability of one (1) means that you have all chances

Probability= $\frac{number\ of\ events}{sample\ space}$

Example: A basket has 2 ripe mangoes and 6 row mangoes. What is the probability of Twaha picking a ripe mango at random?

: $Probability = \frac{number\ of\ events}{sample\ space}$

$n(E) = 2$

$Total\ chances\ (SS) = 2 + 6 = 8$

$Probability = \frac{2}{8}$

Try these

1. What is the probability that a baby will be produced by a pregnant mother?
2. The probability that peter will pass his examinations is $\frac{2}{7}$. What is the probability that he will not pass his examinations?
3. In a tin there are 30 blue and red pens. If the probability of picking a red pen is $\frac{3}{5}$, how many red pens are in the tin?
4. In a football match a team will either win, draw or lose a game.

(a) What is the probability that a team wins the game?
(b) Find the probability that a team draws the match.
(c) What is the probability of a team losing a match?

Mathematics is the Key

Example 1:

If a coin is tossed once, what is the probability of getting a head on the top?

$$\boldsymbol{Total\ chances} = \{\boldsymbol{H}, \boldsymbol{T}\}$$

$$\boldsymbol{Number\ of\ possible\ outcomes(SS)} = \boldsymbol{2}$$

$$\boldsymbol{Expected\ out\ comes} = \{\boldsymbol{H}\}$$

$$\boldsymbol{n(E)} = \boldsymbol{1}$$

$$\boldsymbol{Probability} = \frac{\boldsymbol{n(E)}}{\boldsymbol{SS}}$$

$$= \tfrac{1}{2}$$

Example 2:

When a die is rolled once, what is the probability of getting an even number on top?

$$Probability\ space = \{all\ expected\ out\ comes\}$$

$$\{1, 2, 3, 4, 5, 6\}$$

$$(s.s) = 6$$

$$Expected\ outcomes = \{all\ desired\ chances\}$$

$$(E) = \{2, 4, 6\}$$

$$n(E) = 3$$

$$\boldsymbol{Probability} = \frac{\boldsymbol{n(E)}}{\boldsymbol{SS}} = \frac{\boldsymbol{3}}{\boldsymbol{6}}$$

Try these

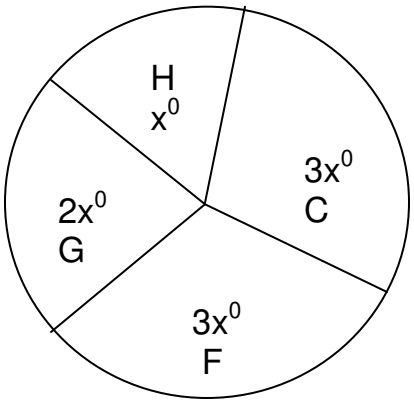
1. A coin is tossed once. What is the probability of getting ;
   (a) A head on top
   (b) A tail on top
   (c) A head or a tail on top
2. A dice is tossed once. What is the probability of getting;
   (a). an even number on top.
   (b). a prime number on top.
   (c). a number less than five on top

Mathematics is the Key

TOPICAL EXERCISE ON GRAPHS

1. Hamisa kept the following daily record of the number of people who visited their home in a week: 3, 5, 3, 2, 0, 3, 5. Find the mean.
2. A die is rolled once. What is the probability that a composite number will show on top?
3. The average height of Peter, James and John is 51cm. If the height of Peter is 53cm and that of James is 46cm Find the height of John.
4. Mary kept the following record of rainfall in centimeters 4, 3, 6, 5, 3, 0. Find the mode.
5. A FOOT BALL TEAM CAN WIN, DRAW OR LOSE A Match. What is the probability that it will win a Match?
6. The mean of the scores: 8, 7, 6, 5, (a – 5) is 6
   (a) Find the value of a.
   (b) Find the range of the scores.
7. Sumaya scored the following marks in her homework exercises: 2, 5, 7, 3, 10, 4, 7, 11, 8, 3
   (a) Find her median mark
   (b) Find the mean mark
   (c) Find the probability that Sumaya scored a mark above her mean mark
8. Find the mean of x, 4, 2x, 6 and 2x.
9. What number is mid way of ½ and 1/3?
10. The average of 3, 5, 4, 7, 9, 5 and y is 5. Find:
    (a) the value of y
    (b) the median
    (c) the mode

11. The pie chart below shows how a farmer has divided his land. C is for cash crops, G is for grazing, F is for food crops and for other purposes . The land available is 720 hectares.



   (a) How many hectares are left for grazing?
   (b) If he pays rent of sh. 20,000 per hectare per year, how much will he pay for land reserved for cash crops?

Mathematics is the Key

12. In a Mathematics test given to a class, the marks scored frequency and total marks scored are shown in the table below.

Marks scored	Frequency	Total marks
4	4	16
_____	9	45
6	_____	84
7	8	_____
9	5	45

(a) Complete the table
(b) What was the mode?
(c) How many pupils were in the class?
(d) What was the average mark scored?

13. Study the frequency table and answer the questions that follow:

Marks scored	20	40	70	50
No. of children	2	3	1	1

(a) How many pupils did the test?
(b) Find their mean mark.
(c) Calculate their median mark.
(d) What was the modal mark.
(e) Workout the range

MONEY

SUB TOPIC: Shopping lists

Example

1. A mother had a twenty thousand shilling note and bought the following items.
1 ½ kg of beans at shs.3,000 per kg.
500g of salt at sh. 2,600 each kg.
2 bars of soap at sh.8,000
12 tomatoes at sh.800 for every 4 tomatoes
(a) How much did she spend altogether?

Mathematics is the Key

Beans	Salt	Soap	Total exp.
$1\frac{1}{2}kg \times sh.3{,}000$ $\frac{3}{2} \times sh.3{,}000$ $3 \times sh.1{,}500$ $sh.4{,}500$	$1kg = 1000g$ $\frac{500}{1000} \times$ sh. 2,600 $50 \times sh.26$ $sh.1{,}300$	$sh.8{,}000$ **Tomatoes** $\frac{12}{4} \times sh.800$ $3 \times sh.800$ $sh.2{,}400$	$sh.4{,}500$ $sh.1{,}300$ $sh.8{,}000$ $+sh.2{,}400$ $sh.16{,}200$

(b) Find her change

$Change = Money\ at\ hand - Total\ expenditure$

$= \boldsymbol{sh.20{,}000 - sh.16{,}200}$

$= \boldsymbol{sh.3{,}800}$

Activity

1. During the COVID-19 pandemic, a lady bought the following items.

   $3\ bottles\ of\ sanitizers\ at\ sh.5{,}000@\ bottle$

   $6\ bars\ of\ soap\ at\ sh.4{,}000@bar$

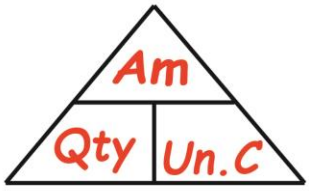
   $12\ face\ masks\ at\ sh.2{,}500\ each$

   $A\ box\ of\ gloves\ at\ sh.12{,}000$

   (a) How much money was spent altogether?

   (b) If she went with 2-fifty shilling notes, calculate her change.

SUB TOPIC: Completing table bills



$Amount = Qty \times Un.C$

$Qty = \frac{Amount}{Un.C}$

$Un.C = \frac{Amount}{Qty}$

1. **Study the shopping table below which shows how Alvas bought items for the birthday party and use it to answer the questions**

Item	*Quantity*	*Unit cost*	*Amount*
Sugar	*2kg*	*Sh.3,600*	*Sh.7,200*
Rice	*4kg*	*Sh. 3,000*	*Sh.12,000*
Meat	$1\frac{1}{2}kg$	*Sh.12,000*	*Sh.18,000*
Cooking oil	*500ml*	*Sh.5,000@litre*	*Sh.2,500*
Total expenditure			*Sh.49,700*

Mathematics is the Key

(a) Complete the table

Sugar

$2 \times sh.3{,}600 = sh.7{,}200$

rice

$sh.12{,}000 \div 4$

$= sh.3{,}000$

meat

$sh.18{,}000 \div 1\frac{1}{2}$

$sh.18{,}000 \div \frac{3}{2}$

$sh.18{,}000 \times \frac{2}{3}$

$sh.6{,}000 \times 2$

$sh.12{,}000$

Cooking oil

$\frac{500}{1000} \times sh.sh.5{,}000$

$sh.500 \times 5$

$sh.2{,}500$

(b) Find the change given that he went with sh.50,000.

$\boldsymbol{sh.50{,}000 - sh.49{,}700 = sh.300}$

2. Complete the shopping table below

Item	*Quantity*	*Unit cost*	*Amount*
Books	*5*	*Sh.2,000*	*Sh._____*
Pens	_____	*Sh. 700*	*Sh.6,300*
pencils	*half dozen*	*Sh.4,500@doz*	*Sh._____*
Reams	*2*	*Sh._____*	*Sh.50,000*
Total expenditure			*Sh._____*

SUB TOPIC: CURRENCY (comparison of currencies)

Below are some of the countries with their currency

COUNTRY	***CURRENCY***
Burundi	*Burundi francs (BF)*
Zambia	*Kwacha (Kch)*
Zimbabwe	*Zimbabwe Dollar (Z$)*
German	*Deutsch mark (DM)*
Egypt	*Egyptian pound*
America	*US Dollar(US$)*
Britain	*GB pound(£)*
Kenya	*Kenya shillings (Ksh)*
Tanzania	*Tanzania shilling (TZ sh)*
Rwanda	*Rwanda francs (RF)*

Mathematics is the Key

Examples

1. Given that

$1US\$ = Ugsh.3{,}700$

$1\ TZ\ sh. = Ugsh.2.2$

$1ksh = ugsh.$

a) How much in Uganda shillings is equivalent to $20 plus Tzsh. 30,00?

$\mathbf{1US\$ = Ugsh.3{,}700}$

$\mathbf{Ugsh\ 3{,}700 \times 20}$

$\mathbf{Ugsh\ 74{,}000}$

$\mathbf{1\ TZsh = Ugsh\ 2.2}$

$\mathbf{TZ\ shs\ 30{,}000 = Ush.\frac{22}{10} \times 30{,}000}$

i. $\mathbf{= Ush.66{,}000}$

Total Uganda currency

$\mathbf{Ugsh\ 74{,}000}$

$\mathbf{+\ Ugsh\ 66{,}000}$

$\mathbf{Ush.140{,}000}$

b) Kizito works with the Tanzania high commission and his monthly salary is Ugsh.33,000. What is his salary in Tanzania currency?

$\mathbf{Ugsh.2.2 = TZsh1}$

$\mathbf{33{,}000 \div 2.2}$

$\mathbf{33000 \div \frac{22}{10}}$

$\mathbf{33000 \times \frac{10}{22}}$

$\mathbf{3000 \times 5}$

$\mathbf{TZsh.15{,}000}$

c) A trader sold maize to Kenya for K sh. 150,000. How much money did he get in Uganda shillings given that 1 ksh. = Ugsh.20

$\mathbf{Ksh\ 1\ equivalent\ to\ U\ sh\ 20}$

$\mathbf{Ugsh.20 \times 150{,}000}$

$\mathbf{Ugshs\ 3{,}000{,}000}$

d) Musiime exported coffee to USA and earned US$ 25,000. He also exported maize to Kenya and earned K shs 500,000.Calculate his total earning in Uganda currency.

e) Convert £ 37,000 to Uganda shillings.

f) Mr Santu Daniel went to the Forex Bureau with Ugsh. 207200. How much in US$ did he get in exchange.

g) Convert GBP ____ to Kenya shillings.

Mathematics is the key

1. The table below shows the rates at which different currencies are bought and sold.

CURRENCY	BUYING(UGX)	SELLING(UGX)
1 US dollar	3600	3650
1 Euro	4000	4020
1 Rwa. franc	4.0	5.0

(a) How many Euros did Musa get for ugsh.603,000?

$1\ Euro\ =\ Ugsh.4{,}020$

$\boldsymbol{Ugsh.603,000}$

$\boldsymbol{Ugsh.4,020}$

60300

402

150 *Euros*

(b) Amiina came from Rwanda with 111,000 Rwandese francs and exchanged them for us dollars. How many US dollars did she get from the bank?

Rwanda francs to Ugsh

$1\ Franc\ =\ Ugsh.4$

$111{,}000\ \times\ 4$

$Ugsh.444{,}000$

Ugsh to US dollars

$Ugsh.3700\ =\ 1US\ dollar$

$Ugsh.444{,}000$

$Ugsh.3700$

4440

37

$120\ US\ dollars$

Activity

1. **The table below shows how money is bought and sold in a Barclays bank in Uganda shillings.**

CURRENCY	BUYING(UGX)	SELLING(UGX)
1 US dollar	3700	3750
1 ksh	18	20
1 *Pound* (£)	4500	4650

(a) How much money in UG shillings can one get with ;

i. 125 US dollars?

ii. 5000 Kenya shillings?

iii. 789 Pounds?

(b) How much money in US dollars can one get from UGSH.3562500?

(c) How many Kenya shillings are equivalent to 780 Pounds?

Mathematics is the Key

SUB TOPIC: Bank notes

Examples

1. Bank notes in a bundle are numbered from $AM\ 0024354$ to $AM\ 0024453$. How many notes are in that bundle?

$$\begin{array}{r} \boldsymbol{Last\ note - first\ note} \\ \boldsymbol{AM\ 0024453} \\ \underline{\boldsymbol{-AM0024354}} \\ \boldsymbol{99} \end{array}$$

$$\boldsymbol{99 + 1 = 100\ notes}$$

2. A bundle of bank notes are numbered from $KQ\ 1234567$ to $KQ\ 1234636$

(a) How many bank notes are in the bundle?

$$\begin{array}{r} \boldsymbol{Last\ note - first\ note} \\ \boldsymbol{KQ1234636} \\ \underline{\boldsymbol{-KQ1234567}} \\ \boldsymbol{49} \end{array}$$

$$\boldsymbol{49 + 1 = 50\ notes}$$

(b) How much money is contained in the bundle if it contains five thousand shilling notes?

$$\begin{array}{r} \boldsymbol{sh.\,5,000 \times 50} \\ \underline{\boldsymbol{sh.\,250,000}} \end{array}$$

3. **How many notes are in a bundle of notes numbered from;**
   - **(a) CG1994489 to CG1994588**
   - **(b) DU9951653 to DU9951702**
   - **(c) WG7207450 to WG7207550**
4. **Fifty thousand uganda shilling notes are numbered from BW5275381 to BW5275430. How much money is contained in this bundle?**
5. **A bundle of one thousand bank notes contains 100 bank notes. If the last note is numbered FM3450718;**
   - **(a) Find the number for the first note.**
   - **(b) How much money is contained in the bundle?**

Mathematics is the Key

DISTANCE, SPEED AND TIME

- Revision about conversion of time

SUB TOPIC: Conversion of 12 hour time to 24 hour time

Example

1. Change 2:00am to 24 hour clock

2:00am
+00:00
02 00 hrs

2. Change 8:30pm to 24 hour lock

8:30 pm
+12:00
20 30 hrs

NOTE:

12 noon and 12 mid night is special time which means that we just state the answer as shown below.

12:30 am = 00:30 hrs

12:30 pm = 12:30hrs

3. Change the following time to 24hour clock.

(a) 5:30am
(b) 4:18pm
(c) 12:12am
(d) 12:19pm
(e) 11:11pm

REFERENCE

A New MK Primary Mathematics 2000 Bk 7 Pg 412 (New Edition)

SUB TOPIC: Changing 24 hour clock to 12 hour clock

Example

1. Write 0436 hrs in the 12-hour clock

04 36 hrs
- 00 00
4:36 am

2. Write 2340 hrs in the 12-hour clock time

23 40hrs
-12 00
11:40 pm

3. Write 1245hrs in 12 hour clock

1245hrs = 12:45 pm

4. Write 0045hrs in 12 hour clock

0045hrs = 12:45hrs

Mathematics is the Key

5. **Write the following time in 12 hour clock.**

(a) $0319hrs$

(b) $1529hrs$

(c) $1256hrs$

(d) $0013hrs$

(e) $1943hrs$

SUB TOPIC: Finding duration

$$Duration = Ending\ time - Starting\ time$$
$$Duration = ET - ST$$

Example

1. A lesson started at 8:30 am and ended at 11:00 am. How long did the lesson take?

11:00 am
- 8:30 am
2:30

2hours 30minutes

$2\frac{30}{60}\text{hours} = 2\frac{1}{2}\ hours$

2. A bus left Nairobi at 1315 hours and arrived in Kampala at 1630 hrs. How long did the journey take?

1630 hrs
- 1315 hrs
3 15

3hours 15minutes

$3\frac{15}{60}\ \text{hours} = 3\frac{1}{4}\ \text{hours}$

3. A party started at 2000hrs and ended at 11:30pm. How long did the party last? (Express 11:30pm in 24 hr-clock)

11:30pm
+12:00hrs
2330hrs

200hrs
-2000hrs
3:30

The party lasted for 3 hours and 30 minutes.

4. A baby slept at 10:00pm and woke up at 3:30 am. How long did the baby sleep?

10:00pm to 12:00 mid night
12:00
+10:00
2:00

Total time
2:00
+ 3:30
5:30

The baby slept for 5 hours 30 minutes

Mathematics is the Key

5. A man started his journey at 6:35am and reached the destination at 10:00am.how long did the journey take?
6. A motorist left town A at 11:00am and reached town B at 3:00pm. How long did he take to move from tow A to town B?
7. Jamil started digging at 6:50am and ended at 1000hrs. How long did he take digging?
8. How many hours are their between 8:00pm to 3:00am?

SUB TOPIC: More problems on duration

REMEMBER

$$Duration = ET - ST$$
$$ET = ST + Duration$$
$$ST = ED - Duration$$

Examples

1. A 45 minute lesson ended at 5:20pm. At what time did the lesson start?

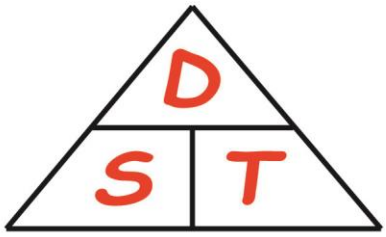
$$ST = ET - Duration$$
$$5{:}20pm$$
$$-00{:}45$$
$$4{:}35pm$$

2. Hope started the journey at 8:00am and took 1hr 30minutes. At what time did the journey end?

$$ED = ST + Duration$$
$$8{:}00am$$
$$+1{:}30$$
$$9{:}30am$$

3. A motorist moved for 3hours from town A to Town B. if he reached town B at 7:30 pm, at what time did he start the journey?
4. Mercy started revising at 5:45am and took $2\frac{1}{2}$ hours. At what time did he end the revisions?
5. A truck moved for 5 hours and reached the destination at 2:00am. At what time did he start the journey?

Mathematics is the Key



$$\text{Distance} = S \times T$$

$$\text{Speed} = \frac{D}{T}$$

$$\text{Time} = \frac{D}{S}$$

Distance is measured in km or m

Examples

1. Alex moved from town A to town B at a speed of 40km/hr for 2hours. How far is town A from town B?

$$\begin{aligned} \boldsymbol{D} &= \boldsymbol{S} \times \boldsymbol{T} \\ &= \frac{\boldsymbol{40km}}{\boldsymbol{hr}} \times \boldsymbol{2hrs} \\ &= \boldsymbol{40km} \times \boldsymbol{2} \\ &= \boldsymbol{80km} \end{aligned}$$

2. A car travelled for $2\frac{1}{2} hours$ at a speed of 80km/hr. How far did he move?

$$\begin{aligned} \boldsymbol{D} &= \boldsymbol{S} \times \boldsymbol{T} \\ &= \frac{\boldsymbol{80km}}{\boldsymbol{hr}} \times \boldsymbol{2}\frac{\boldsymbol{1}}{\boldsymbol{2}}\boldsymbol{hrs} \\ &= \boldsymbol{80km} \times \frac{\boldsymbol{5}}{\boldsymbol{2}} \\ &= \boldsymbol{40km} \times \boldsymbol{5} \\ &= \boldsymbol{200km} \end{aligned}$$

3. A bus travelled from town Q to town R for 6 hours at a speed of 65km/hr. What is the distance between town Q and R?
4. Allen moved from town Y at 4:30pm and reached town X at 5:00pm. If she was moving at a speed of 120km,
   (a) How long did he take travelling?
   (b) How far is town X from town Y?

Mathematics is the Key

SUB TOPIC: Finding Speed

The units for speed are km/hr or m/s

Examples

1. Kagoma takes 45 minutes to drive from home to town a distance of 30km. Calculate his speed in km/hr.

$$\boldsymbol{Speed = \frac{distance}{time}}$$
$$\boldsymbol{= 30km \div \frac{45}{60} hrs}$$
$$\boldsymbol{= 30km \times \frac{60}{45} hrs}$$
$$\boldsymbol{\underline{= 40km/hr}}$$

2. James covered a distance of 80km in just 2 hours. At what speed was he moving?
3. A bus moved for $2\frac{1}{2}$ hours from town A to town B. If the distance from town a to town b is 100km, find the speed at which the bus was moving.
4. Daniel covered 45km in only 45 minutes. Find his speed in km/hr.

SUB TOPIC: Finding Time

Examples

1. A driver covered 60km at a speed of 15km/hrs. How long did he take travelling?

$$\boldsymbol{Time = \frac{D}{S}}$$
$$\boldsymbol{Time = \frac{60km}{15km/hr}}$$
$$\boldsymbol{\underline{\underline{Time = 4\ hours}}}$$

2. A boy moved a distance of 180m at a speed of 2m/s. How many seconds did he take to cover the distance?

$$\boldsymbol{Time = \frac{D}{S}}$$
$$\boldsymbol{Time = \frac{180m}{2m/s}}$$
$$\boldsymbol{\underline{Time = 90seconds}}$$

3. Calculate the time taken to cover 80km at a speed of 20km/hr
4. Amon travelled from home to school at a speed of 80km/hr which is a distance of 120km. How long did he take to reach school?
5. A truck moving at 150km/hour covered a distance of 450km. how long did the journey take?

Mathematics is the Key

SUB TOPIC: Changing km/hr to m/s

Example

1. Change 90km/hr to m/s

$$90km/hr = \frac{90km}{1hr}$$
$$1km = 1000m$$
$$1hour = 3600s$$

$$= \frac{90 \times 1000}{1 \times 3600}$$
$$= 25\ m/s$$

2. Change the following as to m/s
   - **(a) 72km/hr**
   - **(b) 108km/hr**
   - **(c) 180km/hr**
   - **(d) 144km/hr**

REFERENCE

A New MK Primary Mathematics Bk 7 pg 331 (old edition)

SUB TOPIC: Changing m/s to km/hr

Example

1. Change 10m/s to km /hr

$$10m/s = \frac{10m}{1s}$$
$$1\ hour = 3600\ sec$$
$$1\ km = 1000m$$

$$10m/s = \frac{10 \div 1000}{1 \div 3600}$$
$$= \frac{10}{1000} \div \frac{1}{3600}$$
$$= \frac{10}{1000} \times \frac{3600}{1}$$
$$= 36\ km/hr$$

2. Convert the following m/s to km/hr
   - (a) $40m/s$
   - (b) $15\ m/s$
   - (c) $25m/s$
   - (d) $5m/s$

Mathematics is the Key

1. .Dungu travelled from town A to town B at a speed of 60km/hr for 3 hours. Then he went to town C from B at a speed of 80km/hr in $2hrs$. Calculate the average speed for the whole journey.

   Average speed = $\frac{TDC}{TTT}$

   Distance 1

   $D = S \times T$

   $= 60km/hr \times 3hrs$

   $= 60 \times 3km$

   $= 60 \times 3km$

   $= \underline{180km}$

   Distance 2

   $D = S \times T$

   $= 80km/hr \times 2hrs$

   $= 80 \times 2km$

   $= \underline{160km}$

   $TDC = 180km + 160km = 340km$

   $TTT = 2hrs + 3hrs = 5hrs$

   $$\textbf{Average speed} = \frac{340km}{5hrs}$$

   $$\underline{=68km/hr}$$

2. A bus driver left town **A** at 6:00am driving at an average speed of 30km/hr for 2 hours to town **B**. he stopped at **B** for 30minutes and then left for **C** driving at 60km/hr for $2\frac{1}{2}$hours.

   (a) Calculate his average speed.

   (b) At what time did he reach town C.

3. A bus driver left town **M** driving at an average speed of 70km/hr for 2 hours to town **N**. He stopped at **N** for an hour and then continued to town **Q** driving at 60 km/hr for 1hour**.** Calculate his average speed.

4. A bus driver left town **R** at 6:40am driving at an average speed of 25km/hr for 2 hours to town **S**. He stopped at **S** for an hour and then left for **T** driving at 30km/hr for 3hours. Calculate his average speed for the whole journey.

Mathematics is the Key

SUB TOPIC: School Time Table

Example:

1. Study the time table below for a P.6 class in Kyebando Primary School and answer the questions that follow.

From	8:30 am	9:10 am	9:50 Am	10:30 Am	11:10 Am	11:50 Am	12:30 pm	2:00 pm	2:40 pm
To	9:10 am	9:50 am	10:30 Am	11:10 Am	11:50 am	12:30 pm	2:00 pm	2:40 pm	3:20 pm
MON	***MTC***	***ENG***		***PAPE***	***PAPE***	***R.E***		***PAPE MDD***	***PAPE MDD***
TUE.	***SCI***	***MTC***		***R.E***	***R.E***	***ENG***		***SST***	***SST***
WED.	***SST***	***ENG***		***IPS***	***SCI***	***SCI***		***ENG***	***ENG***
THUR	***ENG***	***SCI***		***MTC***	***MTC***	***L.LAG***		***R.E***	***MTC***
FRI	***MTC***	***MTC***		***KISW***	***ENG***	***SCI***		***IPS***	***IPS***

(i) How long does each lesson last?

9:~~10~~[70]am ***(60 + 10) = 70 minutes***

-8:30 am

40

Each lesson lasts for 40 minutes

(i) At what time does break end?

10:30am

(iii) For how long do the pupils take studying Science the whole week?

5 lessons x 40 minutes = 200 minutes

SUB TOPIC: Taxi and bus time tables

Example

1. The table shows the departure and arrival time of a taxi at given stations. Study it and answer the questions that follow:

Station	Arrival	Depature
Tororo		6:00am
Iganga	7:30am	7:45am
Jinja	8:35am	8:50am
Kampala	10:50am	

Mathematics is the Key

(i) How long did the taxi take to move from Tororo to Iganda?

Time of arrival – Time of departure

7:30am
- 6:00am
1:30

It took 1 hour 30 minutes

(ii) How long was the taxis stopover in Jinja?

8:50am
- 8:35am **It was 15 minutes**
0:15

(ii) How long did the taxi take to move from Iganga to Kampala?

10 : 50 am
- 7 : 45 am
3 : 15

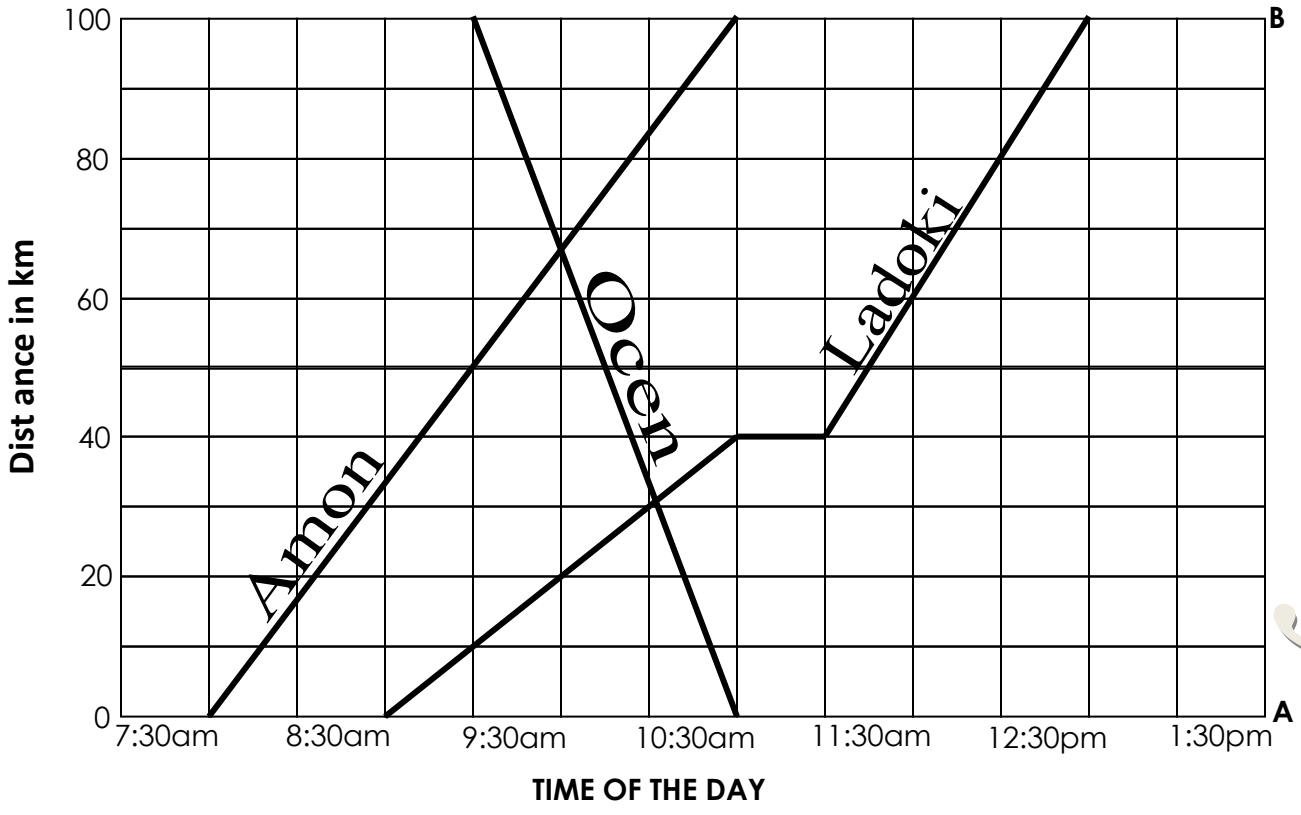
It took 3 hours and 15 minutes

SUB TOPIC: INTERPRETING TRAVEL GRAPHS (Distance Time graph)

A travel graph is one which shows the distance travelled in a period of time

Example1

The graph below shows 3 people who moved between town A and town B. Amon started from town A at 8:00 am to town B, Ladoki started the journey at 9:00am to town B and Ocen started the journey fom B at 9:30am to town A .



Mathematics is the Key

Questions

ii. What is the scale on the horizontal axis.?
One small square represents 30 minutes

iii. What is the scale on the vertical axis?
One small square represents 10 km

iv. Find the average speed for Ladoki.

$$\boldsymbol{Average\ speed} = \frac{\boldsymbol{TDC}}{\boldsymbol{TTT}}$$

$$\boldsymbol{TDC} = \boldsymbol{100\ km}$$

$$\boldsymbol{TTT} = \boldsymbol{4\ hours}$$

$$\boldsymbol{Average\ speed} = \frac{\boldsymbol{100km}}{\boldsymbol{4hrs}}$$

$$\underline{\underline{\boldsymbol{= 25\ km/hr}}}$$

v. How many hours did Amon take to complete her journey?
3hours

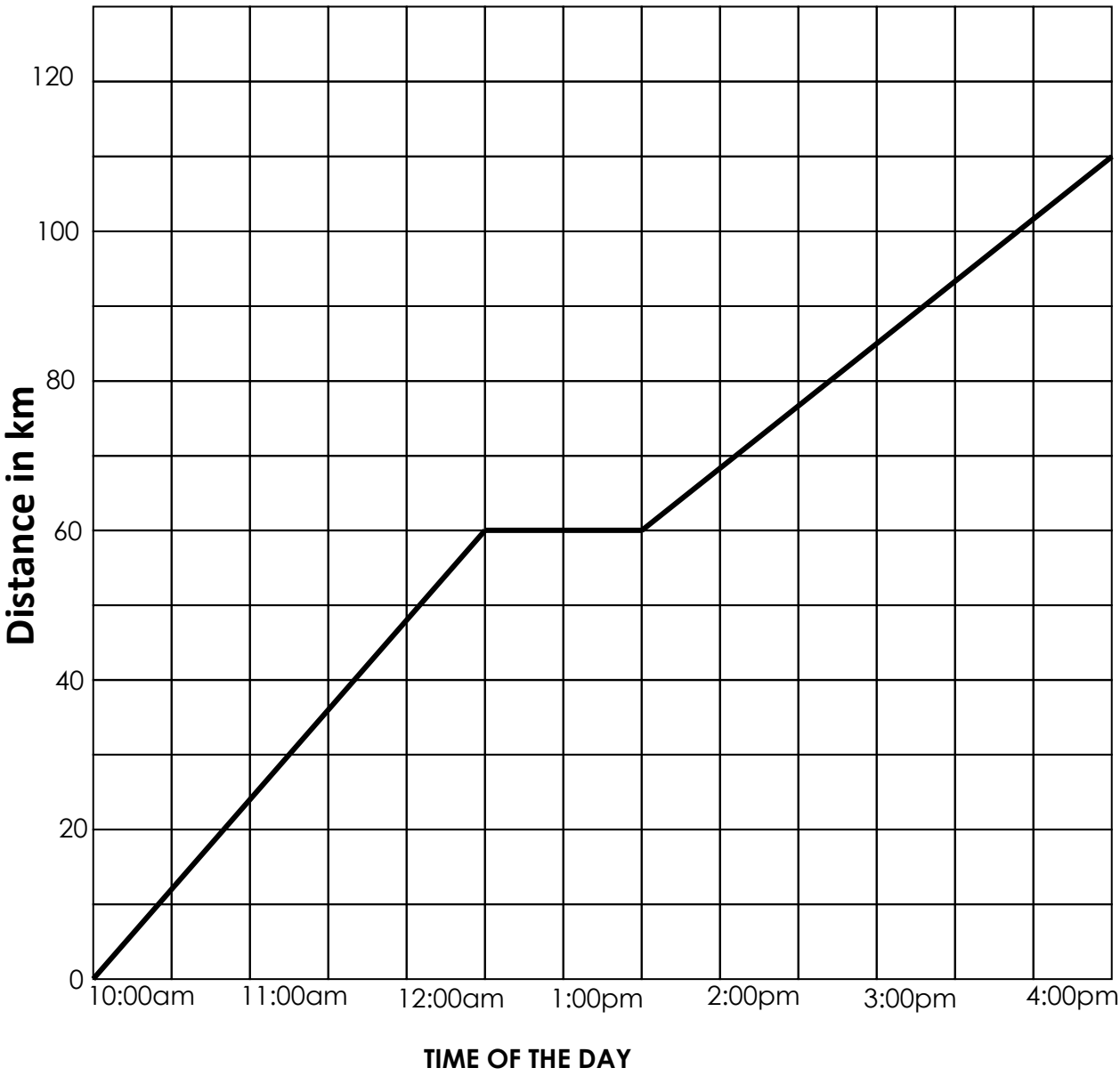
vi. At what time did Amon meet Ocen?
At 10:00am

vii. How many hours earlier did Amon arrive at town B before Ladoki?
2 hours

Mathematics is the Key

Example 2

The graph below shows how the driver moved from ASA town to OMU town via EKO town. Use it to answer the questions that follow.



Questions

a) What is the scale on the vertical axis?
1 small square represents 10km

b) What is the scale on the horizontal axis?
1 small square represents 30 minutes

c) At what time did he start the journey?
At 10:00am

d) At what time did he reach OMU?
At 4:30pm

e) How long did he take resting?
1 hour

Mathematics is the Key

f) How far is ASA from OMU?
110km

g) How long did he take to move from ASA to EKO?
2hours 30minutes

h) What is the distance from EKO to OMU?

i) At what speed was he moving from ASA to OMU?

j) Find his average speed for the whole journey.

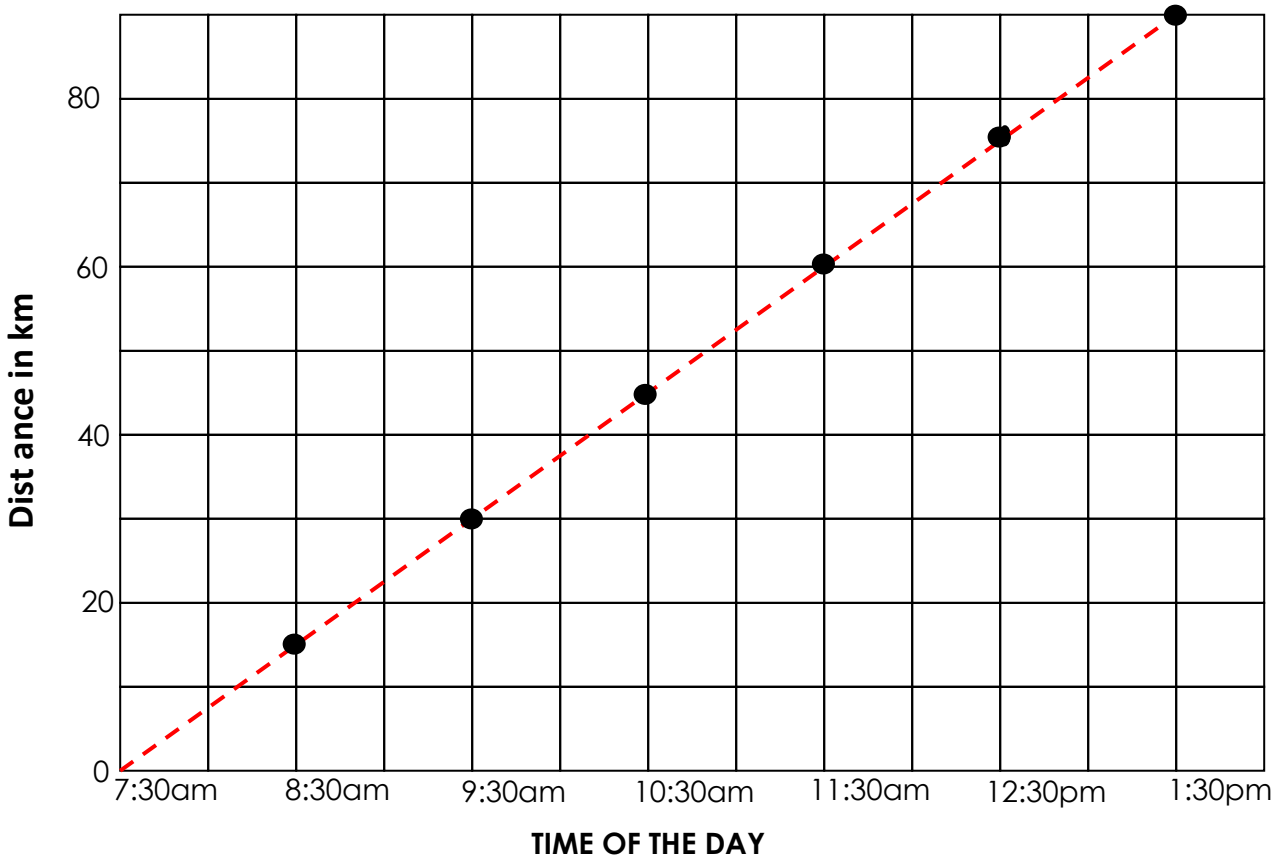
SUB TOPIC: DRAWING TRAVEL GRAPHS

Example1:

Mukasa covered a journey in 6 hours traveling at 15 K.P.H. Show the journey on the grid if he started the journey at 7:30am.

KM	0^{+15}	15km $^{+15}$	30km $^{+15}$	45km^{+15}	60km^{+15}	75km^{+15}	90km
Time	0^{+1}	1 hr $^{+1}$	2hrs $^{+1}$	3hrs^{+1}	4 hrs^{+1}	5hrs^{+1}	6hrs

A graph representing Mukasa's journey.



Example 2

Town M is 150km from town G. A motorcyclist started the journey from town M at 10:30am .He was travelling at a speed of 25km/hr for 2 hours. he rested for 30 minutes and then continued at a speed of 50km/hr for the rest of the journey to town G.

Mathematics is the Key

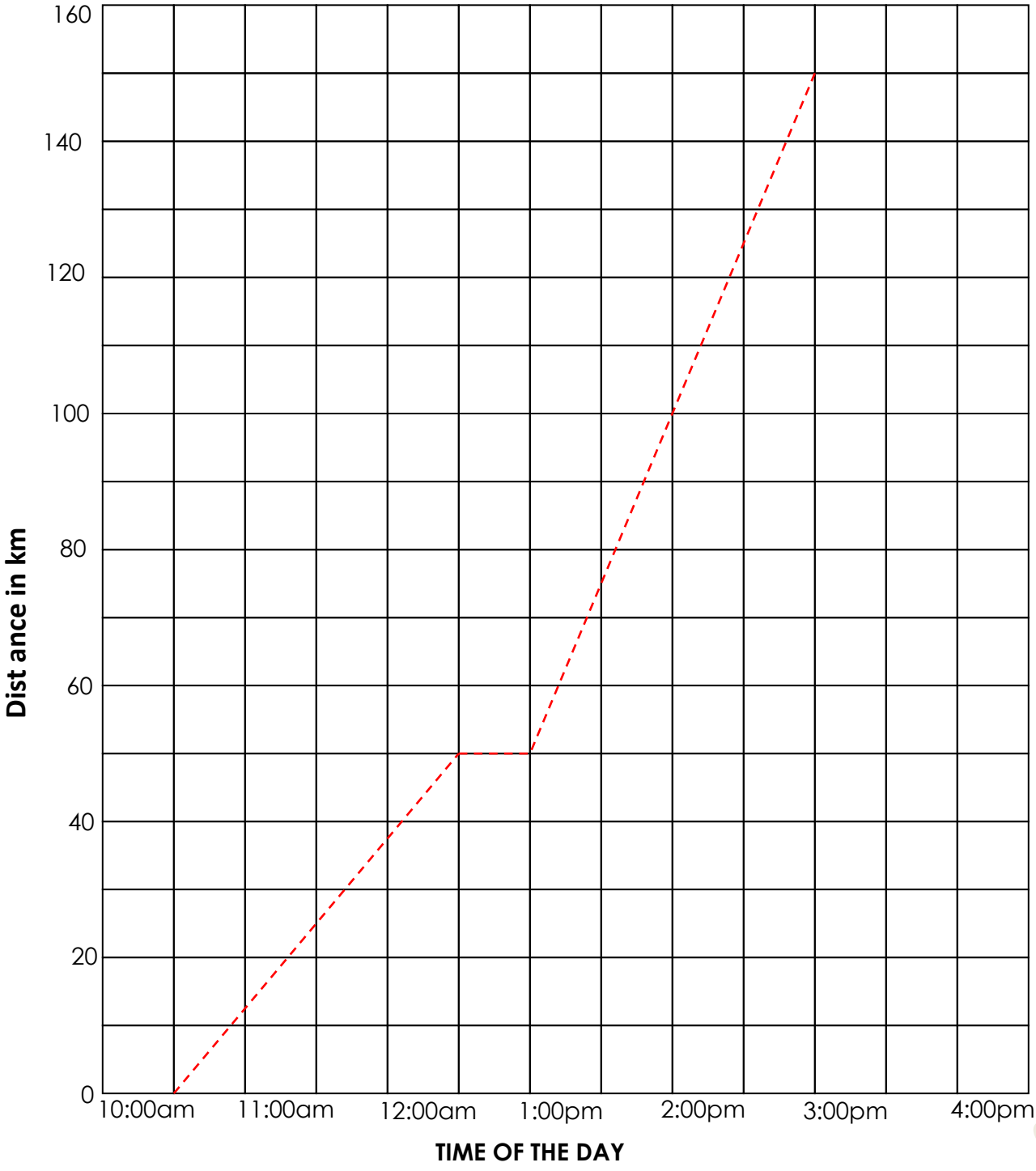
(a). ***Represent the motorcyclists journey on the graph below.***

Phase 1

Distance = S X T
= 25km/hr X 2hrs
=50 km

Phase 2

D = 150 km – 50 km =100 km
Time = 100km ÷ 50km/hr
= 2 hours



(b).At what time did he reach town G?

At 3:00 pm

Mathematics is the Key

1. Amson arrives at Kampala at 11:20pm and leaves at 2:00am to travel to Nairobi. She is due into Nairobi at 6:00am the following day. Unfortunately she is delayed and arrives at 9:30am.
   (a) How late is Amson in arriving at Nairobi?
   (b) For how long does Amson have to wait in Kampala?
   (c) At what time does Amson leave Kampala on the 24 – hour clock?
2. A lesson started at 10:30am and ended at 11:50 am. How long did the lesson last?
3. Convert 7200 seconds into hours.
4. Convert 1717 hours to a 12- hour clock.
5. Thieves escaped from the prisons at 12:15 am. Express this time in a 24-hour clock.
6. Convert 2 ½ hours to minutes.
7. It takes 4 hours for a bus traveling at 75 km/hr to move from town X to town y. Find the time taken by a bus traveling at 50km/hr to cover the same distance.
8. Express 90km/hr as m/sec.
9. Convert 10m/second to km/hour
10. A motorist covered 140km between 11:25 am and 2:55pm. Find his average speed.
11. A bus driver left town **A** at 6:00am driving at an average speed of 50km/hr for 3 hours
12. to town **B**. he stopped at **B** for 2hours and then left for **C** driving at 60km/hr for 1hour.
13. Calculate the average speed for the whole journey
14. The average speed of a car is 60km/hr for 30 minutes. What distance is covered?
15. A cyclist traveled from town P to R as follows. For 2 hours, he cycled from P to town Q a distance of 30km and then rested for 1 hour from Q. He continued for another 1 hour to town R at a speed of 40km/hr. Draw a travel graph to show his journey
16. .A school bus taking pupils to a Game park covered 75% of its journey in 1½ hours. The bus travelled at a steady speed of 80 kilometres per hour. Find how far the school is from the Game Park.

Mathematics is the Key

TERM III

LENGTH, MASS AND CAPACITY

SUB TOPIC: ***Comparing units/conversion of metric units(review)***

Examples:

Comparing metric units

Km	***Hm***	***Dm***	***Metre***	***dm***	***cm***	***mm***
Kg	***Hg***	***Dg***	***Gram***	***dg***	***Cg***	***mg***
Kl	***Hl***	***Dl***	***Litre***	***dl***	***Cl***	***Ml***

(a) Change 7m to millimetres

1m = 1000mm

7m = (7 x 1000m)

= 7000mm

(b). Change 800m to km

$$\mathbf{1000}\boldsymbol{m} = \mathbf{1}\boldsymbol{km}$$

$$\mathbf{800}\boldsymbol{m} = \frac{\mathbf{800}}{\mathbf{1000}}$$

$$= \frac{\mathbf{8}}{\mathbf{10}}$$

$$= \mathbf{0.8}\boldsymbol{km}$$

Convert the following as instructed

(a) 4km to metres

(b) 0.4 litres to milliliters

(c) 2000g to kg

(d) 50cm to m

Mathematics is the Key

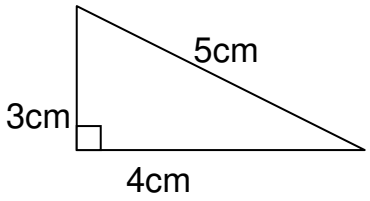
SUB TOPIC: Finding perimeter

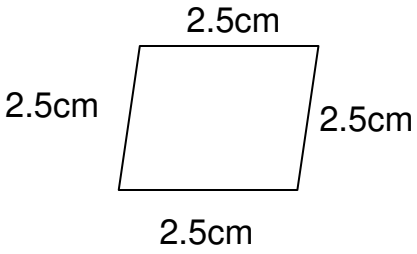
Perimeter is the total distance around the figure

Examples:

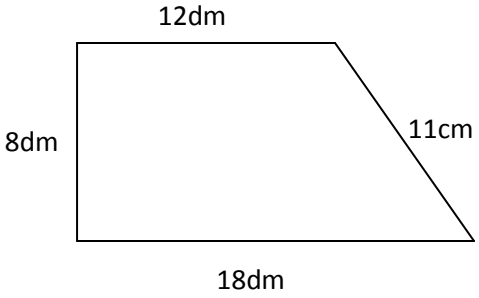
Find the distance (Perimeter) around the shapes given below:

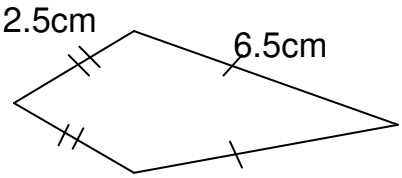
(i)





$$P = 4cm + 3cm + 5cm$$
$$= 7cm + 5cm$$
$$= 12cm$$





SUB TOPIC: FINDING AREA OF SIMPLE SHAPES

BASIC FORMULAE

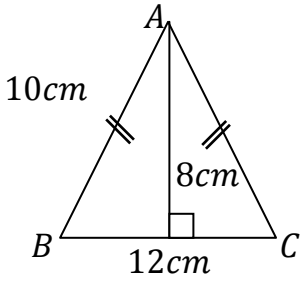
$SQUARE = S \times S$

$RECTANGLE = L \times W$

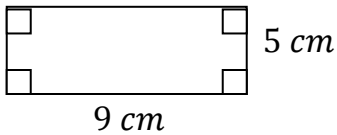
$TRIANGLE = \frac{1}{2}bh$

$TRAPEZIUM = \frac{1}{2}h(a+b)$

1. Find the area of the shapes below

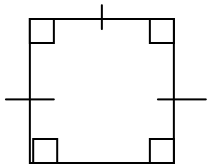


$$A = ½ \times b \times h$$
$$= ½ \times 12cm \times 8cm$$
$$= 6cm \times 8cm$$
$$A = 48cm^2$$



$$A = L \times W$$
$$= 9cm \times 5cm$$
$$= 45cm^2$$

Mathematics is the Key

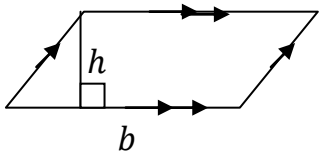


$$\boldsymbol{A = S \times S}$$
$$\boldsymbol{= 7cm \times 7cm}$$
$$\boldsymbol{= 49cm^2}$$

Try these

1. *Find the area of a square whose side is 13m*
2. *Calculate the area of a rectangle whose length is 14dm and width is 9dm.*
3. *Find the area of a triangle whose base is 25cm and height is 30cm.*

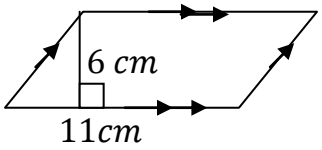
SUB TOPIC: Finding area of a parallelogram



$$\boldsymbol{PARALLELOGRAM = b \times h}$$

Examples

1. Workout the area of the figure below.

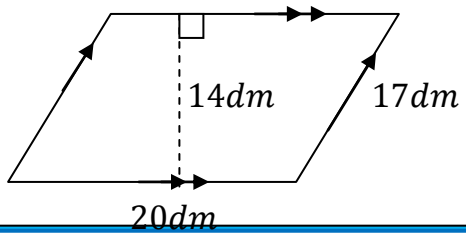


$$\boldsymbol{A = b \times h}$$
$$\boldsymbol{= 11cm \times 6\,cm}$$
$$\boldsymbol{= 66cm^2}$$

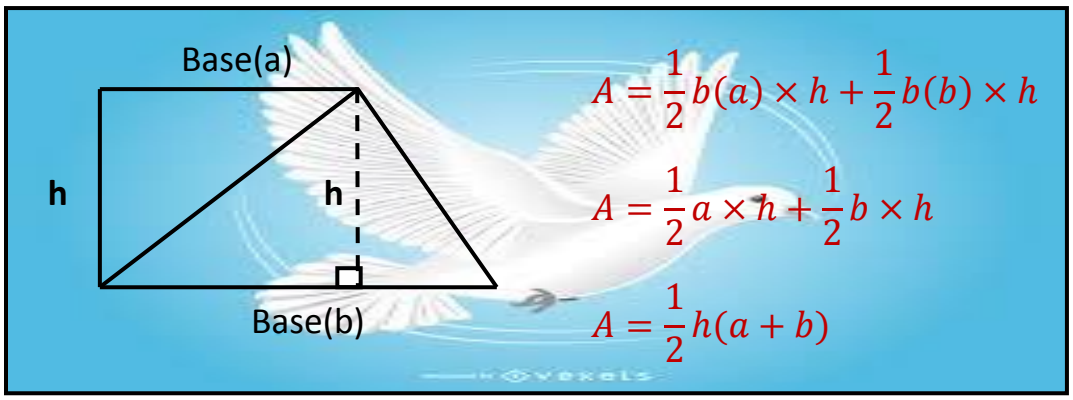
2. Find the area of a parallelogram whose base is 17cm and height is 10cm.

$$\boldsymbol{A = b \times h}$$
$$\boldsymbol{A = 17cm \times 10cm}$$
$$\boldsymbol{A = 170cm^2}$$

3. *Find the area of a parallelogram whose base and height are 16cm and 11cm respectively.*
4. Find the area and perimeter of the figure below

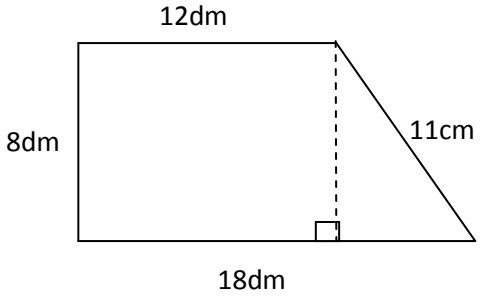


Mathematics is the Key



Examples

1. Find the area of the figure below.



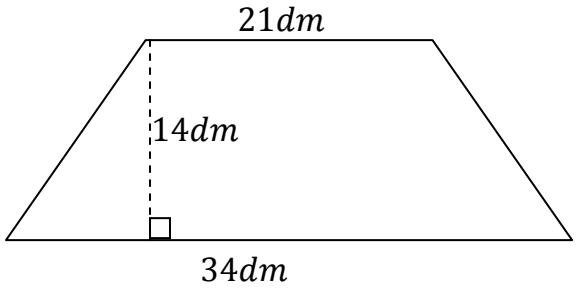
$\boldsymbol{A = \frac{1}{2}h(a+b)}$

$\boldsymbol{A = \frac{1}{2} \times 8dm(18dm + 12dm)}$

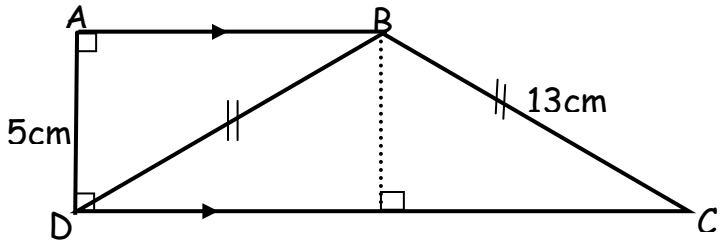
$\boldsymbol{A = 4dm \times 30dm}$

$\boldsymbol{\underline{A = 120dm^2}}$

2. Find the area of the figure below.



3. The figure below is made up of two triangles ABD and BCD. Line BC=BD = 13cm line AD = 5cm, line DC=24cm, AB= 12cm.



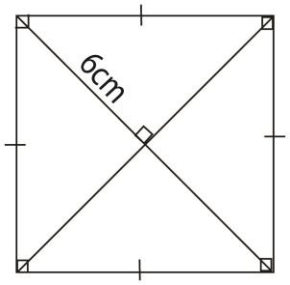
Calculate the area of the figure ABCD

Mathematics is the Key

NOTE: All shapes whose diagonals meet at a right angle use a similar formulae for area.

AREA = $\frac{1}{2} \times d_1 \times d_2$

1. Calculate the area of the square below



AREA = $\frac{1}{2} \times d_1 \times d_2$

d_1 = 6cm + 6cm

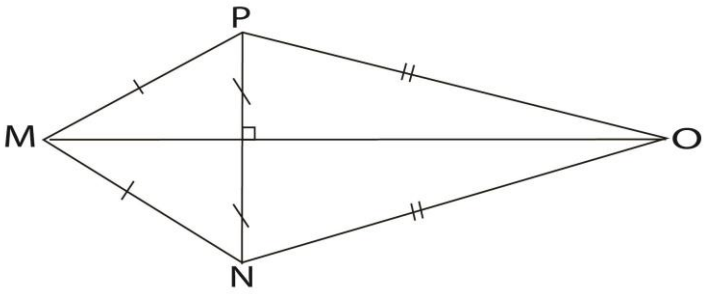
= 12 cm

Area = $\frac{1}{2} \times 12cm \times 12cm$

= 6cm x 12cm

= 72 cm²

2. In the figure below, line MO =12cm and line PN = 5cm.Calculate its area.



AREA = $\frac{1}{2} \times d_1 \times d_2$

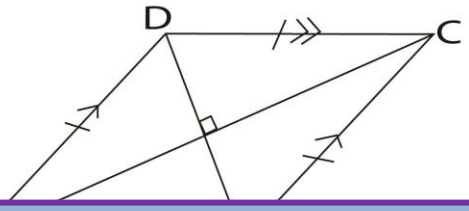
d_1 = 12 cm $\quad d_2 = 5cm$

Area = $\frac{1}{2} \times 12cm \times 5cm$

= 6cm x 5cm

= 30 cm²

3. Diagonals of rhombus ABCD measure 16m by 12m. Calculate its area.



AREA = $\frac{1}{2} \times d_1 \times d_2$

d_1 = 16m $\quad d_2 = 12m$

Area = $\frac{1}{2} \times 16m \times 12m$

= 8m x 12m

REMEMBER:
Since these shapes have diagonals which meet at a right angle.
Divide the shape into right angled triangles and look for area of each triangle.
Later combine the areas.

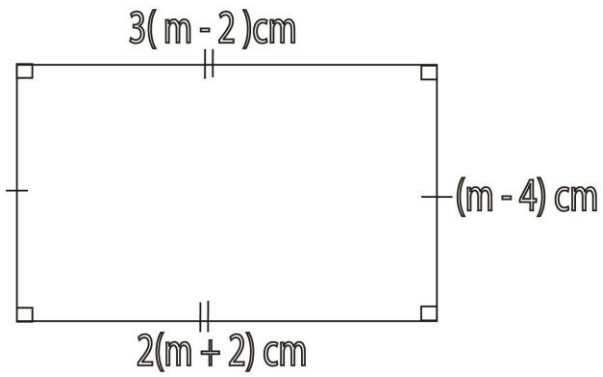
Try these

1. Find the area of a kite whose diagonals are 12cm and 4cm.
2. Find the area of a square whose diagonal is 10cm.
3. Calculate the area of a rhombus whose diagonals are 16cm and 10cm.

SUB TOPIC: Comparing sides of a polygon

Mathematics is the key

1. Study the figure below



(a) Find the value of m

$2(m + 2)cm = 3(m - 2)cm$

$2(m + 2) = 3(m - 2)$

$2m + 4 = 3m - 6$

$2m - 3m = -6 - 4$

$-m = -10$

$\frac{-m}{-1} = \frac{-10}{-1}$

$m = 10$

(a) Find its area

$Length = 2(m + 2)cm = 2(10 + 2)cm = 2 \times 12cm = 24cm$

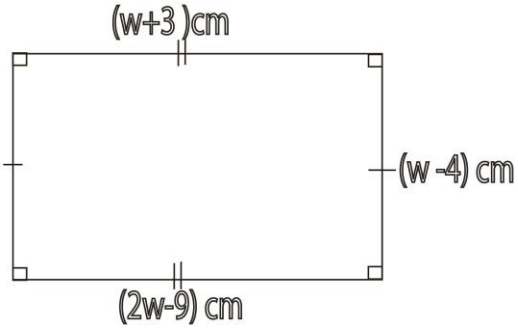
$width = (m + 4)cm = 10cm + 4cm = 14cm$

$Area = L \times W$

$= 24cm \times 14cm$

$= 336cm^2$

Use the figure below to answer the questions



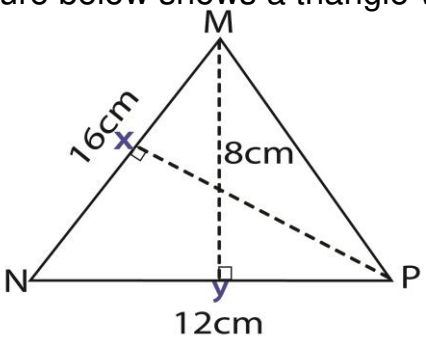
(a) Find the value of w

(b) Find the area and perimeter of the figure

Mathematics is the Key

Example 1

1. The figure below shows a triangle with two heights. Find the length XP



$$\frac{1}{2}bh = \frac{1}{2}bh$$

$$\frac{1}{2} \times 16cm \times h = \frac{1}{2} \times 12cm \times 8cm$$

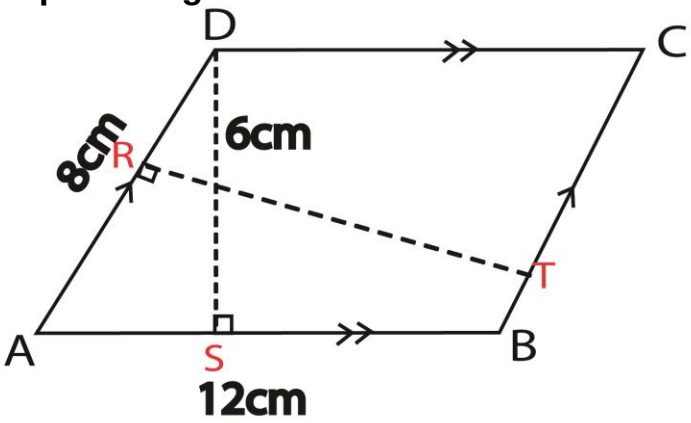
$$8cmh = 12cm \times 4cm$$

$$\frac{8cmh}{8cm} = \frac{12cm \times 4cm}{8cm}$$

$$h = 6cm$$

$$\underline{XP = 6cm}$$

2. **Study the parallelogram below and use it to answer the questions that follow**



Find the length of line RT

$$bh = bh$$

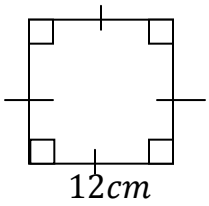
$$8cm \times h = 12cm \times 6cm$$

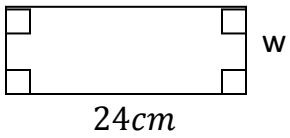
$$\frac{8cmh}{8cm} = \frac{12\cancel{cm} \times 6cm}{8\cancel{cm}}$$

$$\underline{h = 9cm}$$

Mathematics is the Key

3. The area of the rectangle is equal to the area of the square below.

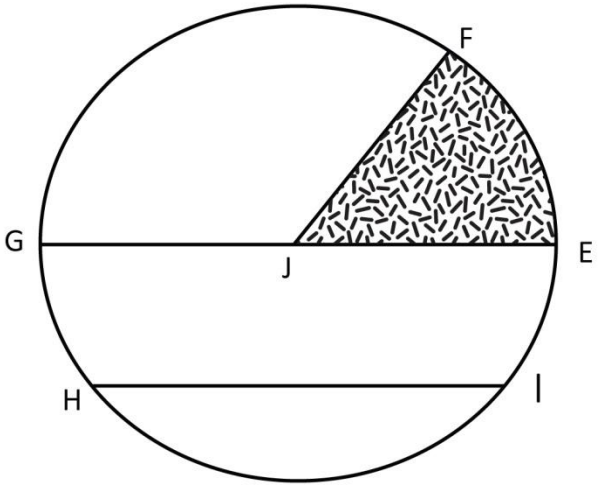




Find the value of w

$$L \times W = S \times S$$
$$24cm \times W = 12cm \times 12cm$$
$$\frac{24cmW}{24cm} = \frac{12cm \times 12cm}{24cm}$$
$$\underline{\underline{W = 6cm}}$$

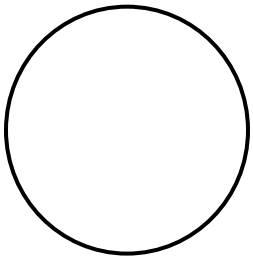
CIRCLE PROPERTIES (review)



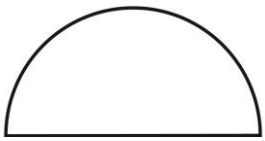
GE = diameter
JE = radius
HI = chord
FE =arc
JEF = sector
FEIHGF= circumference
JF = ???
NOTE: The diameter is the longest chord

SUBTOPIC: Finding circumference of a circle and parts of a circle.

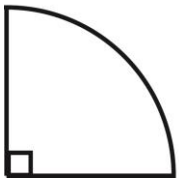
Circumference is the length of the arc.



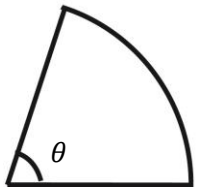
CIRCLE
$C = \pi D$



SEMI CIRCLE
$C = \frac{1}{2}\pi D$



QUADRANT
$C = \frac{1}{4}\pi D$



SECTOR
$C = \frac{\theta}{360°}\pi D$
$\theta = sector\ angle$

Mathematics is the Key

1. Calculate the circumference of ;($\pi = \frac{22}{7}$)

(a) A circle whose diameter is 7m.

$$\boldsymbol{C = \pi D}$$
$$\boldsymbol{= \frac{22}{7} \times 7m}$$
$$\underline{\underline{\boldsymbol{= 22m}}}$$

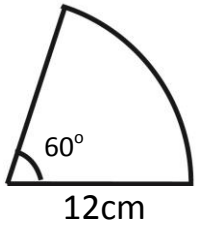
(b) A semi circle whose radius is 7cm

$$\boldsymbol{C = \frac{1}{2}\pi D}$$
$$\boldsymbol{= \frac{1}{2} \times \frac{22}{7} \times 7cm \times 2}$$
$$\boldsymbol{= 11cm \times 2}$$
$$\boldsymbol{= 22m}$$

(c) A quadrant whose radius is 14cm

$$\boldsymbol{C = \frac{1}{4}\pi D}$$
$$\boldsymbol{= \frac{1}{4} \times \frac{22}{7} \times 14cm \times 2}$$
$$\boldsymbol{= \frac{22}{4} \times 2cm \times 2}$$
$$\underline{\underline{\boldsymbol{= 22cm}}}$$

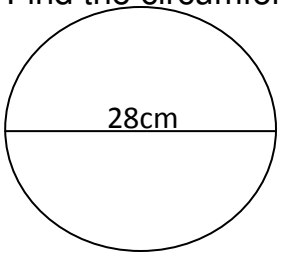
2. Calculate the circumference of the figure below.(Given that $\pi = 3.14$)



$$C = \frac{\theta}{360°}\pi D$$
$$= \frac{60°}{360°} \times 3.14 \times 12cm \times 2$$
$$= \frac{1}{6} \times \frac{314}{100} \times 24cm$$
$$= \frac{1256}{100} cm$$
$$\underline{\underline{= 12.56cm}}$$

Activity

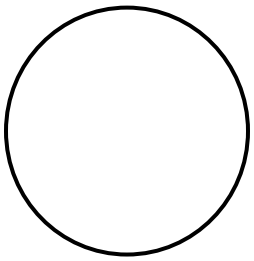
1. Find the circumference of a circle whose diameter is 14cm. ($\pi = \frac{22}{7}$)
2. Find the circumference of a semicircle whose diameter is 21cm. ($\pi = \frac{22}{7}$)
3. Calculate the circumference of a quadrant whose radius is 28m. ($\pi = \frac{22}{7}$)
4. Find the circumference of a circle below.



Mathematics is the Key

SUB TOPIC: Finding perimeter of a circle and parts of a circle

PERIMETER is the total distance around the city.



CIRCLE

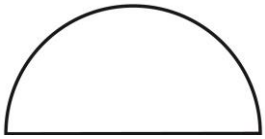
Perim. = Circ

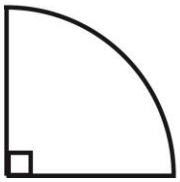
$$P = \pi D$$

SEMI CIRCLE

P = C + D

$$P = \frac{1}{2}\pi D + D$$





QUADRANT

P = C + r + r

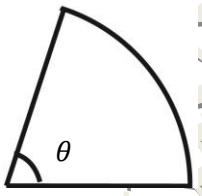
$$P = \frac{1}{4}\pi D + D$$

SECTOR

P = C + r + r

$$P = \frac{\theta}{360^\circ}\pi D + D$$

$$\theta = sector\ angle$$



Examples

1. Calculate the perimeter of ;

(a) A semi-circle whose radius is 14cm($\pi = \frac{22}{7}$)

$$P = \frac{1}{2}\pi D + D$$
$$= \frac{1}{2} \times \frac{22}{7} \times 14cm \times 2 + 14cm \times 2$$
$$= 44cm + 28cm$$
$$\underline{= 72cm}$$

(b) A quadrant whose radius is 28cm.($\pi = \frac{22}{7}$)

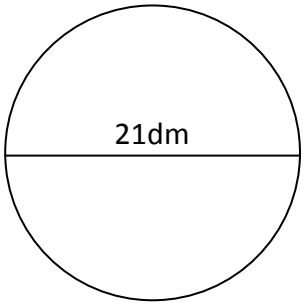
$$P = \frac{1}{4}\pi D + D$$

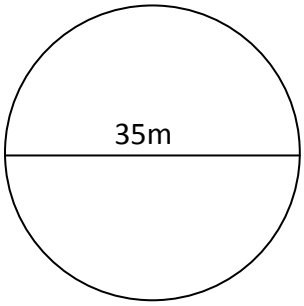
D=28cm x 2 =56cm

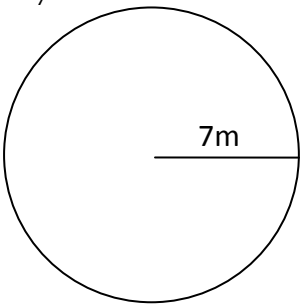
$$P = \frac{1}{4} \times \frac{22}{7} \times 56cm + 56cm$$
$$= (22 \times 2) + 20cm$$
$$= 44 + 20cm$$
$$\underline{= 64cm}$$

Activity

1. **Find the perimeter of the circles below.** ($take\ \pi = \frac{22}{7}$)







Mathematics is the Key

2. **Find the perimeter of a semicircle whose diameter is;**
   - **(a) 14cm**
   - **(b) 28dm**
3. **Find the perimeter of a quadrant whose radius is 14cm**

SUB TOPIC: Finding the radius or diameter when given circumference

Examples

1. The circumference of a circle is 88m. Find its radius.

$$\pi D = P$$
$$\frac{22}{7}D = 88m$$
$$\frac{22D}{7} = 88m$$
$$7 \times \frac{22D}{7} = 88m \times 7$$
$$22D = 88 \times 7m$$
$$\frac{22D}{22} = \frac{88 \times 7m}{22}$$
$$D = 4 \times 7m$$
$$\underline{D = 28m}$$
$$r = \frac{28m}{2}$$
$$\underline{r = 14m}$$

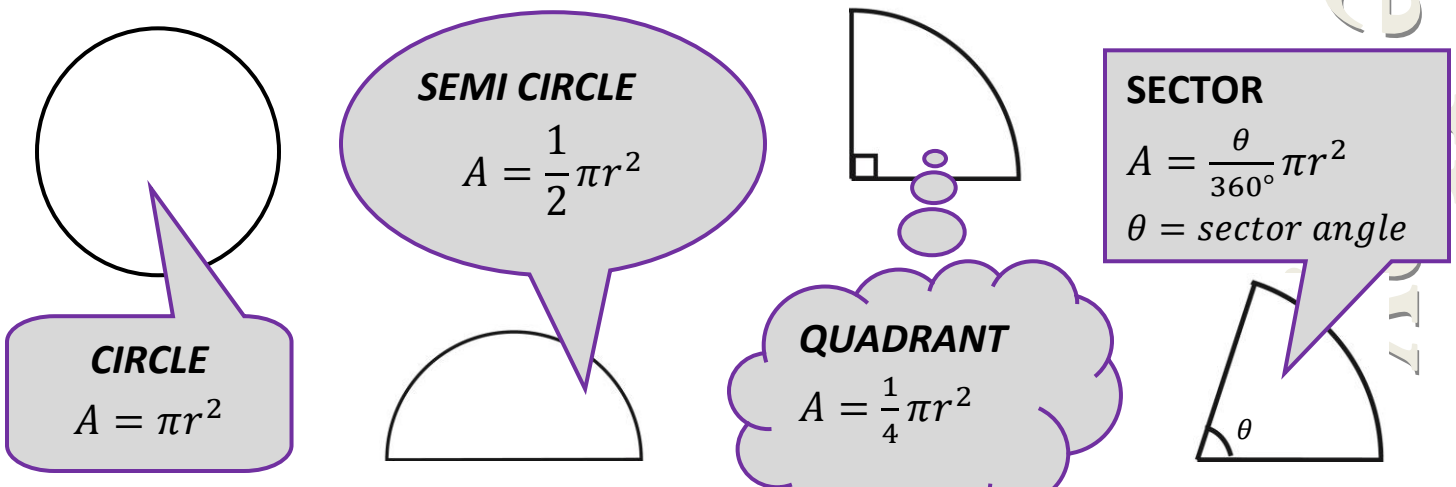
2. The circumference of a circle is 66dm. Find its diameter.

$$\pi D = C$$
$$\frac{22}{7} \times D = 66dm$$
$$\frac{22D}{7} = 66dm$$
$$7 \times \frac{22D}{7} = 66dm \times 7$$
$$22D = 66dm \times 7$$
$$\frac{22D}{22} = \frac{66dm \times 7}{22}$$
$$D = 3dm \times 7$$
$$\underline{D = 21dm}$$

Activity

1. Find the radius of a circle whose circumference is;
   (a) 44cm
   (b) 154m
   (c) 88dm
2. Find the diameter of a circle whose circumference is 110cm

SUB TOPIC: Finding area of a circle and parts of a circle



Mathematics is the art

1. Calculate the area of ;($\pi = \frac{22}{7}$)

(a) A circle whose diameter is 7m.

$$A = \pi r^2$$
$$= \frac{22}{7} \times \frac{7m}{2} \times \frac{7m}{2}$$
$$= \frac{11m \times 7m}{2}$$
$$= \frac{77}{2} m^2$$
$$= 38\frac{1}{2} m^2$$

(b) A semi circle whose radius is 7cm

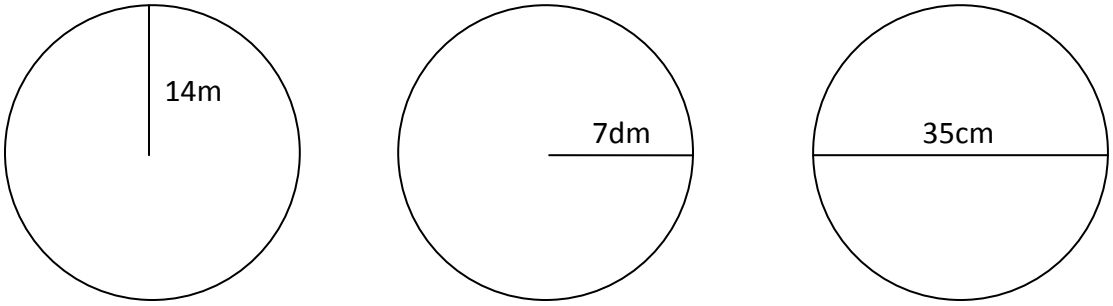
$$A = \frac{1}{2}\pi r^2$$
$$= \frac{1}{2} \times \frac{22}{7} \times 7cm \times 7cm$$
$$= 11cm \times 7cm$$
$$= \underline{\underline{77cm^2}}$$

(c) A quadrant whose radius is 14cm

$$A = \frac{1}{4}\pi r^2$$
$$= \frac{1}{4} \times \frac{22}{7} \times 14cm \times 14cm$$
$$= \frac{22}{4} \times 2cm \times 7cm$$
$$= 11 \times 7cm^2$$
$$= \underline{\underline{77\ cm^2}}$$

Activity

1. **Find the area of the figure below**



2. **Find the area of a semi circle whose radius is;**
   - **(a) 7cm**
   - **(b) 14m**
3. **Find the area of a quadrant whose radius is:**
   - **(a) 21cm**
   - **(b) 7dm**

Mathematics is the Key

SUB TOPIC: Finding radius or diameter when given area

1. The area of a circle is154cm^2. Find its radius.

$\boldsymbol{\pi r^2 = A}$

$\frac{22}{7}r^2 = 154\text{m}^2$

$\frac{22r^2}{7} = \boldsymbol{154m^2}$

$\boldsymbol{7 \times \frac{22r^2}{7} = 154m^2 \times 7}$

$\boldsymbol{22r^2 = 154 \times 7m^2}$

$\frac{22r^2}{22} = \frac{154 \times 7m^2}{22}$

$\boldsymbol{r^2 = 7 \times 7m^2}$

$\boldsymbol{r^2 = \sqrt{49m^2}}$

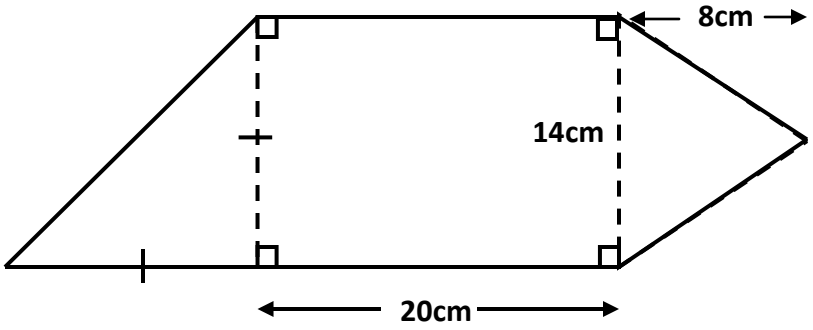
$\underline{\underline{\boldsymbol{r = 7m}}}$

2. Find the radius of a circle whose area is;
   (a) 308dm^2
   (b)1386cm^2

SUB TOPIC: Finding area of the combined shapes

Examples

1. Study the figure below and find its area.



Mathematics is the Key

Trapezium

$A = \frac{1}{2}h(a+b)$

$= \frac{1}{2} \times 14cm\big((14cm + 20cm) + 20cm\big)$

$= 7cm \times 54cm$

$\underline{= 378cm^2}$

Triangle

$A = \frac{1}{2}bh$

$= \frac{1}{2} \times 14cm \times 8cm$

$= 7 \times 8cm^2$

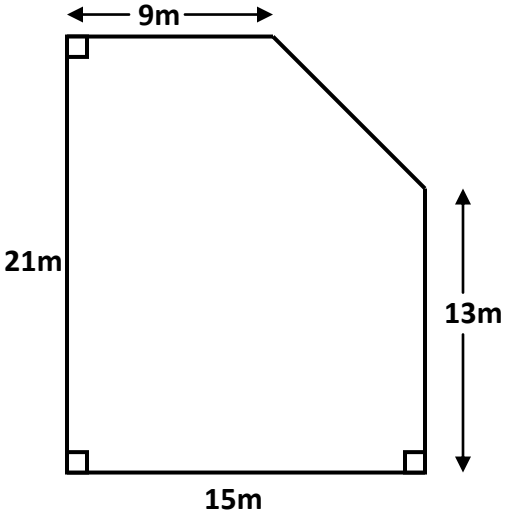
$\underline{= 56cm^2}$

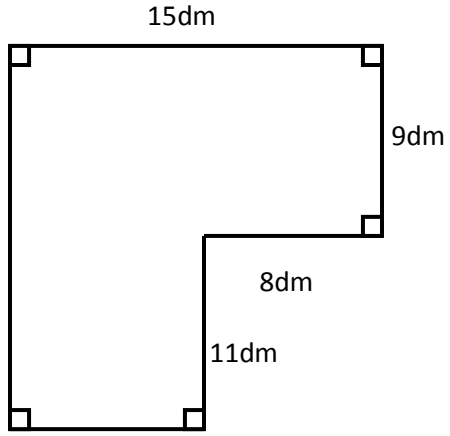
$\underline{total\ area}$

$(378 + 56)cm^2$

$\underline{434cm^2}$

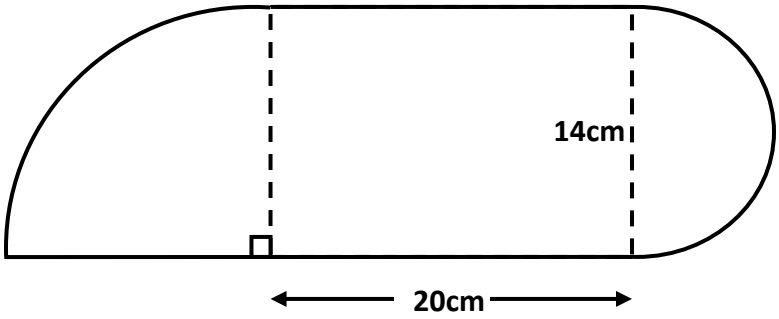
2. Find the area of the figures below





Project work

Work out the area of the figure below

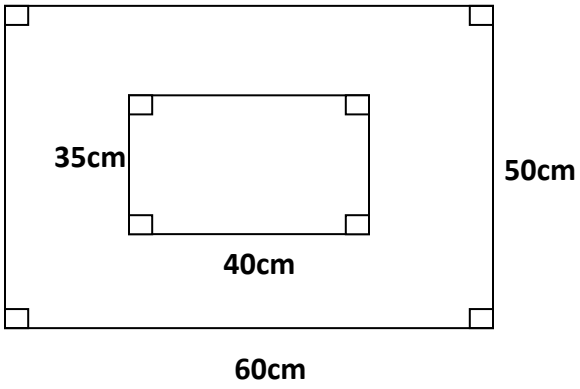


Mathematics is the Key

SUB TOPIC: Finding shaded area

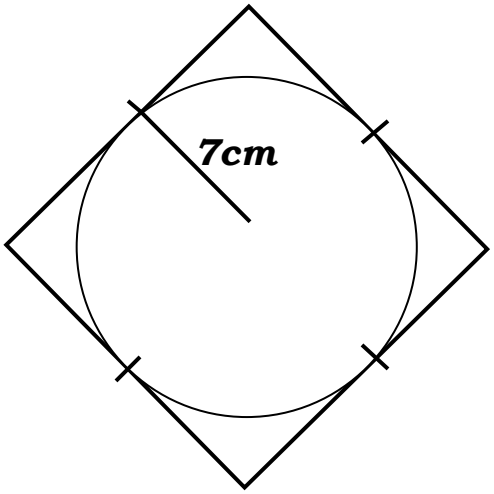
Examples

1. **Study the figure below and find the shaded area**



$$\textbf{Shaded area} = \textbf{outer area} - \textbf{inner area}$$
$$= (L \times W) - (L \times W)$$
$$= (60cm \times 50cm) - (40cm \times 35cm)$$
$$= 3000cm^2 - 1400cm^2$$
$$\underline{= 1600cm^2}$$

2. Study the figure below and use it to answer the questions that follow.



Find the shaded area($\pi = \frac{22}{7}$)

Square

$side = 7cm + 7cm = 14cm$

$A = s \times s$

$= 14cm \times 14cm$

$\underline{= 196cm^2}$

circle

$A = \pi r^2$

$= \frac{22}{7} \times 7cm \times 7cm$

$= 22cm \times 7cm$

$\underline{= 154cm^2}$

Shaded area

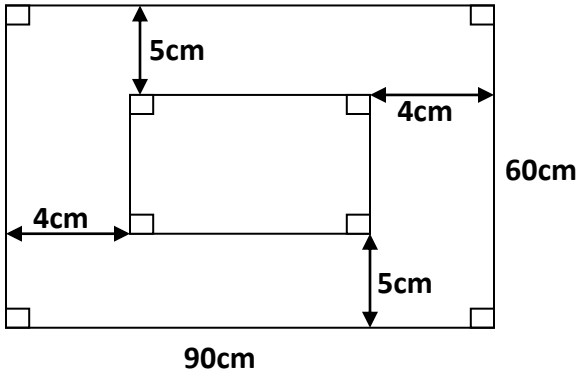
$Outer\ area - Inner\ area$

$196cm^2 - 154cm^2$

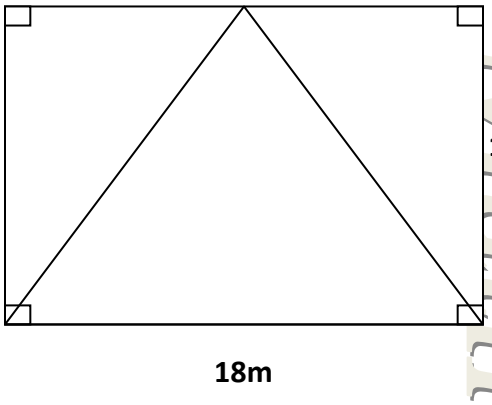
$\underline{42cm^2}$

Mathematics is the Key

3. A table of size 90cm by 60cm was partly covered with a piece of cloth as shown in the figure below. What part of the table was uncovered?

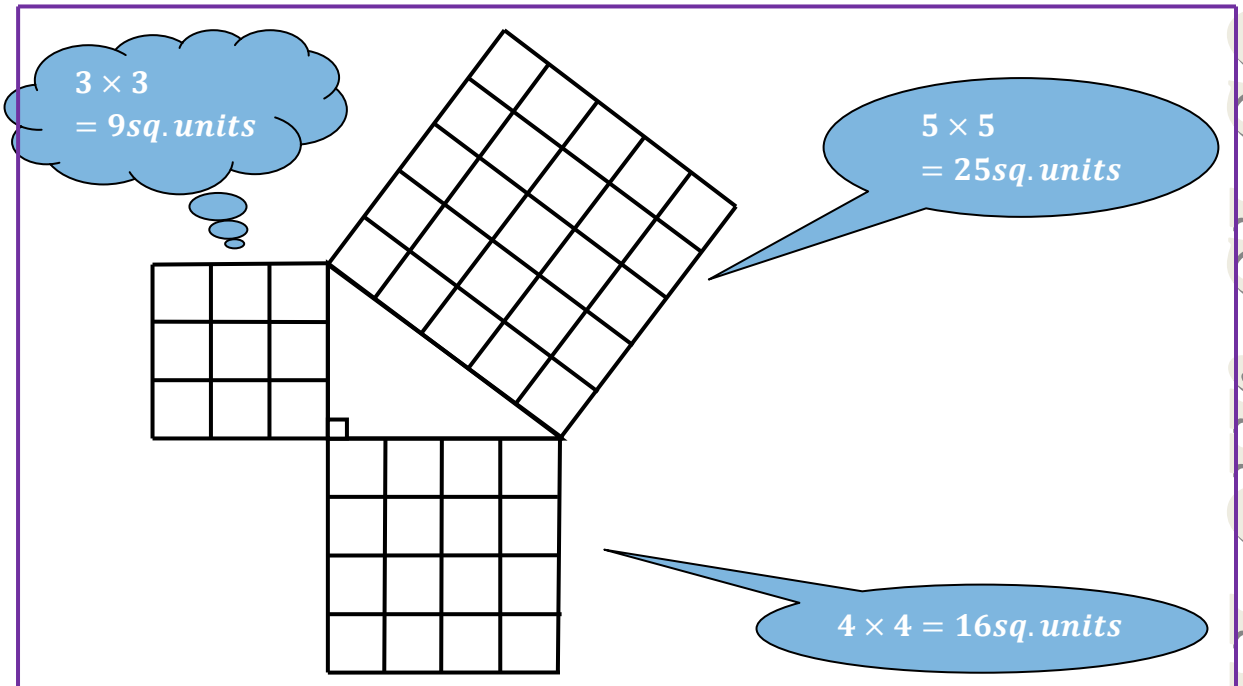


4. Find the un shaded area



SUB TOPIC: Finding missing sides using Pythagoras' theorem

Pythagoras' theorem states that the sum of the squares of the two shorter sides of a right angled triangle is equal to the square of the hypotenuse.

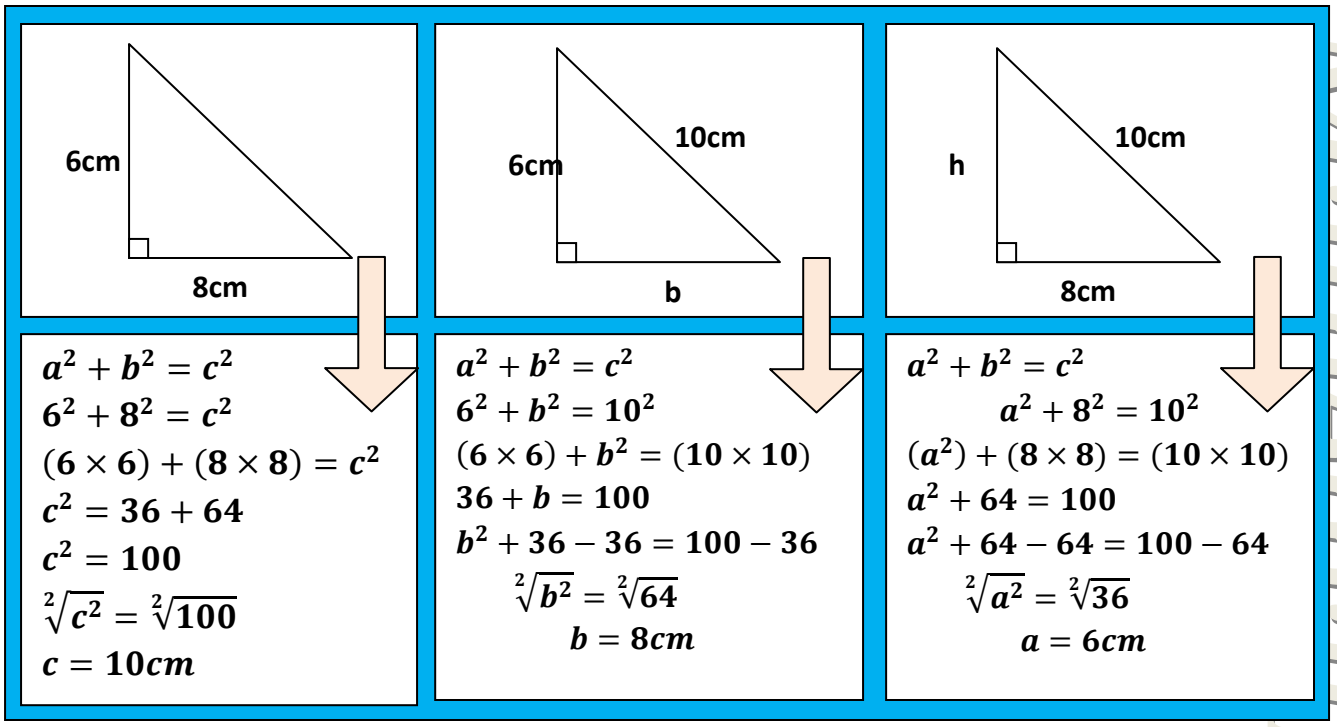


$$16squares + 9\ squares = 25\ square$$
$$base^2 + height^2 = hyp^2$$
$$a^2 + b^2 = c^2$$

Mathematics is the Key

Examples

1. **Study the triangles below and find the missing side.**



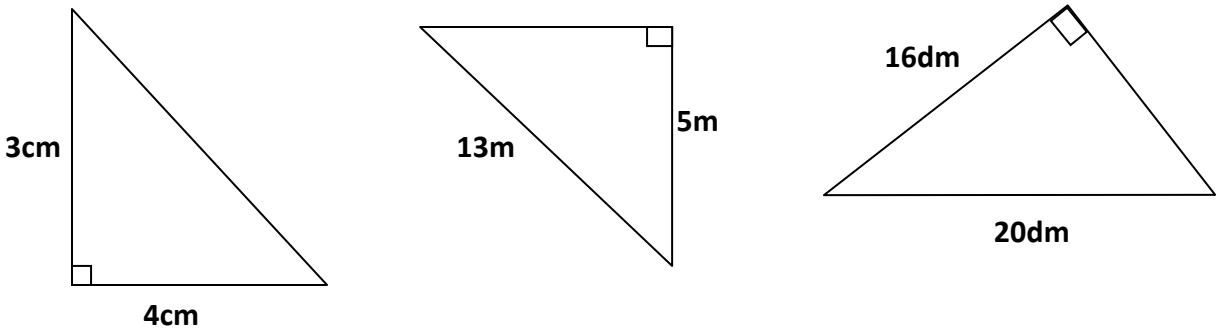
$a^2 + b^2 = c^2$
$6^2 + 8^2 = c^2$
$(6 \times 6) + (8 \times 8) = c^2$
$c^2 = 36 + 64$
$c^2 = 100$
$\sqrt[2]{c^2} = \sqrt[2]{100}$
$c = 10cm$

$a^2 + b^2 = c^2$
$6^2 + b^2 = 10^2$
$(6 \times 6) + b^2 = (10 \times 10)$
$36 + b = 100$
$b^2 + 36 - 36 = 100 - 36$
$\sqrt[2]{b^2} = \sqrt[2]{64}$
$b = 8cm$

$a^2 + b^2 = c^2$
$a^2 + 8^2 = 10^2$
$(a^2) + (8 \times 8) = (10 \times 10)$
$a^2 + 64 = 100$
$a^2 + 64 - 64 = 100 - 64$
$\sqrt[2]{a^2} = \sqrt[2]{36}$
$a = 6cm$

Activity

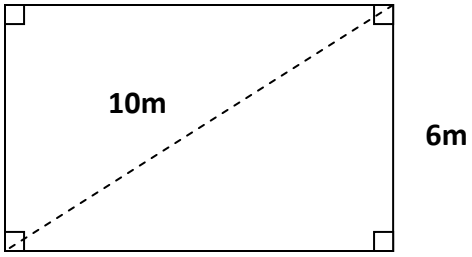
1. **Find the missing sides in the following triangles**



SUB TOPIC: Application of Pythagoras' theorem

Examples

1. Find the area of the figure below



Mathematics is the key

$a^2 + b^2 = c^2$

$6^2 + b^2 = 10^2$

$(6 \times 6) + b^2 = (10 \times 10)$

$36 + b = 100$

$b^2 + 36 - 36 = 100 - 36$

$\sqrt[2]{b^2} = \sqrt[2]{64}$

$b = 8m$

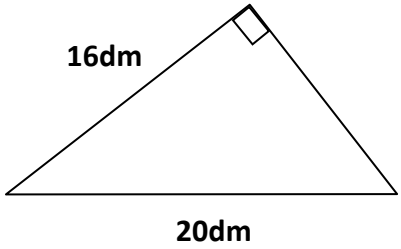
$length = 8m$

$Area = L \times W$

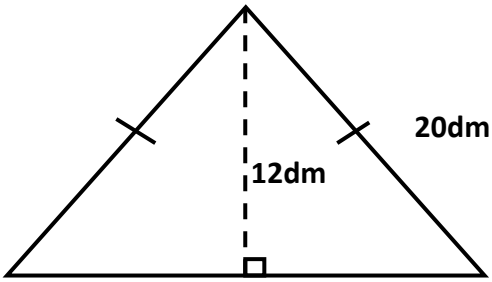
$= 8m \times 6m$

$= 48m^2$

2. Find the total distance around the figure



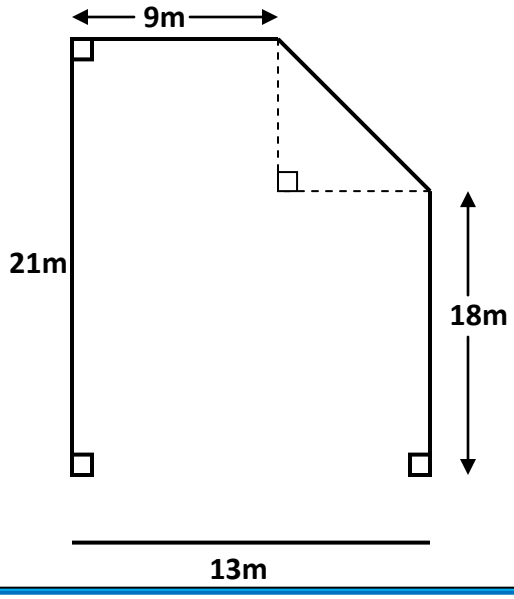
3. The figure below is an isosceles triangle. Use it to answer the questions that follow



(a) Find the area of the figure

(b) A rat moved around the figure 3 times. What distance did it cover?

4. Find the perimeter of the figure below



Mathematics is the Key

VOLUME AND SURFACE AREA

SUB TOPIC: Converting from square centimetres (cm^2) to square metres(m^2) and vice versa.

$1m = 100cm$
$1m^2 = 1m \times 1m$
$= 100cm \times 100cm$
$= 10{,}000cm^2$

Examples

1. Convert the following as instructed.
   (a). 0.5 m^2 to square centimetres.
   $\mathbf{1m^2 = 10{,}000cm^2}$
   $\mathbf{0.5m^2 = 0.5 \times 10{,}000cm^2}$
   $\underline{\mathbf{= 5{,}000cm^2}}$

   (b). 8000cm^2 to square metres
   $\mathbf{10{,}000cm^2 = 1m^2}$
   $\mathbf{5000cm^2 = \frac{5{,}000cm^2}{10{,}000cm^2} = \frac{1}{2}\ m^2}$

2. Convert the following to square centimetres.
   a. $\mathbf{2m^2}$
   b. $\mathbf{45m^2}$
   c. $\mathbf{0.03m^2}$
3. Convert the following to square metres
   a. $\mathbf{700{,}000cm^2}$
   b. $\mathbf{1{,}200cm^2}$
   c. $\mathbf{88{,}800cm^2}$

SUB TOPIC: Converting from square kilometres (km^2) to square metres(m^2) and vice versa.

$1km = 1000m$
$1km^2 = 1km \times 1km$
$= 1000m \times 1000m$
$= 1{,}000{,}000m^2$



Examples

1. Convert the following as instructed.
   (a). 0.5 km^2 to square metres.
   $\mathbf{1km^2 = 1{,}000{,}000m^2}$
   $\mathbf{0.5km^2 = 0.5 \times 1{,}000{,}000m^2}$
   $\underline{\mathbf{= 500{,}000m^2}}$

   (b). 970,000m^2 to square kilometres
   $\mathbf{1{,}000{,}000m^2 = 1km^2}$
   $\mathbf{970{,}000m^2 = \frac{970{,}000m^2}{1{,}000{,}000m^2}}$
   $\mathbf{= \frac{97}{100}\ km^2}$
   $\mathbf{= 0.97km^2}$

Mathematics is the Key

2. Convert the following to square metres.
   - **d. $2km^2$**
   - **e. $45km^2$**
   - **f. $0.03km^2$**

3. Convert the following to square kilometres
   - **d. $67{,}000{,}000m^2$**
   - **e. $1{,}200m^2$**
   - **f. $88{,}800m^2$**

SUB TOPIC: Converting from cubic metres (m^3) to cubic centimetres(cm^3) and vice versa.

$1m = 100cm$

$1m^3 = 1m \times 1m \times 1m$

$= 100cm \times 100cm \times 100cm$

$= 1{,}000{,}000cm^3$

Examples

1. Convert the following as instructed.

(a). 0.24 m^3 to cubic centimetres.

$1m^3 = 1{,}000{,}000cm^3$

$0.24m^3 = 0.24 \times 1{,}000{,}000cm^3$

$= \underline{\underline{240{,}000cm^3}}$

(b). 8,600,000cm^3 to cubic metres

$1{,}000{,}000cm^3 = 1m^3$

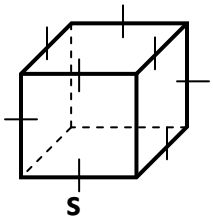
$8{,}600{,}000cm^3 = \frac{8{,}600{,}000cm^3}{1{,}000{,}000cm^3}$

$= \frac{86}{10}\ m^3 = 8.6m^3$

2. Convert the following to cubic centimetres.
   - **g. $2\frac{1}{2}m^3$**
   - **h. $82m^3$**
   - **i. $0.63m^3$**

3. Convert the following to square metres
   - **g. $3{,}900{,}000cm^3$**
   - **h. $1{,}600cm^3$**
   - **i. $40{,}800cm^3$**

SUB TOPIC: *Volume and capacity of a cube and cuboid*

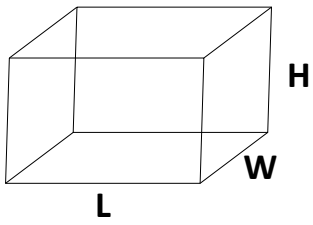


$\underline{CUBE}$

$VOLUME = b.a \times h$

$VOLUME = (S \times S) \times S$

Mathematics is the Key



$$\underline{CUBOID}$$
$$VOLUME = b.a \times h$$
$$VOLUME = (L \times W) \times H$$

NOTE:
1 litre contains $1000cm^3$

Examples

1. Find the volume of a cube whose side is 6m

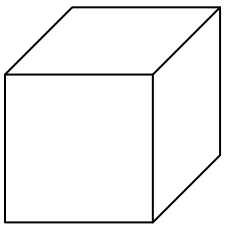
$$\begin{aligned} \boldsymbol{VOLUME} &= \boldsymbol{b.a \times h} \\ &= \boldsymbol{(S \times S) \times S} \\ &= \boldsymbol{6m \times 6m \times 6m} \\ &= \boldsymbol{36m^2 \times 6m} \\ &= \boldsymbol{216m^3} \end{aligned}$$

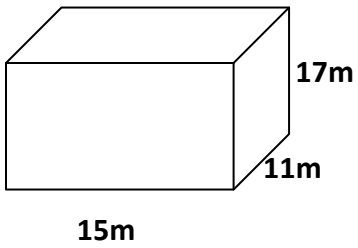
2. Calculate the volume and capacity of a cuboid measuring 12cm by 15cm by 20cm.

$$\begin{aligned} \boldsymbol{VOLUME} &= \boldsymbol{b.a \times h} \\ &= \boldsymbol{(L \times W) \times H} \\ &= \boldsymbol{12cm \times 15cm \times 20cm} \\ &= \boldsymbol{180cm^2 \times 20cm} \\ &= \boldsymbol{3600cm^3} \end{aligned}$$

$$\underline{\boldsymbol{CAPACITY}}$$
$$\boldsymbol{1000cm^3 = 1litre}$$
$$\boldsymbol{3600cm^3 = \frac{3600cm^3}{1000cm^3}}$$
$$\boldsymbol{= 3.6\ litres}$$

3. **Find the volume of the figures below**



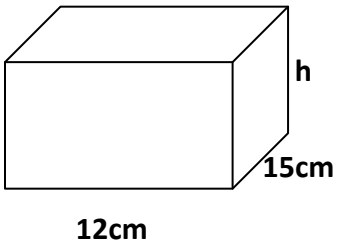


4. **Find the capacity of a rectangular tank whose dimensions measure 24cm by 16cm by 30cm.**

Mathematics is the Key

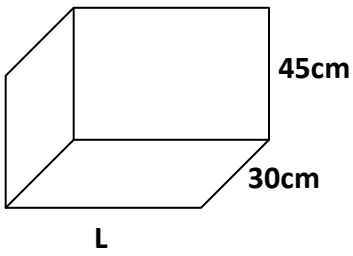
Examples

1. **The volume of the figure below is $3600cm^3$. Use it to find the missing side.**



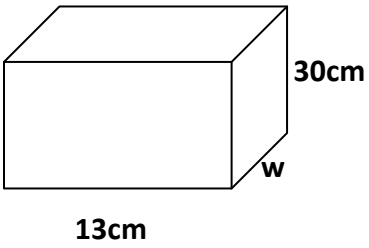
$$b.a \times h = VOLUME$$
$$(L \times W) \times H = VOLUME$$
$$12cm \times 15cm \times H = 3600cm^3$$
$$\frac{12cm \times 15cm \times H}{12cm \times 15cm} = \frac{3600cm^3}{12cm \times 15cm}$$
$$H = 20cm$$

2. Study the figure below.

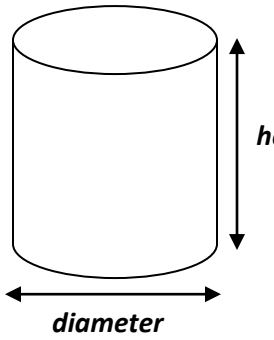


If the figure below holds 27litres, find the value of L

3. The volume of a cuboid which measures 6cm by m by 5cm is $210cm^3$. Find the value of m in cm.
4. Find the value of w in the figure below given that the volume is $6240cm^3$.



Mathematics is the Key



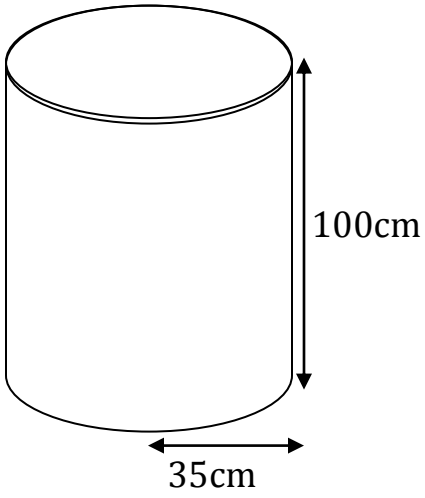
NOTE
1Litre = 1,000cm³
Volume =base area x height
$volume = \pi r^2 h$

Examples

1. Calculate the volume of a cylinder whose radius is 14cm and height is 30cm.

$$Volume = \pi r^2 h$$
$$= \frac{22}{7} \times 14cm \times 14cm \times 30cm$$
$$= 22 \times 14cm \times 2cm \times 30cm$$
$$= 44 \times 420cm^3$$
$$= \underline{18480cm^3}$$

2. Below is a cylindrical tank. Study it and use it to answer the questions that follow.



(a) Calculate the volume of the tank.

$$Volume = \pi r^2 h$$
$$= \frac{22}{7} \times 35cm \times 35cm \times 100cm$$
$$= 22 \times 5cm \times 35cm \times 100cm$$
$$= 110 \times 3500cm^3$$
$$= \underline{385,000cm^3}$$

Mathematics is the Key

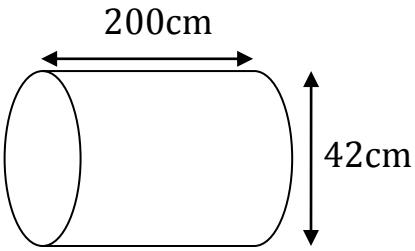
(b).How many litres of water can it hold when full.

$$1000cm^3 = 1\ litre$$

$$385,000cm^3 = \frac{385,000cm^3}{1,000cm^3}$$

$$= \underline{385\ Litres}$$

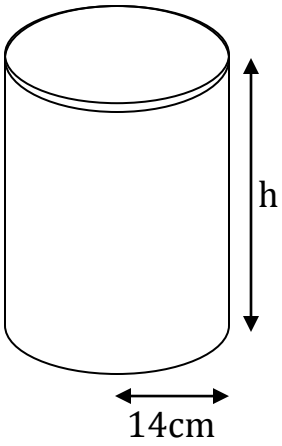
3. Find the volume of a cylinder whose;
   (a) radius is 14cm and height is 40cm
   (b) radius is 21cm and height is 60cm
   (c) diameter is 14m and height is 24m
4. Find the capacity of the figure below.



SUB TOPIC: Finding missing sides volume and capacity of cylinders

Examples

1. **The volume of the cylinder below is 18480cm^3. Find the value of h.**



$$\pi r^2 h = Volume$$

$$\frac{22}{7} \times 14cm \times 14cm \times h = 18480cm^3$$

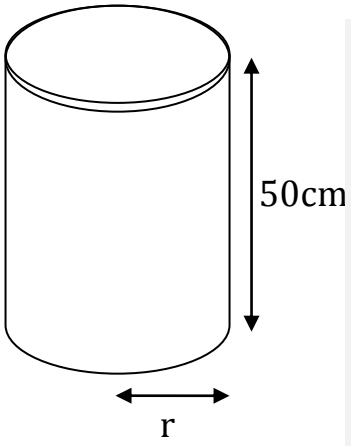
$$44cm \times 14cm \times h = 18480cm^3$$

$$\frac{44cm \times 14cm \times h}{44cm \times 14cm} = \frac{18480cm^3}{44cm \times 14cm}$$

$$\underline{h = 30cm}$$

Mathematics is the Key

2. The tank below holds 123.2litres of water when full. Find its radius



$$\frac{\pi r^2 h}{1000cm^3} = capacity$$

$$\frac{\frac{22}{7} \times r \times r \times 50cm}{1000cm^3} = 123.2\ l$$

$$1000cm^3 \times \frac{\frac{22}{7} \times r \times r \times 50cm}{1000cm^3} = 123.2 \times 1000cm^3$$

$$7 \times \frac{1100cmr^2}{7} = 123200cm^3 \times 7$$

$$1100cmr^2 = 123200cm^3 \times 7$$

$$\frac{1100cmr^2}{1100cm} = \frac{123200cm^3 \times 7}{1100cm}$$

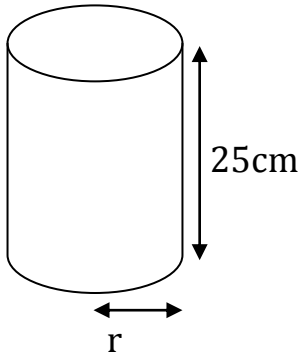
$$r^2 = 784cm^2$$

$$\sqrt{r}^2 = \sqrt{784cm^2}$$

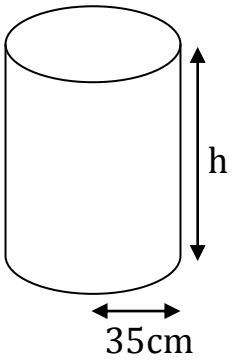
$$\underline{r = 28cm}$$

Try These

1. Find the height of a cylinder whose radius 7cm and volume is 1540cm^3.
2. The volume of the figure below is 3850cm^3. Find its radius

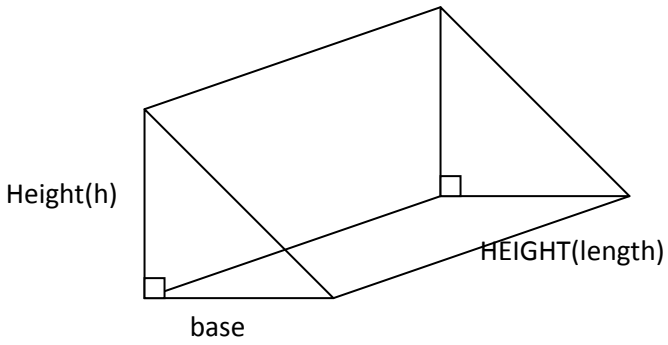


3. The cylindrical tank below holds 385 litres.



Find the value of h.

Mathematics is the Key



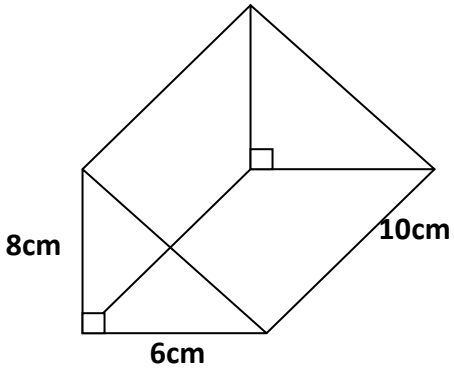
$$Volume = base\ area\ x\ height$$

$$Volume = \frac{1}{2}bh \times l$$

$$volume = \frac{1}{2}bhl$$

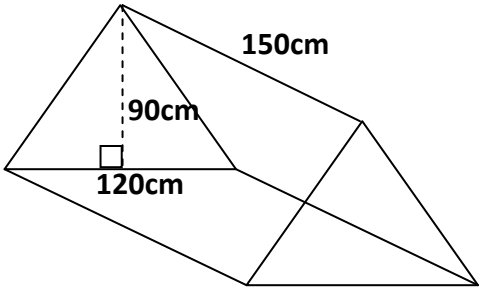
Examples

1. **Find the volume of the figure below**



$$Volume = \frac{1}{2}bhl$$
$$= \frac{1}{2} \times 6cm \times 8cm \times 10cm$$
$$= 3 \times 80cm^3$$
$$= 240cm^3$$

2. **Calculate the capacity of the figure below.**



$$Volume = \frac{1}{2}bhl$$
$$= \frac{1}{2} \times 120cm \times 90cm \times 150cm$$
$$= 60 \times 90 \times 150cm^3$$
$$= 5400 \times 150cm^3$$
$$= \underline{810{,}000cm^3}$$

$1000cm^3 = 1litre$

$$\frac{810{,}000cm^3}{1{,}000cm^3}$$

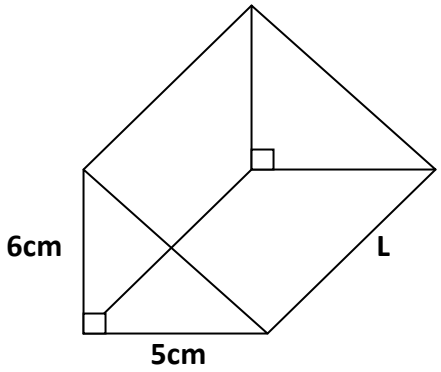
$\underline{810\ litres}$

Mathematics is the Key

SUB TOPIC: Finding missing sides of a triangular prism when given volume.

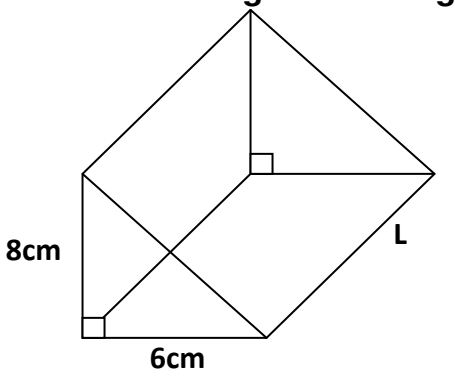
Examples

1. **Find the missing side in the figure below given that its volume is135cm^2**



$$\frac{1}{2}bhl = Volume$$
$$\frac{1}{2} \times 5cm \times 6cm \times L = 135cm^3$$
$$3cm \times 5cm \times L = 135cm^3$$
$$\frac{3cm \times 5cm \times L}{3cm \times 5cm} = \frac{135cm^3}{3cm \times 5cm}$$
$$L = 9cm$$

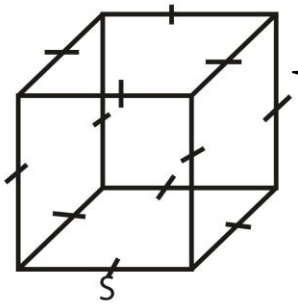
2. **Find the value of L in the figure below given that the volume is 240cm^3**



SUBTOPIC: **Total surface area of cubes and cuboids**

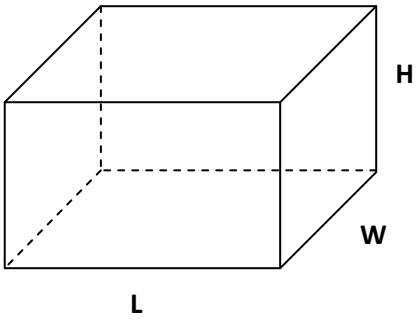
Total surface area is the area of all faces

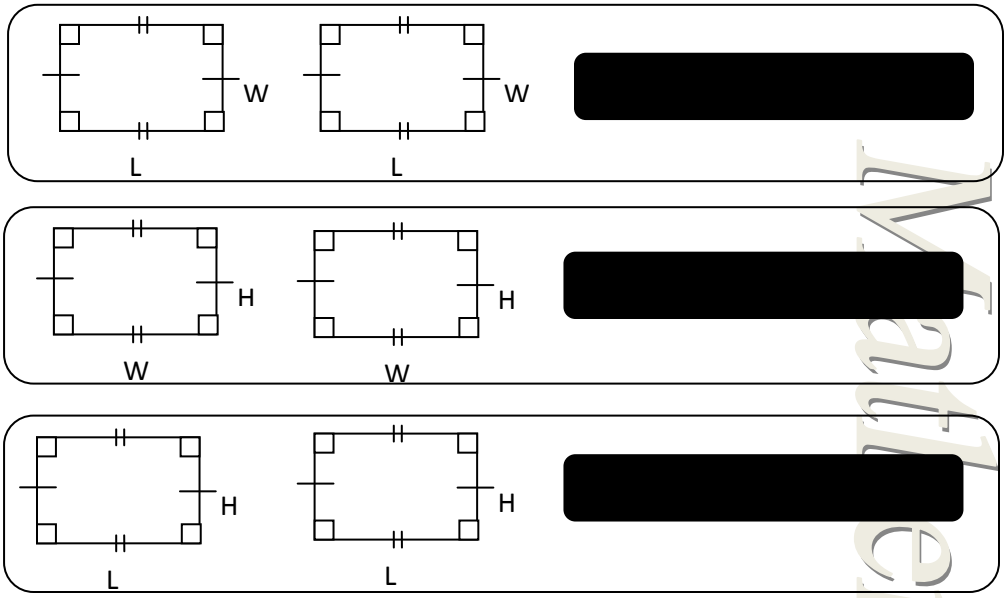
CUBE



A cube has six equal faces of which they are all squares.
Area of a square is (SXS)
$TSA = 6\ XSXS$
$TSA = 6 \times S^2$
$TSA = 6S^2$

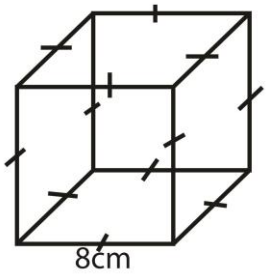
Mathematics is the Key





$TOTAL\ SURFACE\ AREA = 2(L\ X\ W) + 2(W\ X\ H) + 2(L\ X\ H)$

1. **Find the total surface area of the figures below.**

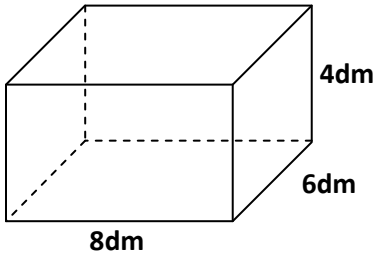


$$TSA = 6 \times S \times S$$

$$= 6 \times 8cm \times 8cm$$

$$= 6 \times 64cm^2$$

$$\underline{= 384cm^2}$$



$$TSA = 2(L\ X\ W) + 2(W\ X\ H) + 2(L\ X\ H)$$

$$= 2(8dm \times 6dm) + 2(8dm \times 4dm) + 2(6dm \times 4dm)$$

$$= 2 \times 48dm^2 + 2 \times 32dm^2 + 2 \times 24dm^2$$

$$= 96dm^2 + 64dm^2 + 48dm^2$$

$$\underline{= 208dm^2}$$

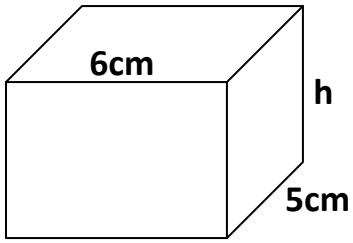
2. Find the total surface area of the box measuring 10cm by 5cm by 4cm.
3. Find the total surface of the cube whose side is 10cm.

Mathematics is the Key

SUBTOPIC: Finding missing sides when given TSA of a cuboid.

Examples

The total surface area of a cuboid is 148cm^2. Find the value of h.



$$2(L\ X\ W)\ +\ 2(W\ X\ H)\ +\ 2(L\ X\ H) = TSA$$

$$2(6cm \times 5cm) + 2(5cm \times h) + 2(6cm \times h) = 148cm^2$$

$$2 \times 30cm^2 + 2 \times 5hcm + 2 \times 6hcm = 148cm^2$$

$$60cm^2 + 10hcm + 12hcm = 148cm^2$$

$$22hcm + 60cm^2 = 148cm^2$$

$$22hcm + 60cm^2 - 60cm^2 = 148cm^2 - 60cm^2$$

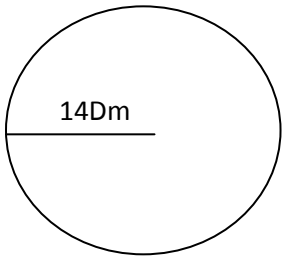
$$22hcm = 88cm^2$$

$$\frac{22hcm}{22cm} = \frac{88cm^2}{22cm}$$

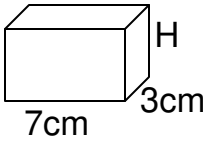
$$\underline{h = 4cm}$$

TOPICAL QUESTIONS

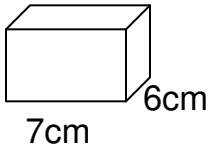
1. How many centimeters are in 0.75 metres?
2. Find the circumference of a circle whose radius is 21cm
3. Find the area of the circle below.



4. The circumference of a circle is 88m. Find the radius of the circle (Use $\pi = \frac{22}{7}$)
5. A cylindrical tank is 7m high. What is the capacity (in litres) of the tank if its radius is 7m?
6. The volume of the figure below is 105cm^3. Find its height.

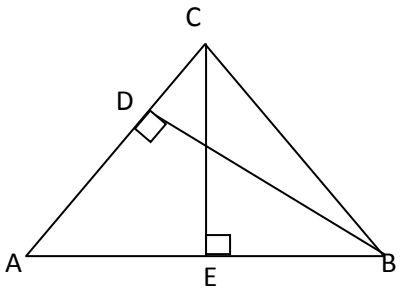


7. Find the base area of the figure below.

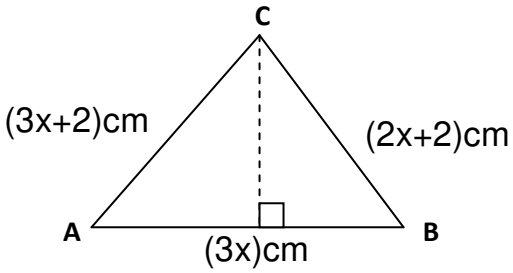


Mathematics is the Key

8. In the triangle below, AB = 12cm, CE = 10cm and AC = 16cm. Find the length of BD in cm.

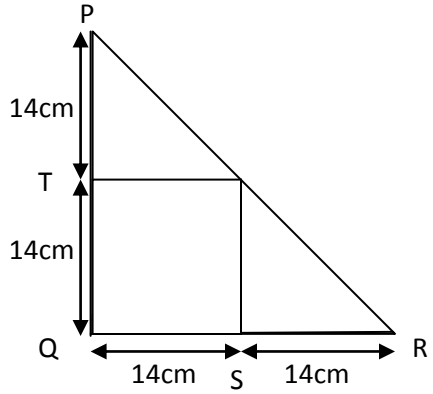


9. The figure ABC below is an isosceles triangle. Use it to answer the questions that follow.



(a) Find the value of x.
(b) Find the area of triangle ABC
(c) Calculate the perimeter of the triangle.
(d) Find the circumference of a circular compound whose radius is 14m. (take $\pi = \frac{22}{7}$)

10. In the figure below, PQ = QR = 28cm use it to answer the questions that follow.



(a) Find the area of triangle PQR.
(b) What is the area of the shaded part?

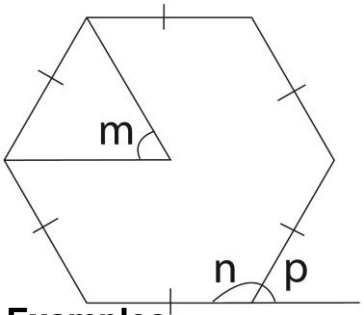
Mathematics is the Key

LINES, ANGLES AND GEOMETRICAL FIGURES

SUB TOPIC: Names of polygons

NAME	SIDES
triangles	3
quadrilateral	4
pentagon	5
hexagon	6
heptagon	7
octagon	8
nonagon	9
decagon	10
hendecagon	11
duo decagon	12

SUBTOPIC: interior and exterior angles of a polygon



[redacted]

Examples

1. The exterior angle of a regular polygon is 36°. Find the size of the interior angle?

$$\boldsymbol{Let\ the\ interior\ angle\ be\ m}$$
$$\boldsymbol{m + 36° = 180°}$$
$$\boldsymbol{m + 36° - 36° = 180° - 36°}$$
$$\underline{\boldsymbol{m = 144°}}$$

2. The interior angle of a regular polygon is 115°.find the size of its exterior angle.

$$\boldsymbol{Let\ the\ exterior\ angle\ be\ m}$$
$$\boldsymbol{m + 115° = 180°}$$
$$\boldsymbol{m + 115° - 115° = 180° - 115°}$$
$$\underline{\boldsymbol{m = 65°}}$$

3. Find the size of the exterior angle of a polygon whose interior angle is;
   (a) 120°
   (b) 80°

Mathematics is the Key

4. Find the size of an interior angle of a polygon whose exterior angle is 45°.

SUB TOPIC: Calculating the number of sides of a polygon

Examples:

1. Calculate the number of sides of a regular polygon whose exterior angle is 30°.

$$\textbf{Number of sides} = \frac{360^\circ}{each\ ext\ angle}$$

$$= \frac{360^\circ}{30^\circ}$$

No of sides = 12 sides.

2. The interior angle of a regular polygon is 144.Name the polygon.
Let the ext angle be x.

$X + 144^0 = 180^0$

$X + 144^0 - 144^0 = 180 - 144$

$X = 36^0$

Exterior angle = 36^0

No of side $= \frac{360^\circ}{36^\circ}$

= 10 sides

The polygon is a decagon

3. The interior angle of a regular polygon is 90^0 more than the exterior angle.

(a) Calculate the exterior angle

Let the ext. angle be x

Int. angle = $x + 90^0$

Ext. angle x

$x + 90^0 + x = 180^0$

$2x + 90^0 - 90^0 = 180^0 - 90^0$

$\frac{2x}{2} = \frac{90}{2}$

$x = 45^0$

ext. angle = 45^0

(b) How many sides has the polygon?

No of sides $= \frac{360^o}{45^o}$

= 8 sides

Mathematics is the Key

Calculate the number of sides of a polygon whose exterior angle is;

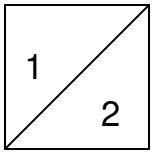
(a) $36°$

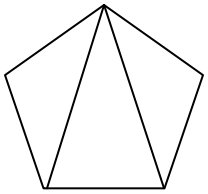
(b) $45°$

(c) $60°$

SUB TOPIC: Triangulation

Triangulation is forming triangles in a polygon.





Quadrilateral Pentagon

Number of triangles = n – 2

Polygon	***Number of sides***	***Number of triangles***
Quadrilateral	4	4 – 2 = 2 triangles
Pentagon	5	5 – 2 = 3 triangles
Hexagon	6	6 – 2 = 4 triangles
Heptagon	7	7 – 2 = 5 triangles

Examples:

1. How many triangles can be formed in a polygon with 8 sides?

$$\boldsymbol{No\ of\ triangles = n - 2}$$
$$\boldsymbol{= 8 - 2}$$
$$\underline{\boldsymbol{= 6\ triangles}}$$

2. Calculate the number of triangles of;

(a) A 6 six sided polygon

(b) A duo decagon

(c) A 20 sided polygon

Mathematics is the Key

SUB TOPIC: Number of right angles

Each triangle contains two right angles.

Number of right angles = 2 (n - 2)

= 2n – 4

Polygon	*Number of sides*	*Number of triangles*	*Number of right angles*
Quadrilateral	4	4 – 2 = 2 triangles	2 x 2 = 4 right angles
Pentagon	5	5 – 2 = 3 triangles	3 x 2 = 6 right angles
Hexagon	6	6 – 2 = 4 triangles	4 x 2 = 8 right angles
Heptagon	7	7 – 2 = 5 triangles	5 x 2 = 10 right angles

Examples:

1. How many right angles can be formed in a polygon with 8 sides?

$$No.of\ right\ angles = 6 \times 2$$
$$= 12\ right\ angles$$

2. *Calculate the number of right angles of a polygon with 11 triangles.*

$$No.of\ right\ angles = 2 \times 11$$
$$22\ right\ angles$$

3. *Calculate the number right angles of;*
   (a) A 6 six sided polygon
   (b) A duo decagon
   (c) A 20 sided polygon
   (d) A polygon with 15 triangles

SUB TOPIC: Finding number of sides of a polygon when given number of triangles or right angles

1. If 10 triangles can be formed in regular polygon, find the number of sides of the polygon.

$$No.of\ triangles = n - 2$$
$$n - 2 = 10$$
$$n - 2 + 2 = 10 + 2$$
$$n = 12\ sides$$

Mathematics is the Key

2. Find the number of sides of a polygon with 16 triangles

$$2(n-2) = no.of\ right\ angles$$
$$2n - 4 = 16$$
$$2n - 4 + 4 = 16 + 4$$
$$2n = 20$$
$$\frac{2n}{2} = \frac{20}{2}$$
$$\underline{n = 10 sides}$$

3. Find the number of sides of a polygon with;
   (a) 10 right triangles
   (b) 4 triangles
4. Name the polygon with;
   (a) 8 triangles
   (b) 18 right angles

SUB TOPIC: THE SUM OF INTERIOR ANGLES OF A REGULAR POLYGON (interior angle sum)

$$Interior\ angle\ sum = 180°(n-2)\ \ or\ 90°(2n-4)$$

Examples:

1. The interior angle of a regular pentagon is 108°. Calculate the sum of all interior angles of the polygon.

$$A\ pentagon\ has\ 5\ sides.$$
$$Each\ int.angle = 108°$$
$$The\ sum\ of\ interior\ angles = 108° \times 5$$
$$\underline{= 540°}$$

2. Calculate the interior angle sum of a regular polygon with 7 sides.

$$Int.angle\ sum = 180°(n-2)$$
$$= 180°(7-2)$$
$$= 180° \times 5$$
$$\underline{= 900°}$$

3. Each exterior angle of a polygon is 30°. Calculate the sum of the interior angles of a polygon.

$$No.of\ sides$$
$$\frac{360°}{30°}$$
$$\underline{12\ sides}$$

$$\underline{The\ sum\ of\ int.angles}$$
$$180°(n-2)$$
$$180°(12-2)$$
$$180° \times 10$$
$$\underline{1800°}$$

Mathematics is the Key

4. Find the sum of interior angles of ;
   (a) A polygon with 8sides
   (b) A polygon with 18sides
   (c) A heptagon
   (d) A polygon with 15 sides

SUB TOPIC: Finding number of sides when given interior angle sum

1. The sum of interior angles of a regular polygon is 1440°.
   (a) How many sides has the polygon?

$180°(n-2)$ = int. angle sum

$180°(n-2) = 1440°$

$$\frac{\cancel{180°}(n-2)}{\cancel{180°}} = \frac{1440°}{180°}$$

$$n - 2 = 8$$

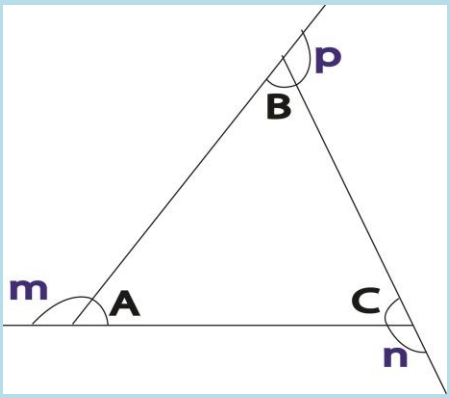
$$n - 2 + 2 = 8 + 2$$

$$\underline{n = 10 \text{ sides}}$$

   (b) What is the size of each exterior angle of the polygon?
   $360° \div 10 = 36^0$

2. Calculate the number of sides of a polygon whose interior angle sum is;
   (a) 1800°
   (b) 540°
   (c) 720°

SUB TOPIC: ANGLES OF TRIANGLES

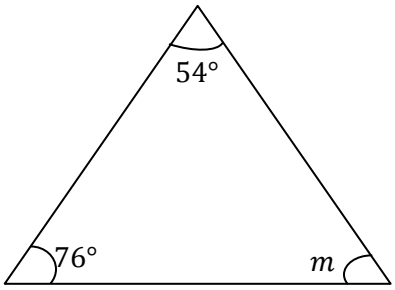


$$A + B + C = 180°$$

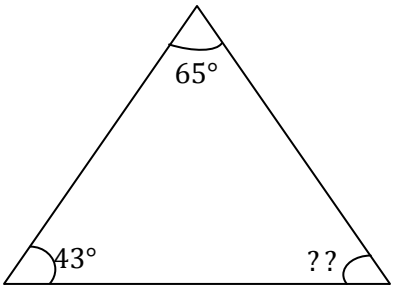
Mathematics is the Key

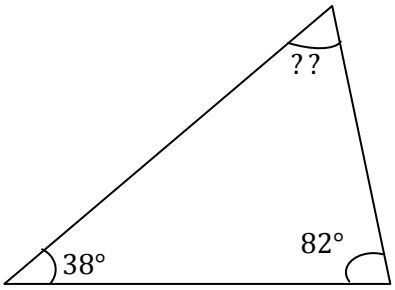
Examples

1. Find the missing angle



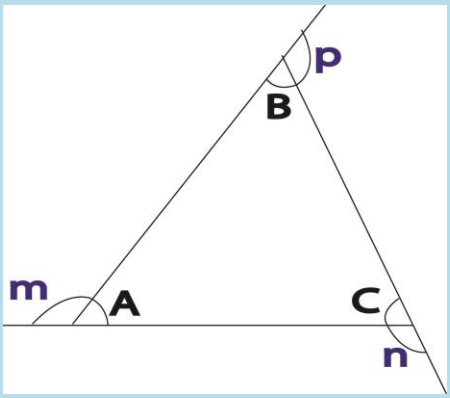
$$m + 76° + 54° = 180°$$
$$m + 130° = 180°$$
$$m + 130° - 130° = 180° - 130°$$
$$m = 50°$$





SUB TOPIC: **Interior and exterior angles of a triangle**

Angle properties of triangles



Two interior angles of a triangle add up to one opposite exterior angle

A + B = n

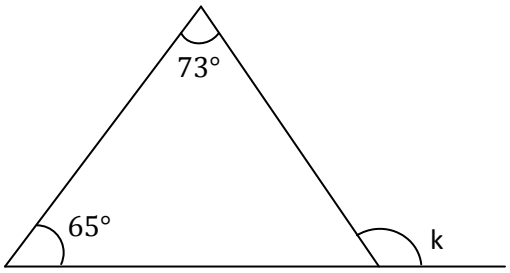
B + C = m

A + C = p

Mathematics is the Key

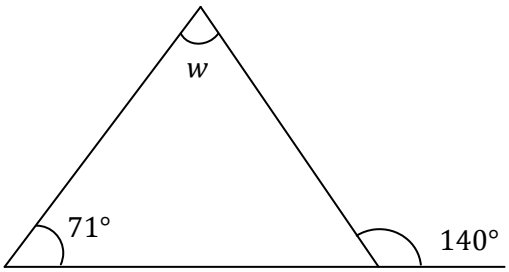
Examples

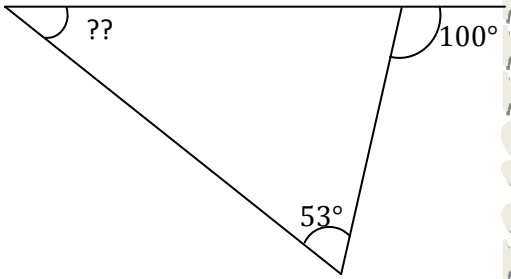
1. Find the missing angle in the figures below

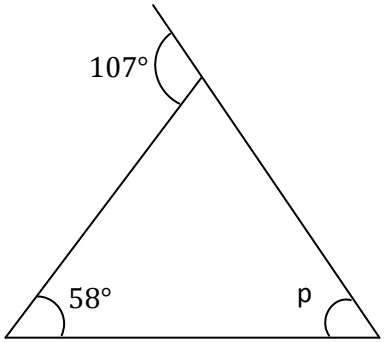


$$k = 65° + 73°$$

$$\underline{\underline{k = 138°}}$$

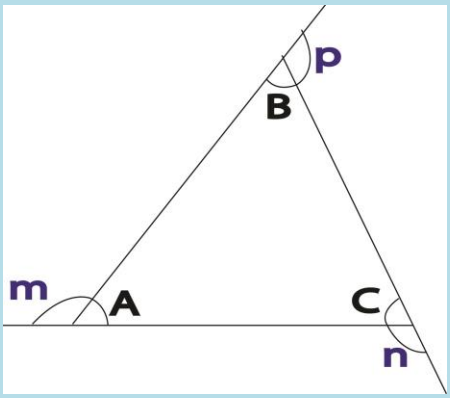






SUB TOPIC: **exterior angles of a triangle**

Angle properties of triangles



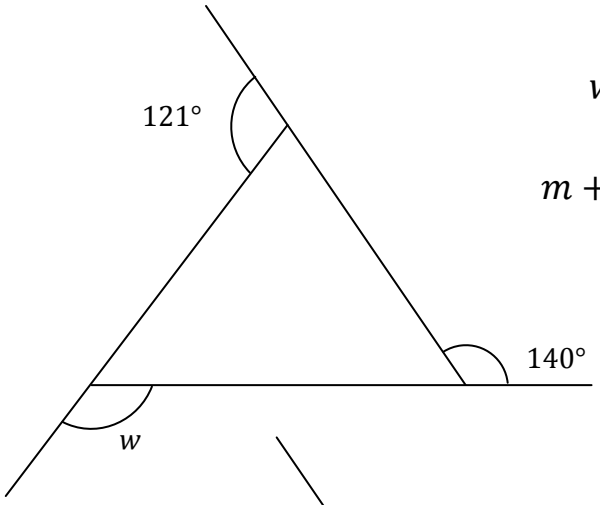
Exterior angles of every polygon add up to **360°**

m + n + p=360°

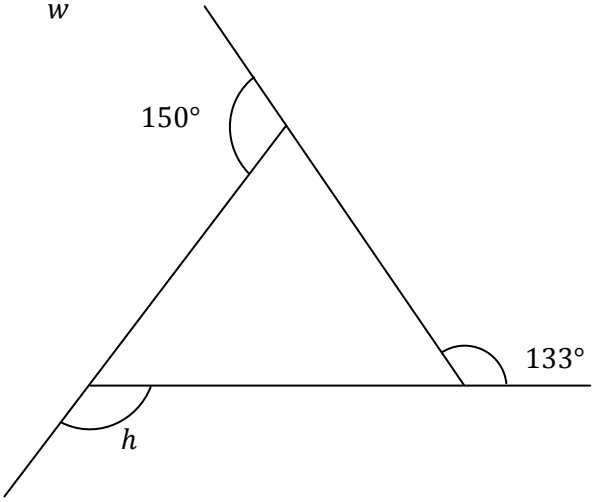
Mathematics is the Key

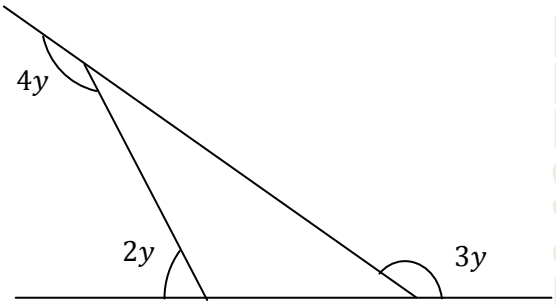
Try these

1. Find the value of the unknown in degrees.



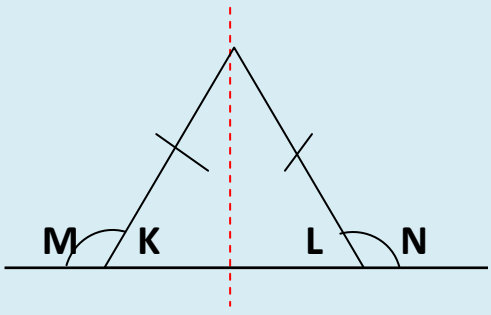
$$w + 140° + 121° = 360°$$
$$m + 261° = 360°$$
$$m + 261° - 261° = 360° - 261°$$
$$m = 99°$$





SUB TOPIC: **exterior angles of a triangle**

Angle properties of triangles



- *Two sides are equal*
- *It has one line of symmetry*
- *Base angles are equal*

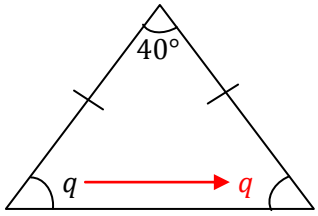
  $\angle K = \angle L$

  $\angle M = \angle N$

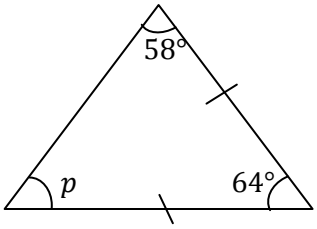
Mathematics is the Key

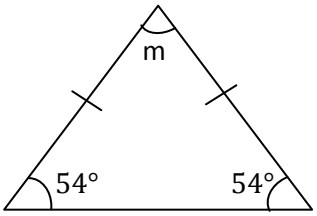
Examples

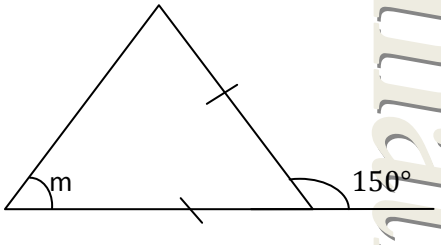
1. Find the value of the unknown in degrees.

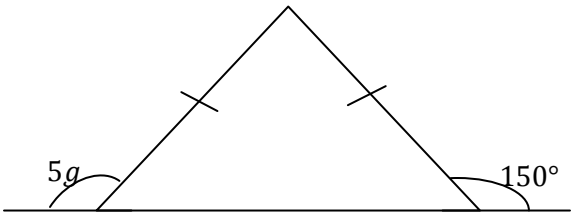


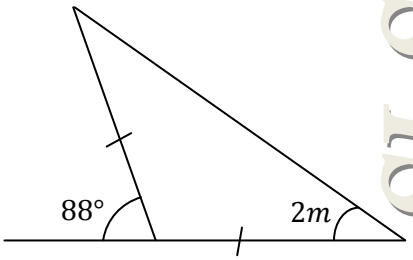
$$q + q + 40° = 180°$$
$$2q + 40° = 180°$$
$$2q + 40° - 40° = 180° - 40°$$
$$2q = 140°$$
$$\frac{2q}{2} = \frac{140°}{2}$$
$$q = 70°$$





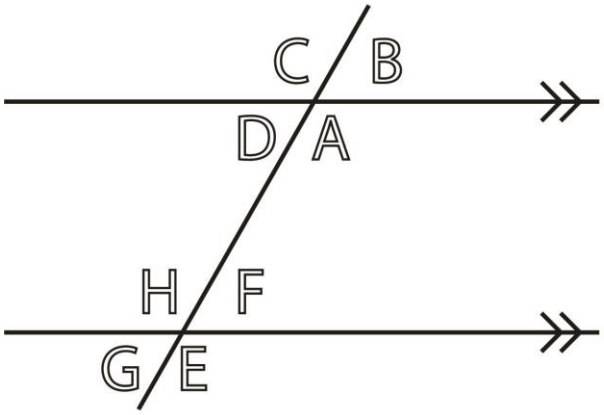






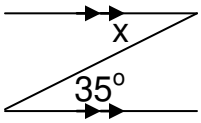
Mathematics is the Key

Properties of angles on parallel lines

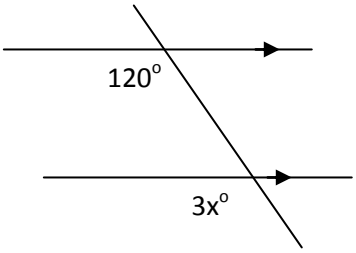


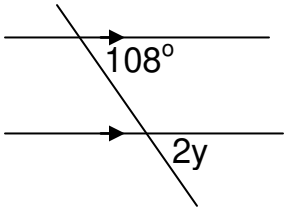
A + B = 180° (supp. ∠S)
A = C (vertically opp ∠S)
A = E (corresp ∠S)
D = G (corresp ∠s)
B = F (corresp ∠s)
C = H(corresp ∠s)
A = H & D = f (alt. Int ∠S)
G = B & C = E (Alt. ext. ∠S)
A + F = 180^0 (co.int. ∠S)
D + H = 180^0(co.int. ∠S)
C + G= 180^0 (co.ext ∠S)
B + E = 180^0 (co.ext ∠S)
H = E (vertically opp. ∠s)
A + B + C + D = 360^0 (∠S at a point)

1. Solve for the unknowns



$\underline{X = 350\ (Alt, int\ \angle S)}$

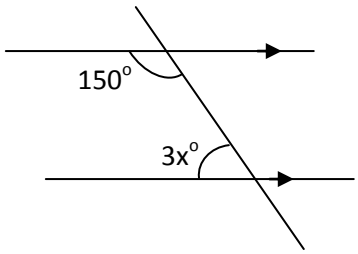


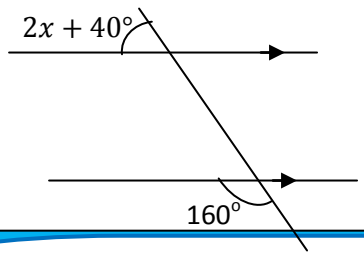


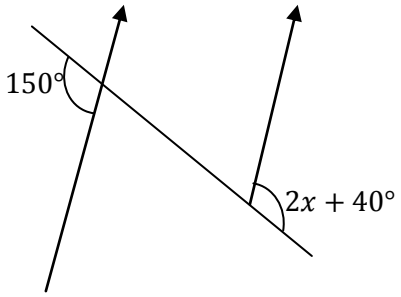
$2y = 108°\ (corr.\angle s)$

$\frac{2y}{2} = \frac{108°}{2}$

$\underline{y = 54°}$



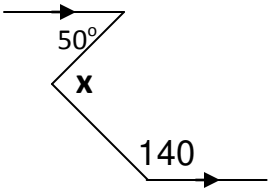


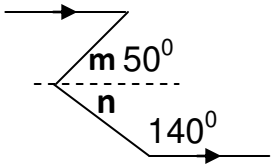


Mathematics is the Key

Examples:

1. Find the value of x.





Imaginary lines

Draw imaginary lines

$\underline{\boldsymbol{m = 50°\ (Alt.int\ \angle S)}}$

$\boldsymbol{n + 140° = 180°\ (Co.int.\angle S)}$

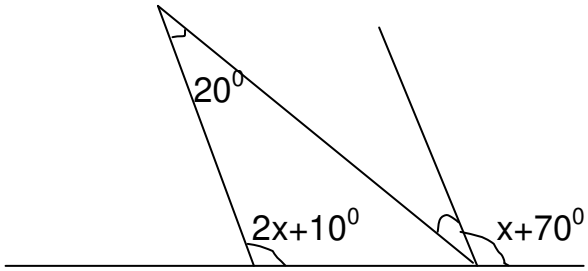
$\boldsymbol{n + 140° - 140° = 180° - 140°}$

$\underline{\boldsymbol{n = 40°}}$

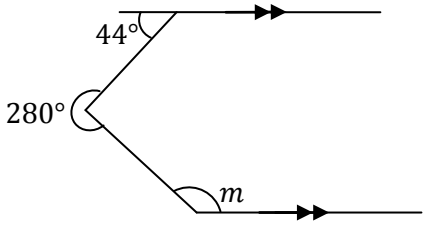
$\boldsymbol{x = 40° + 50°}$

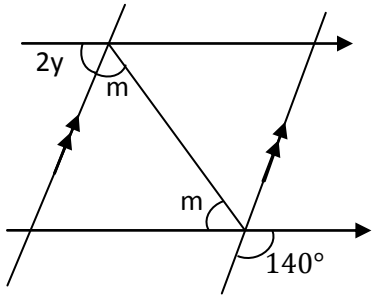
$\underline{\boldsymbol{x = 90°}}$

2. Find the value of x and k



3. Find the value of the unknowns in degrees





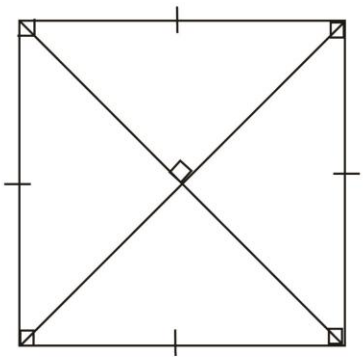
Mathematics is the Key

A quadrilateral is a figure with 4 sides.

Examples of quadrilaterals

- ***Square***
- ***Kite***
- ***Parallelogram***
- ***Rectangle***
- ***Rhombus***
- ***Trapezium***

SQUARE

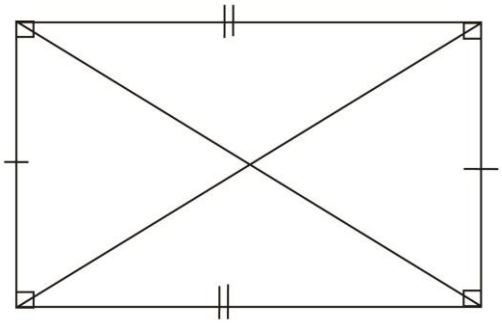


- ***All sides are equal.***
- ***It has 4 right angles.***
- ***Opposite sides are parallel.***
- ***Diagonals are equal and they bisect each other at a right angle.***
- ***It has 4 lines of folding symmetry.***
- ***Diagonals bisect each angle at every vertex.***
- ***Opposite angles are equal.***

Remember :

A square is s regular quadrilateral.

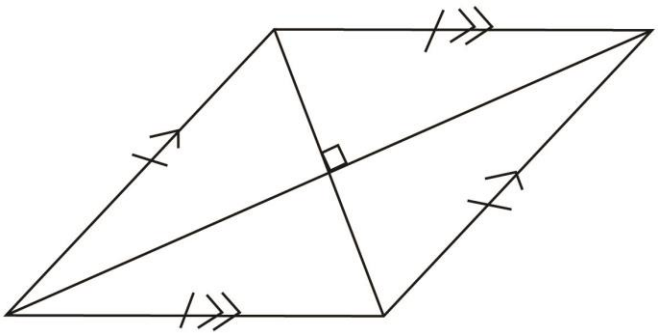
RECTANGLE



- ***Opposite sides are equal and parallel.***
- ***It has 4 right angles.***
- ***Diagonals are equal and they bisect each other.***
- ***Diagonals do not meet at right angle.***
- ***It has 2 lines of folding symmetry.***
- ***Opposite angles are equal.***

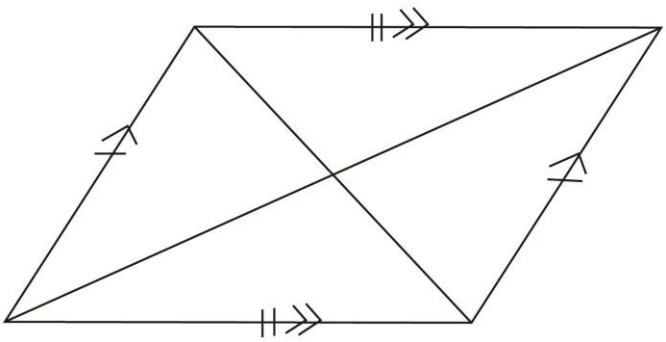
Mathematics is the 17

RHOMBUS



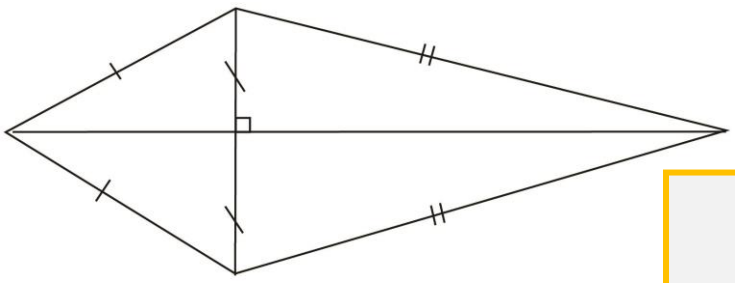
- *All sides are equal*
- *Opposite sides are parallel.*
- *Diagonals are not equal and they bisect each other at a right angle.*
- *Diagonals bisect each angle at every vertex.*
- *It has 2 lines of folding symmetry.*
- *Opposite angles are equal.*

PARALLELOGRAM



- *Opposite sides are equal and parallel.*
- *Diagonals are not equal and they bisect each other.*
- *Diagonals do not bisect each angle at every vertex.*
- *It has no lines of folding symmetry*
- *Opposite angles are equal.*

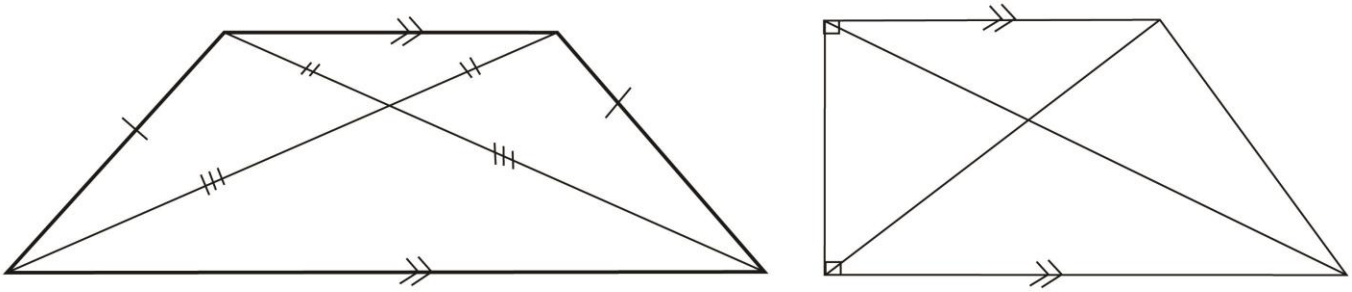
KITE



- *Adjacent sides are equal.*
- *Diagonals are not equal and they meet each other at a right angle.*
- *The longer diagonal bisects the shorter diagonal and the angles at the vertices.*
- *It has 1 line of folding symmetry.*
- *Opposite angles are equal.*

Mathematics is the

TRAPEZIUM



Isosceles trapezium

Right angled trapezium

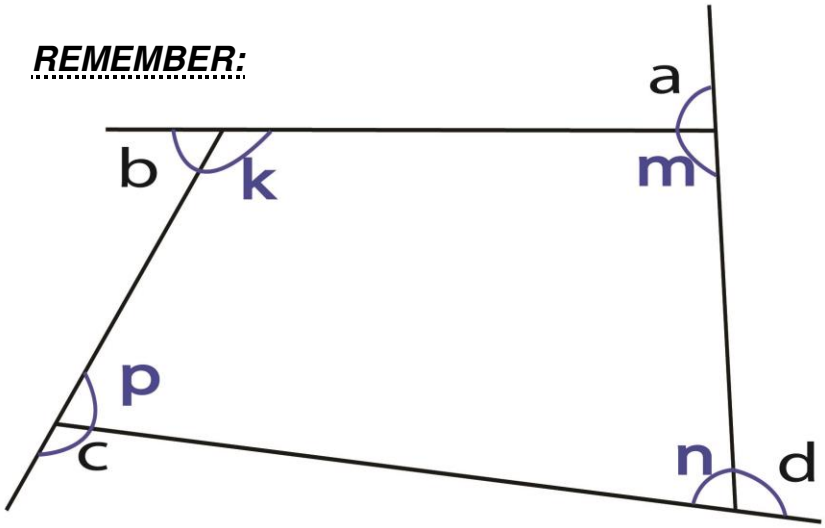
ISOSCELES TRAPEZIUM

- *Two of the sides are parallel.*
- *Diagonals are equal but they do not bisect each other.*
- *Diagonals do not bisect angles in the vertices.*
- *Opposite angles are not equal.*
- *It has 1 line of folding symmetry.*
- *Opposite angles are not equal.*

RIGHT ANGLED TRAPEZIUM

- *Two of the sides are parallel.*
- *Diagonals are not equal and they do not bisect each other.*
- *Diagonals do not bisect angles in the vertices.*
- *Opposite angles are not equal.*
- *It has no lines of folding symmetry.*
- *Opposite angles are equal.*

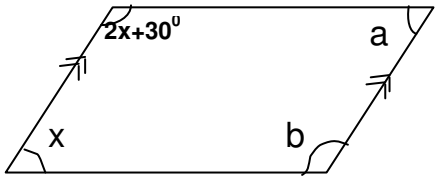
REMEMBER:



- ***Interior angle sum of a quadrilateral is 360°***
  k + m + n + p =360°
- ***Exterior angle sum of every polygon is 360°***
  a + b + c + d =360°

Mathematics is the

1. Calculate the size of angles x, b, a



SUB TOPIC: Complementary angles

An angle with 90^0 is called a right angle.

Any two angles that add up to 90^0 are complementary angles.

Examples:

ii. What is the complement of 30^0?

Let the complement be x

$X + 30^0 = 90^0$

$X + 30 - 30 = 90 - 30$

$x = 60$

iii. Find the complement of $(x + 40)^0$

$90^0 - (x + 40)^0$

$90^0 - x^\circ - 40^0$

$90^0 - 40^0 - x^\circ$

$(50 - x)^0$

iv. What angle is ½ of its complement?

Let the angle be k

ANGLE	COMPL.	TL
k	2k	90^0

$2k + k = 90^0$

$3k = 90^0$

$\frac{3k}{3} = \frac{90^\circ}{3}$

$K = 30^\circ$

v. Find the complement of ;

(a) 30°

(b) 63°

(c) $m - 15^\circ$

(d) p°

vi. What angle is 5 times its complement

Mathematics is the Key

SUB TOPIC: Supplementary angles

Supplementary angles are two angles that add up to 180^0.

Examples:

X + Y = 180^0 (supp. angles)

1. In the above figure, if x = 48^0, find y.

$$x + y = 180^0$$
$$y + 48^0 = 180^0$$
$$y + 48^0 - 48^0 = 180^0 - 48^0$$
$$\underline{y = 132^0}$$

2. What angle is ¼ of its supplement?

Let the angle be m

ANGLE	SUPPL.	TL
K	4k	180^0

$$4k + k = 180^0$$
$$5k = 180^0$$
$$\frac{5k}{5} = \frac{180^\circ}{5}$$
$$\underline{K = 36^\circ}$$

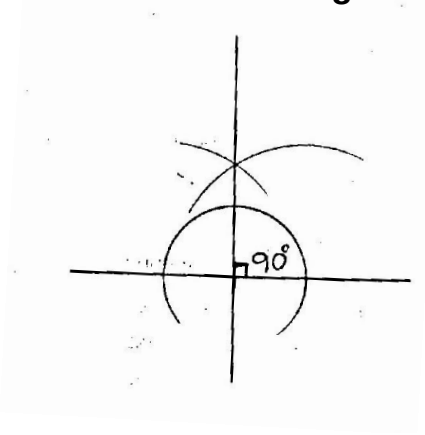
3. Find the supplement of;
   a. 135°
   b. 15°
   c. 152°
   d. $2k - 20^\circ$

4. What angle is 5 times its supplement?

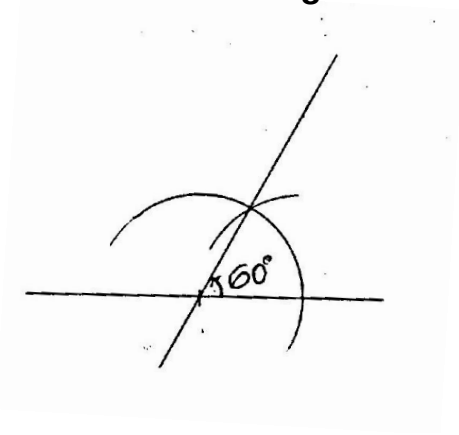
CONSTRUCTION

SUB TOPIC: Constructing special angles

1. **Construct an angle of 90°**



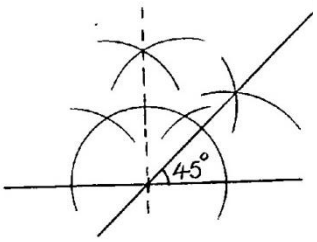
2. **Construct an angle of 60°**



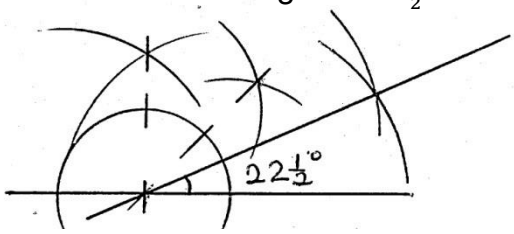
Mathematics is the Key

SUB TOPIC: Constructing other angles

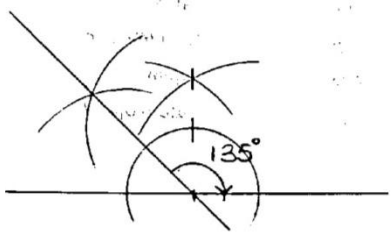
1. Construct an angle of 45°



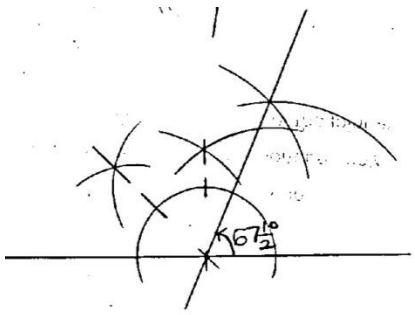
2. Construct an angle of $22\frac{1}{2}°$



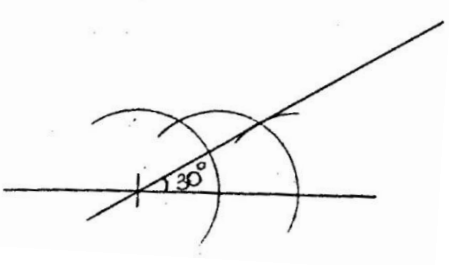
3. Construct an angle of 135°



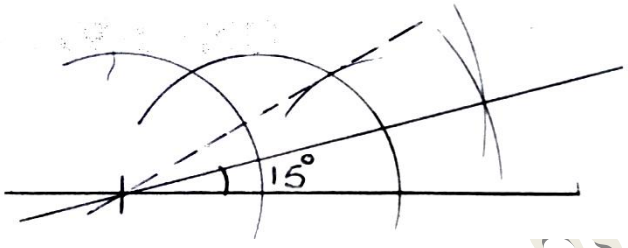
4. Construct an angle of $67\frac{1}{2}°$



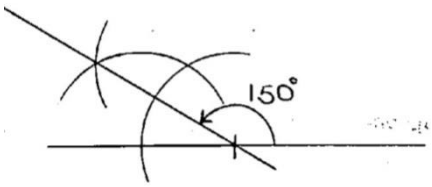
5. Construct an angle of 30°



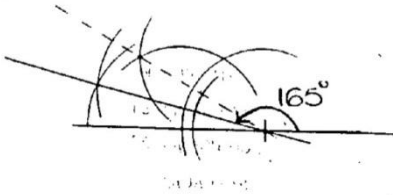
6. Construct an angle of 15°



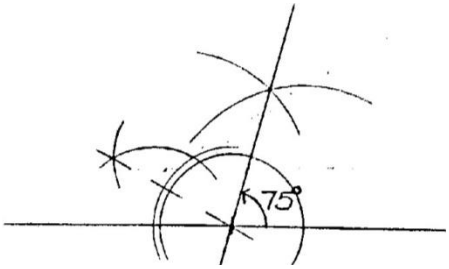
7. Construct an angle of 150°

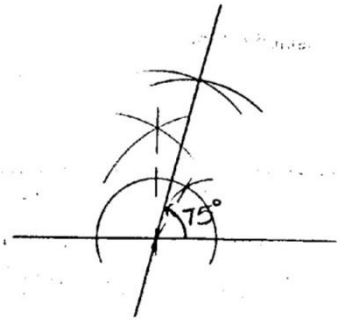


8. Construct an angle of 165°



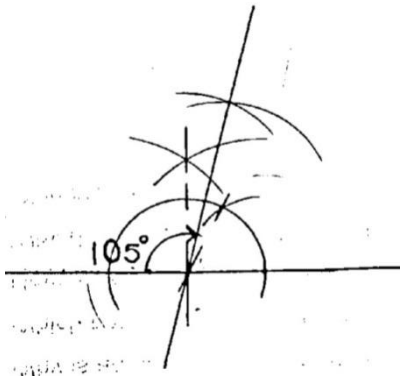
9. Construct an angle of 75°





Mathematics is the Key

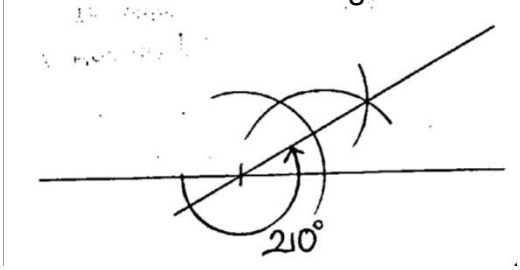
10. Construct an angle of 105°



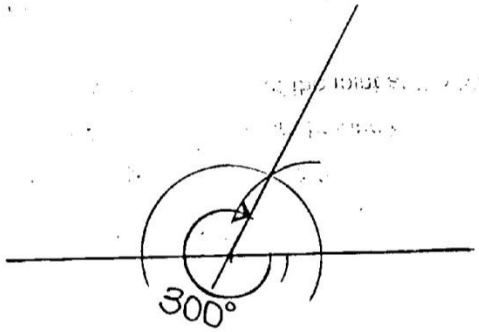
SUB TOPIC: Constructing reflex angles

A reflex angle is constructed by adding 180° to other angles

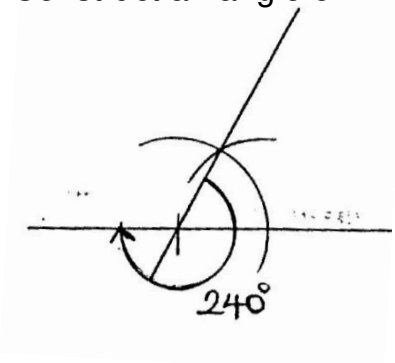
1. Construct an angle of 210°



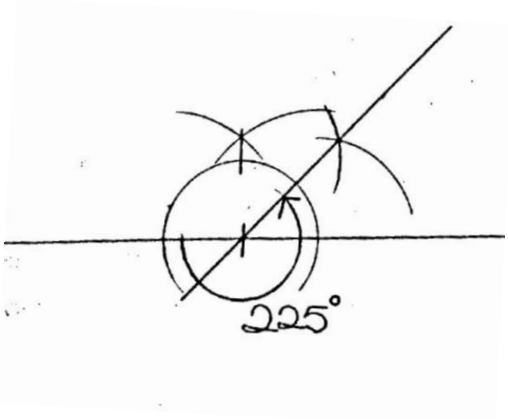
2. Construct an angle of 300°



3. Construct an angle of 240°



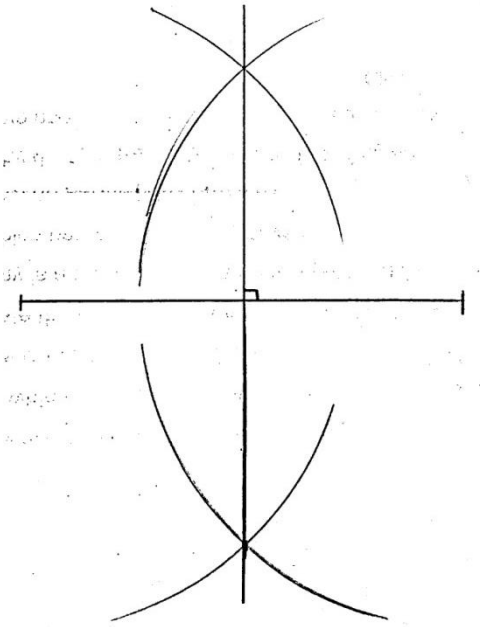
4. Construct an angle of 225°



Mathematics is the Key

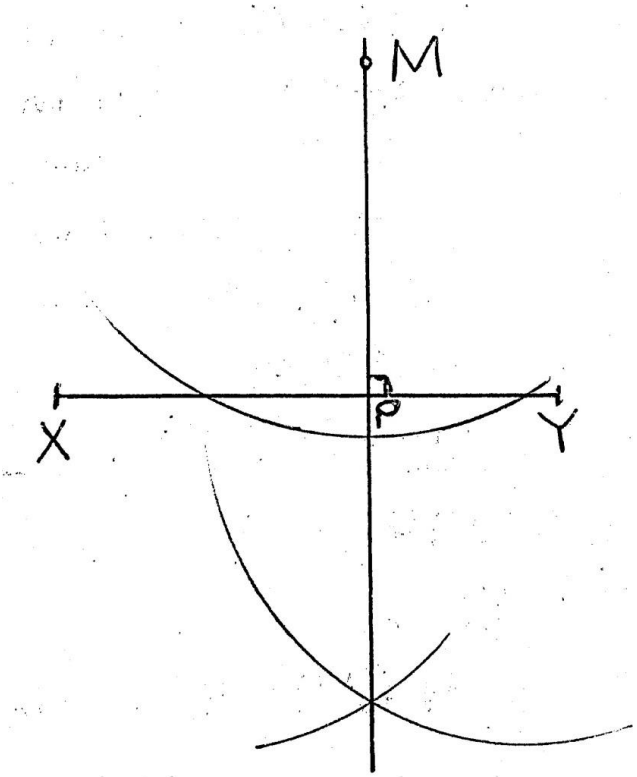
SUB TOPIC: Constructing perpendicular bisectors

1. Bisect the line below



SUB TOPIC: Constructing perpendicular from a point

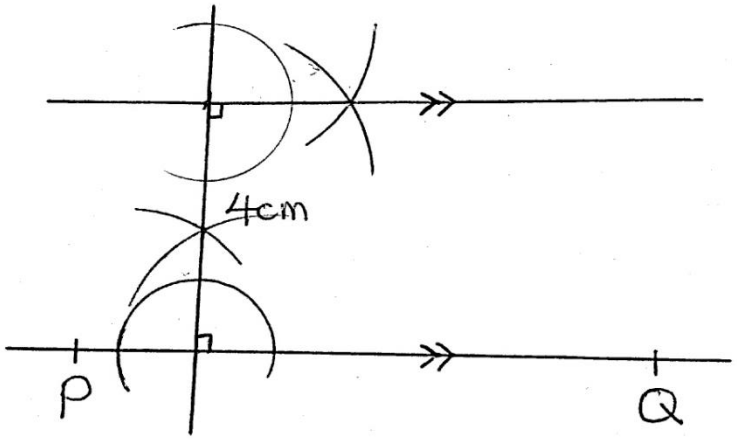
1. Using a ruler, a pencil and a pair of compasses, drop a perpendicular from M to meet line XY at p.



Mathematics is the Key

SUB TOPIC: Constructing parallel lines

1. Construct a line parallel to line PQ below such that the lines are 4 cm apart.

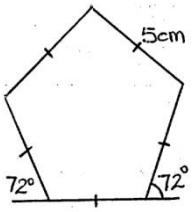


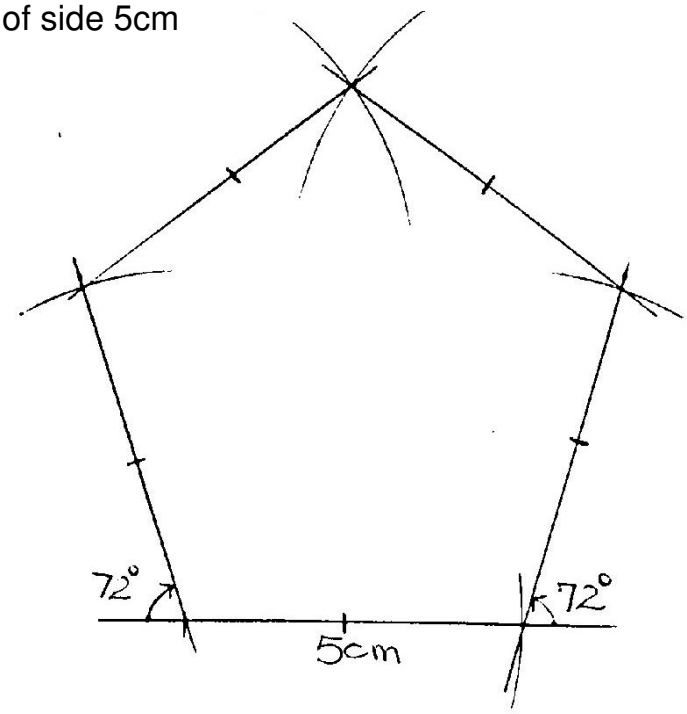
SUB TOPIC: Constructing a pentagon when given a side

1. Construct a pentagon of side 5cm

$$Ext.angle = \frac{360°}{5}$$

$$= \underline{\underline{72°}}$$



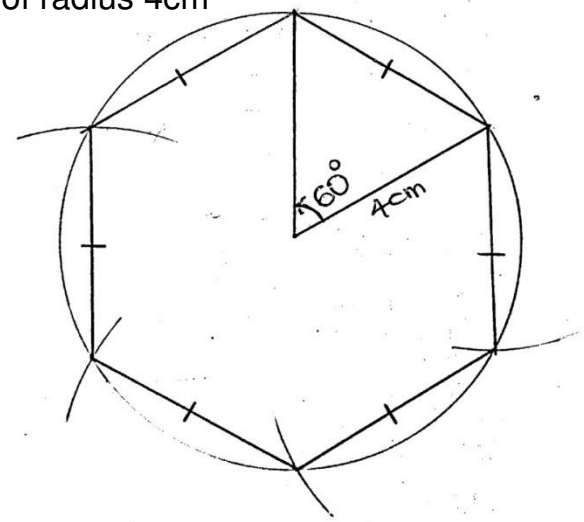


Mathematics is the Key

SUB TOPIC: Constructing polygons using a centre angle

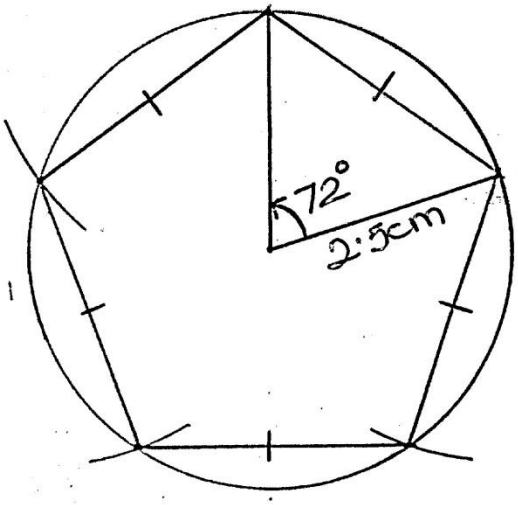
1. Construct a hexagon in a circle of radius 4cm

$$\boldsymbol{Centre\ angle} = \frac{360°}{6}$$
$$= \underline{\underline{60°}}$$



2. Construct a pentagon in a circle of radius 2.5cm

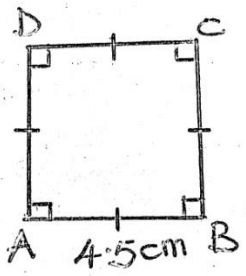
$$\boldsymbol{Centre\ angle} = \frac{360°}{5}$$
$$= \underline{\underline{72°}}$$

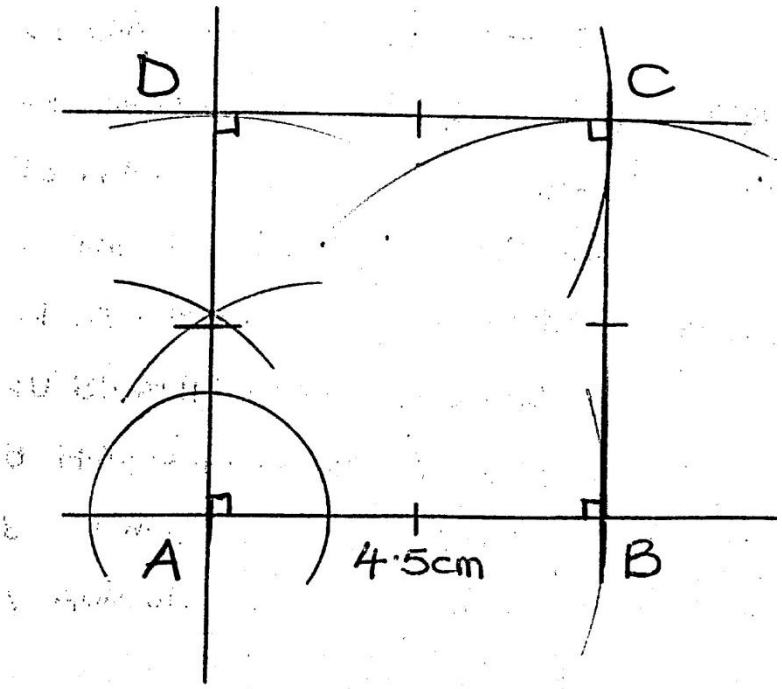


Mathematics is the Key

SUB TOPIC: Constructing a square when given side

1. Construct square ABCD of side 4.5cm

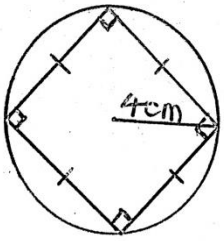




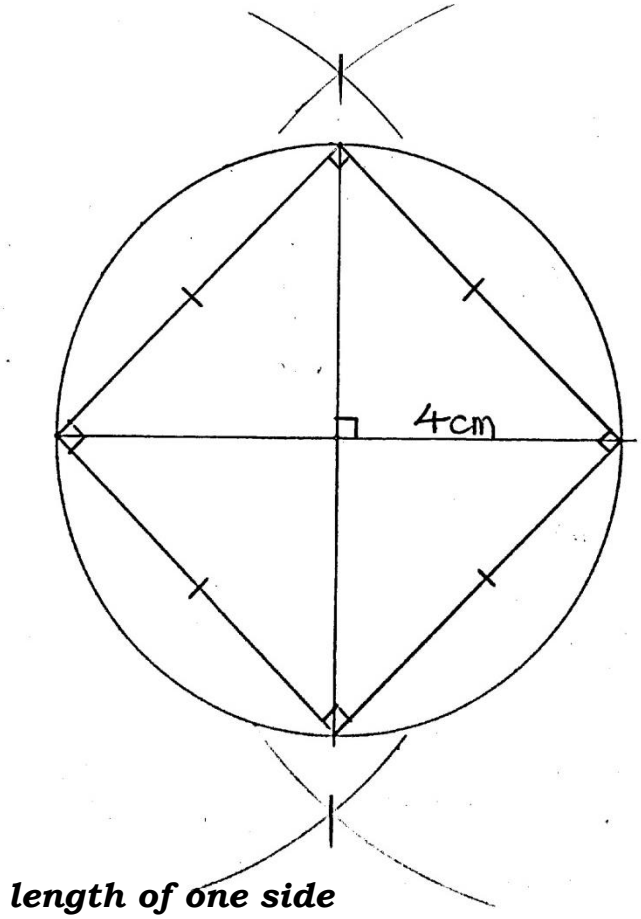
2. Construct a square of side 5.3 cm
3. Construct square MNOP where MN=4cm

SUB TOPIC: Constructing a square in a circle

1. Construct a square in a circle of radius 4cm



Mathematics is the Key

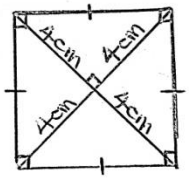


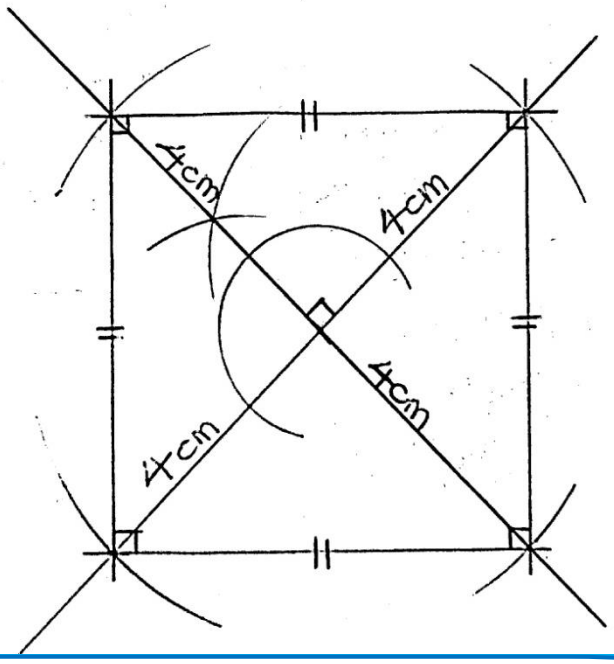
♠ ***Measure the length of one side***

2. Construct a square in a circle of radius 6cm
3. Construct a square in a circle of radius 3.5cm

SUB TOPIC: Constructing a square using diagonals

1. Construct a square whose diagonal is 8cm





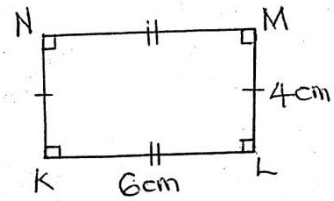
Mathematics is the Key

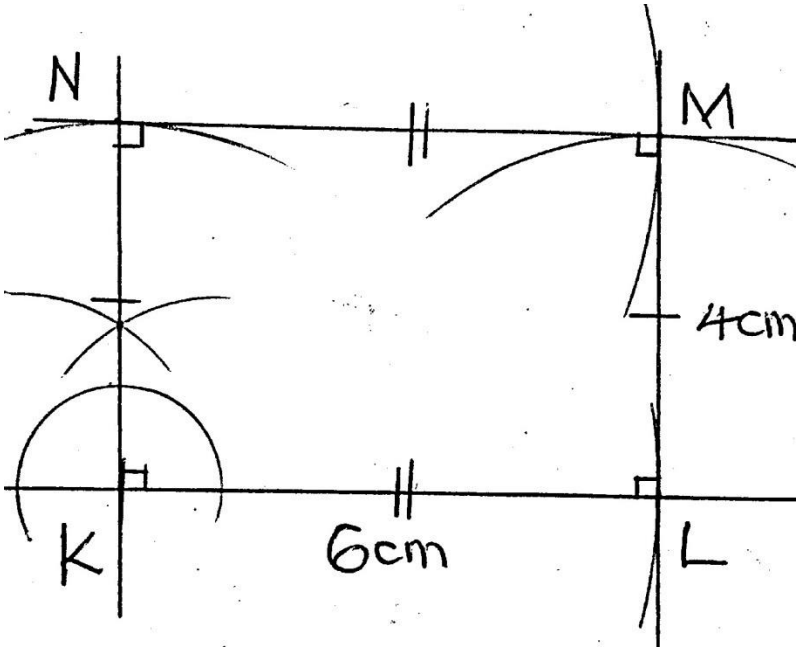
- ♠ ***Measure the length of one side***

2. Construct a square whose diagonal is 9cm
3. Construct square PQRS whose diagonal is 8cm

SUB TOPIC: Constructing a rectangle when given sides

1. Construct rectangle KLMN where KL=6cm and LM = 4cm.



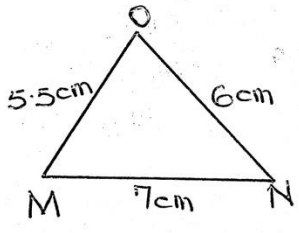


- ♠ ***Measure diagonal KM***
- ♠ ***Measure angle MKL***

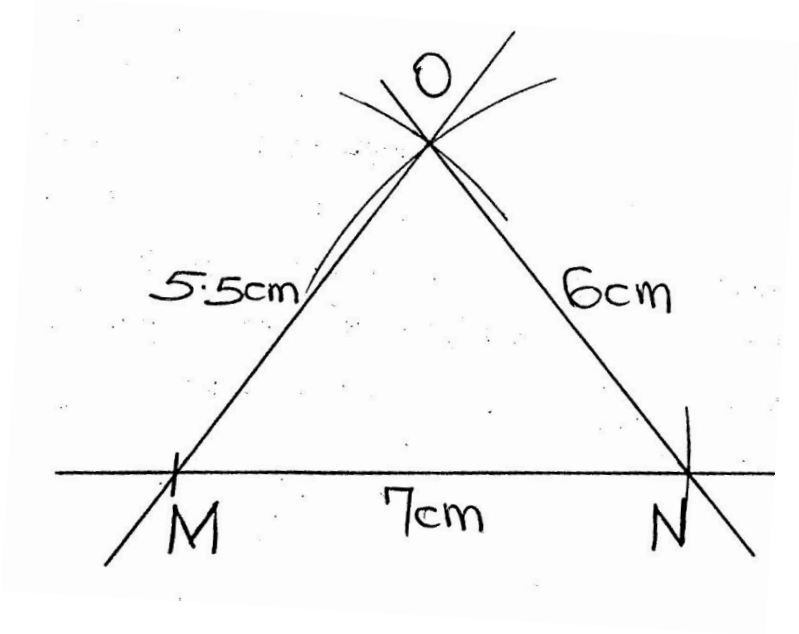
2. Construct a rectangle whose length is 7cm and width is 4.3cm.

SUB TOPIC: Constructing a triangle when given sides(SSS)

1. Construct triangle MNO where MN= 7cm, NO=6cm and MO=5.5cm



Mathematics is the Key

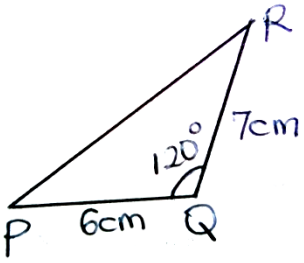


- ♠ ***Measure angle OMN.***

2. Construct triangle KLM in which KL = 7.3cm KM = LM = 8cm

SUB TOPIC: Constructing a triangle when given two sides and one angle(SAS)

1. Construct triangle PQR where line PQ = 6cm, angle PQR = 120^0 and QR=7cm.Drop a perpendicular from R to meet PQ at m.

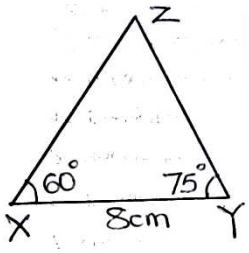


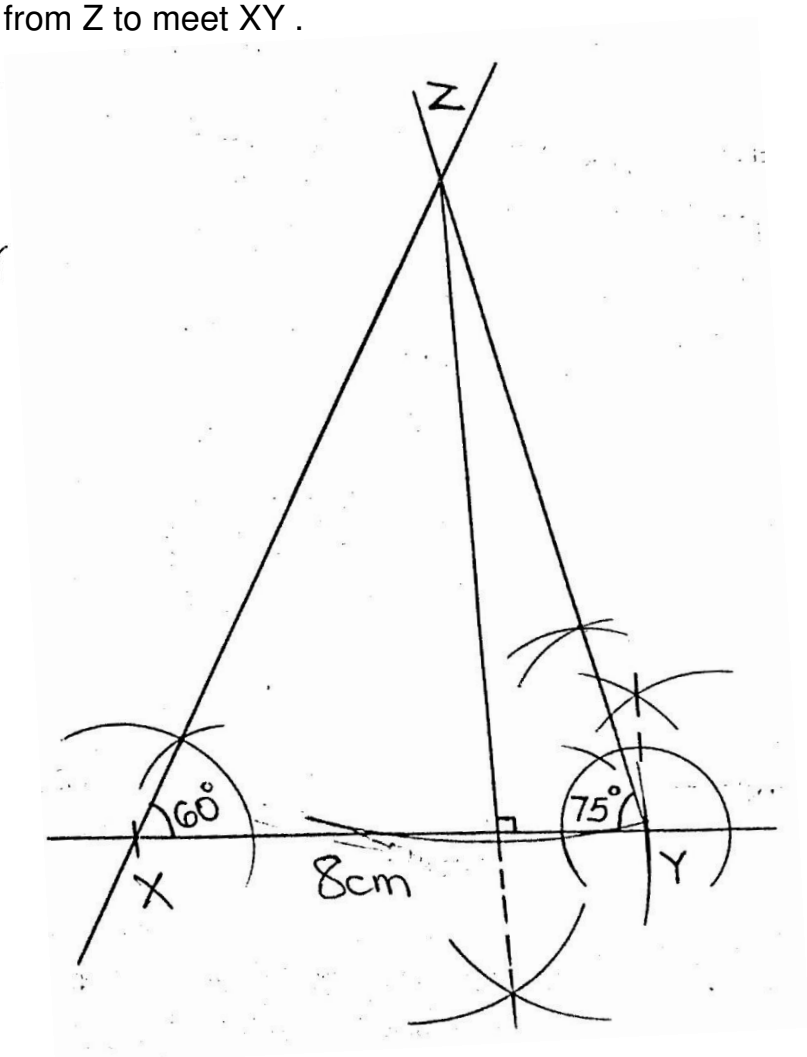
- ♠ ***Measure line RM***
- ♠ ***Measure angle RPQ***

Mathematics is the Key

SUB TOPIC: Constructing a triangle when given two angles and one side(ASA)

1. Construct triangle XYZ where XY=8cm, angle ZXY =60^0 and angle XYZ=75^0.drop a perpendicular from Z to meet XY .





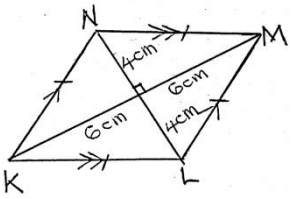
- ♠ ***Measure line XZ***
- ♠ ***Measure line YZ***
- ♠ ***Measure the height of the triangle***
- ♠ ***Find its area***

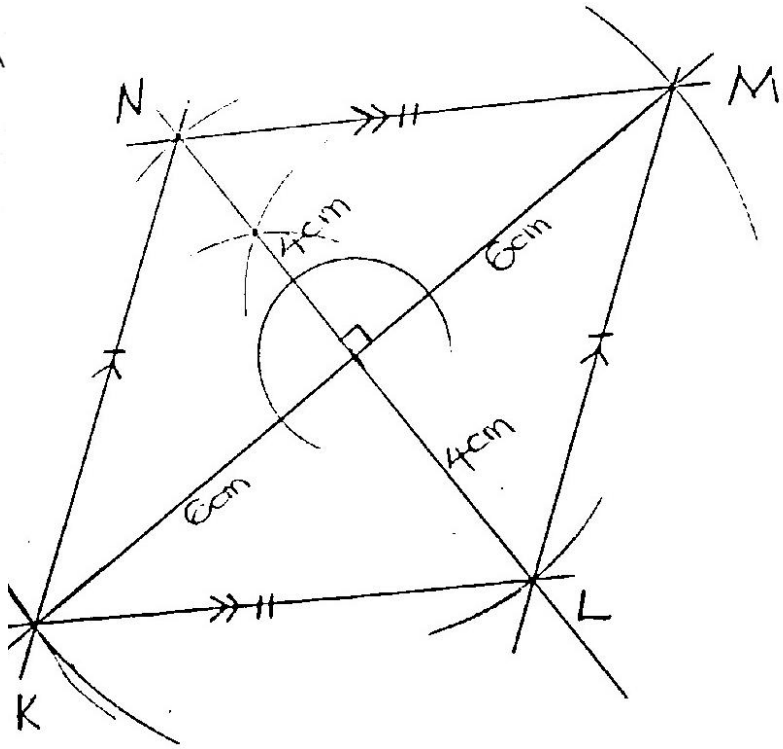
2. Construct a triangle RST where angle R = 60^0 angle S = 45^0 and RS = 5cm Measure the length of ST and angle T.

Mathematics is the Key

SUB TOPIC: Constructing a rhombus when given diagonals

1. Construct rhombus KLMN where KM=12cm and LN=8cm.



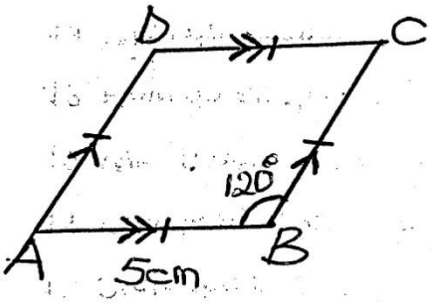


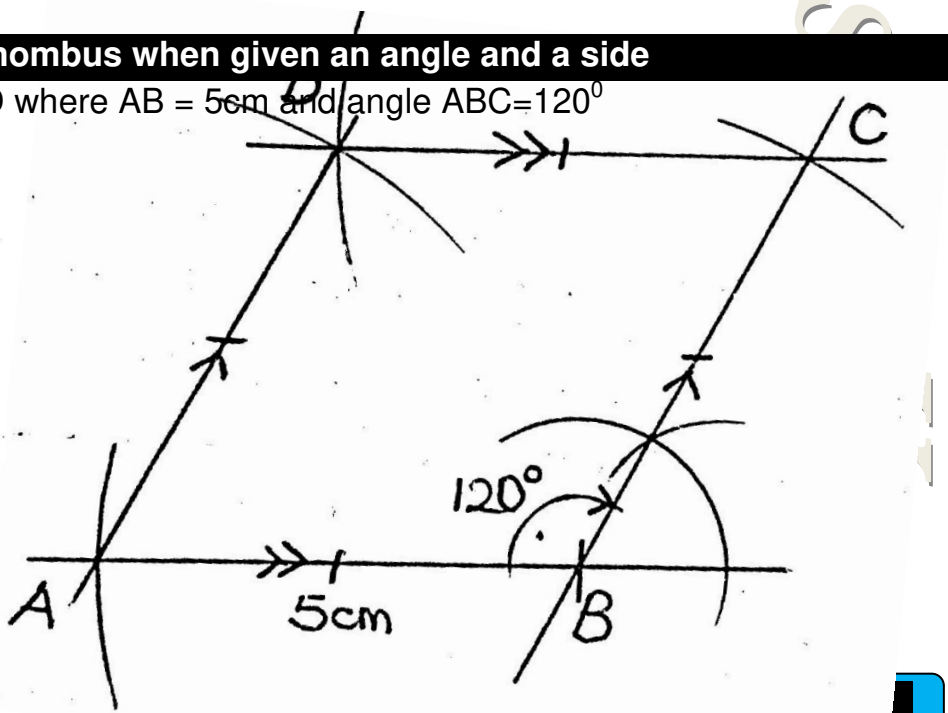
- ***Measure line LM***
- ***Measure angle NKL***
- ***Measure angle MKN***
- ***Measure angle KNL***

2. Construct a rhombus whose diagonals are 16cm and 12cm respectively.

SUB TOPIC: Constructing a rhombus when given an angle and a side

1. Construct rhombus ABCD where AB = 5cm and angle ABC=120^0



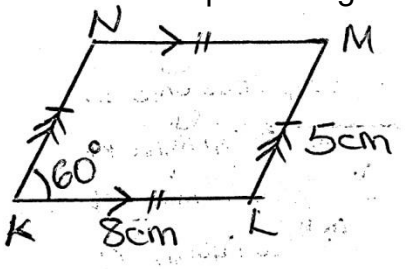


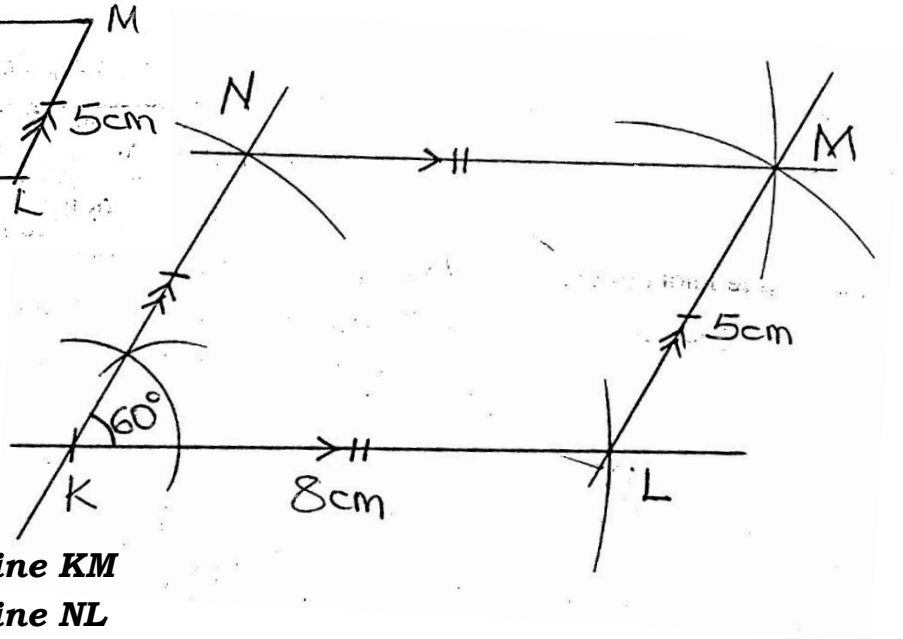
Mathematics is

- ***Measure line AC***
- ***Measure line BD***
- ***Measure angle DAB***
- ***Measure angle CAB***

SUB TOPIC: Constructing a parallelogram when given side and angle

1. Construct parallelogram KLMN where KL=8cm,LM=5cm and LKN=60^0





- ***Measure line KM***
- ***Measure line NL***
- ***Measure angle MKL***
- ***Measure angle KLM***

BEARING AND SCALE DRAWING

SUB TOPIC: Rotations/Revolutions/Complete turns

This is the act of turning around a centre or an axis

$$1\ complete\ turn/1\ rotation/1\ revolution\ =\ 360°$$

Examples

1. How many degrees are in two complete turns?

$$1\ turn = 360°$$
$$2\ complete\ turns = 360° \times 2$$
$$= \underline{720°}$$

2. How many revolutions make up 1080^0?

Mathematics is the Key

$360° = 1\ revolution$

$1080° = \frac{1080°}{360°}$

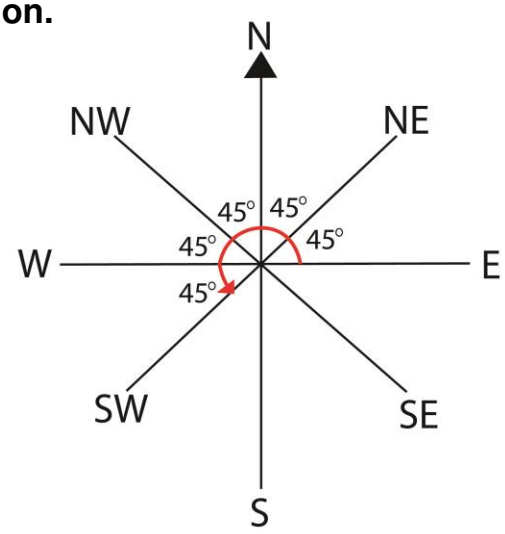
$= \frac{108}{36}$

$= 3\ revolutions$

3. How many degrees are in $\frac{1}{2}$ turn?
4. A boy made 4 complete turns. Through what angle did he turn?

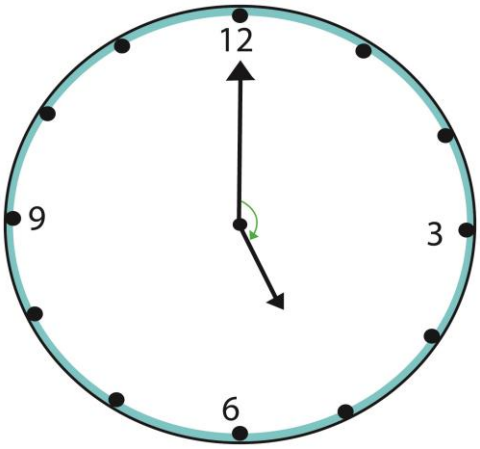
SUB TOPIC: Angles on a compass and a clock face

1. Kakuru was facing in East and turned anticlockwise through an angle of 225^0. Find his new direction.



His new direction became South West

2. Calculate the smaller angle between the hands on the clock face below.



$\frac{25}{60} \times 360°$

$25 \times 6°$

$150°$

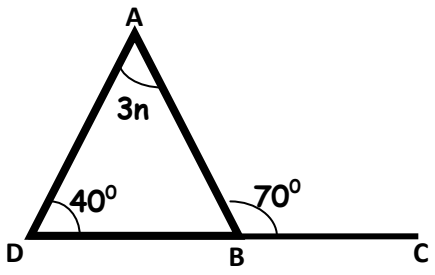
Mathematics is the Key

3. **What angle can one turn after turning from South East to North in a clock wise direction?**
4. **What smaller angle is between West and North East?**
5. **Find the smaller angle between the North West and South West**

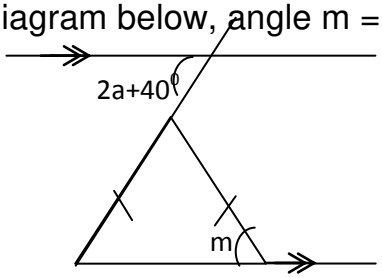
TOPICAL REVISION QUESTIONS:

1. With the help of a ruler and pair of compasses only, construct the following angles.
   (a) 30^0
   (b) 45^0
   (c) 75^0
   (d) 120^0

2. Construct using a ruler and pair of compasses only the triangles with the following measurement.
   (a) Triangle ABC where AB = 7cm, AC = 6cm and BC = 5cm
   (b) Triangle PQR where PQ = 8cm, $\angle Q = 120^0$ and QR = 5cm. Measure PR
3. What is the smaller angle between West and South West.
4. Construct a square WXYZ whose sides are 4.5cm.
5. Each interior angle of a regular polygon is 120°.
   (ii) Find the number of sides of the polygon.
   (iii) Calculate its interior angle sum.
6. How many degrees will Munduni turn through in 3 ¼ revolutions?
7. In the triangle ABC below, find the value of **n**

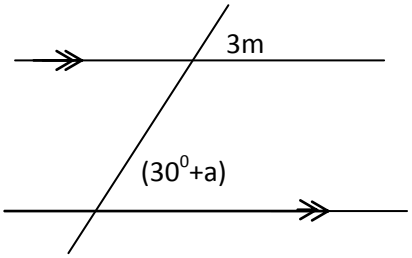


8. The supplement of $\mathbf{(a+30)^0}$ is $\mathbf{40^0}$, find the value of **a**
9. From the diagram below, angle m = 3a. Find the value of a

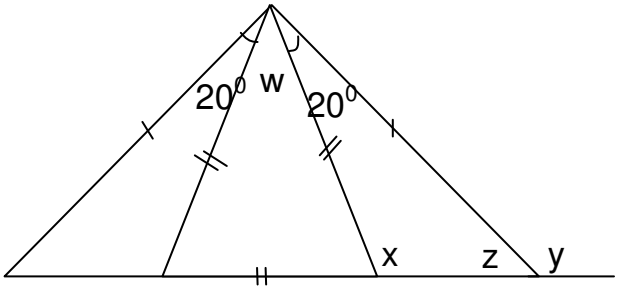


Mathematics is the Key

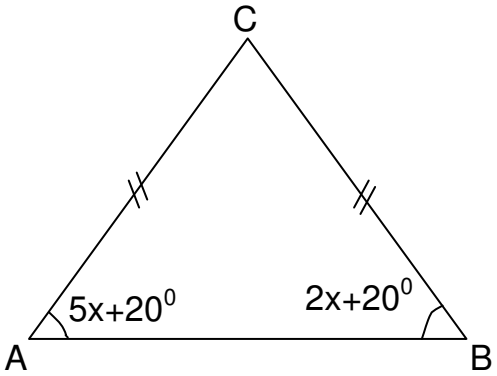
10. Given that m = 2a, find the value of a in degrees.



11. Calculate the size of angle w, x, y, z



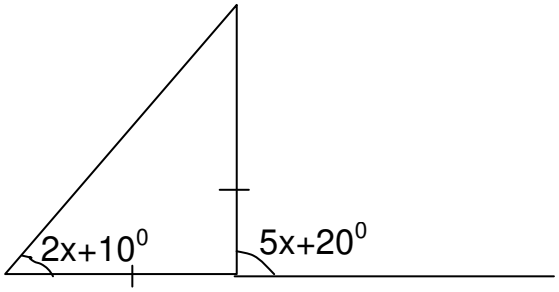
12. Use the figure below to answer the question the questions that follow.



(a) Find the value of x

(b) Find the size of angle ACB

13. find the value of x in degrees

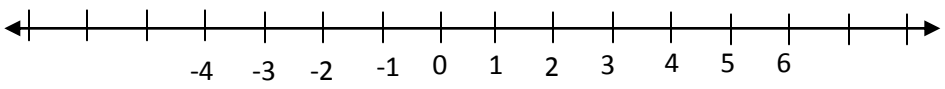


Mathematics is the Key

INTEGERS

SUB TOPIC: ORDERING AND ARRANGING INTEGERS ON A NUMBERLINE

The number line:



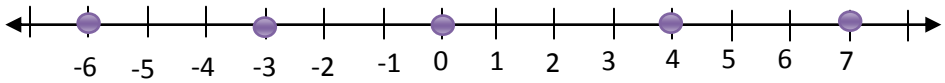
i) All integers to the left of zero are –ve.
ii) All integers to the right of zero are +ve
iii) Any integer is less than that on its right.
iv) Any integer is more than that on its left.
v) Integers on a number line are arranged in ascending order from left to right.

Examples

1. Use >, < or = to compare the pair of integers. Given:

(i) -6 < -3
(ii) -3 < 0
(iii) 0 < +4
(iv) 0 > -6
(v) -3 > -6
(vi) +7 > +4
(vii) +4 = +4
(viii) -8 = -8

2. Arrange in descending order/decreasing order the following integers:
-6, 0, +7, -3, +4



+7, +4, 0, -3, -6

3. Use >, < or = to compare the following pairs of integers.

(i) -2 ____0 **(ii) -1_____-3** **(iii) -6_____-6**
(iv) 8_____8 **(v) 5_____-5** **(vi) -7_____7**

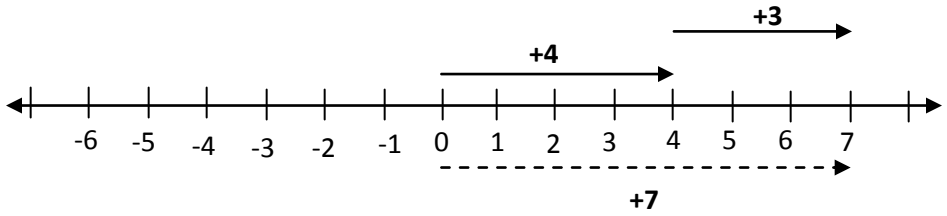
4. Arrange the following integers in ascending order (increasing order)
-8, 2, -1, 5, -3, +7

5. Arrange the integers below in descending order.
0, -7, +4, -6, +1

Mathematics is the Key

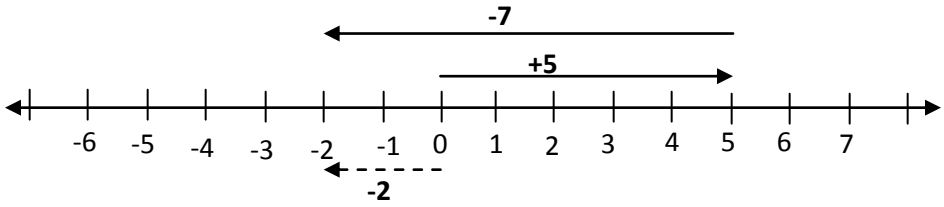
SUB TOPIC: ADDITION OF INTERS USING A NUMBER LINE

Example 1. Workout:***+4 + $^{+}$3***



+4+$^{+}$3 = +7

Example 2. Workout:***+5 + -7***



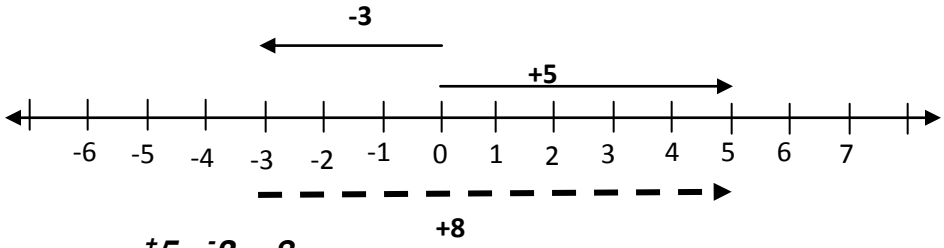
+5 + -7 = -2

Add the following using a number line

(i) -3 + +9 (ii) -4 + +5

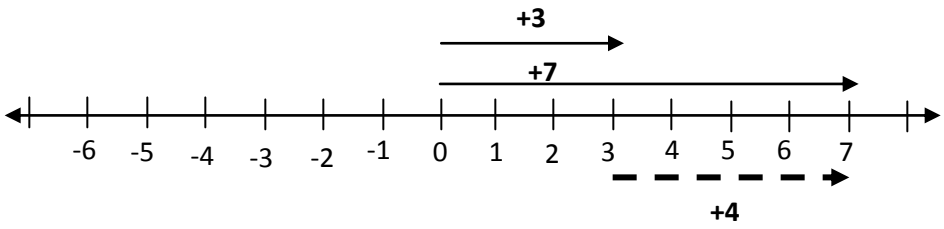
SUB TOPIC: SUBTRACTION OF INTEGERS USING A NUMBERLINE

Example 1. ***+5 - $^{-}$3***



$^{+}$5 - $^{-}$3 = 8

Example 2. ***+7 - +3***



+7-$^{+}$3 = +4

Workout the following using a number line

Mathematics is the Key

(i) -3 - -11 (ii) 8 - +8

SUB TOPIC: SUBTRACTING INTERGERS WITHOUT NUMBER LINES

Example 1.

1.Workout:+8 - +7

+8 - +7

+8 – 7

+1

Note ***- x + = -***

+ + + + + + + +

- - - - - - -

+1

2.Workout: -8 - +3

-8 - +3

-8 – 3

-11

Note ***- x + = -***

- - - - - - - -

- - -

-11

3.workout: -5 - -2

-5 + 2

+2 – 5

- 3

Note ***- x - = +***

+ +

- - - - -

-11

5. Subtract the following integers.

(i) +4 - +2 (ii) +7 - -4 (iii) -3 - +7

SUB TOPIC: ADDING INTEGERS WITHOUT USING A NUMBERLINE

Example 1.

1.Workout ***:+7 + ⁺2***

+7 + ⁺2

+7 + 2

+9

Note ***+ x + = +***

+ + + + + + +

+ +

+9

2.Workout ***:+7 + ⁻2***

+ 7 + ⁻2

+7 – 2

+5

Note ***+ x - = -***

+ + ***+ + + + +***

- -

+5

3.Workout ***:-7 + ⁻2***

-7 + -2

-7 - 2

-9

Note ***+ x - = -***

- - - - - - - -

- -

-11

Add the following integers.

(i) +1 + +7 (ii) +8 + -2 (iii) +18 + -18

Mathematics is the Key

SUB TOPIC: MULTIPLICATION OF INTEGERS

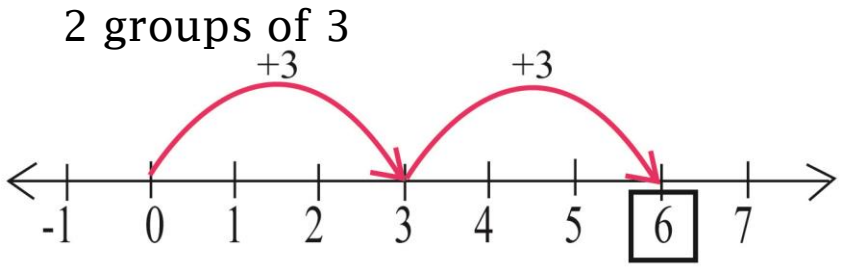
Examples:

1. +2 x +6 = +12
2. +2 x -6 = -12
3. -2 x -6 = +12

Multiplication of integers on a number line:

Examples:

1.Workout +2 x +3



2. Multiply:

(i) +4 x -2 (ii) -6 x 3

3.Workout -2 x 8 using a number line.

NOTE:

+ve x +ve = +ve
+ve x -ve = -ve
-ve x -ve = +ve

SUB TOPIC: DIVISION OF INTEGERS

NOTE:

$+ve \div +ve = +ve$
$+ve \div -ve = -ve$
$-ve \div +ve = -ve$
$-ve \div -ve = +ve$

Examples:

1. ***+16 ÷ +2 = +8***
2. ***+16 ÷ -2 = -8***
3. ***-16 ÷ +2 = -8***
4. ***-16 ÷ -2 = +8***

Divide:

(i) -9 ÷ -3 (ii) 27 ÷ -9

Mathematics is the Key

BC, LOSS, Time before, debts, below sea level are **negative.**
AD, profit, time after, above sea level are **positive**

Example 1:

A Scientist was born in 30BC and died immediately after his birthday in 76AD. How old was he when he died?

The man lived from -30 to +76
The Scientist lived for ***+76 -)-30)***
= 76 + 30
=106 years

Example 2

The temperature of a drink dropped from 10°C to -4°C. By how many degrees did drop?
*Old temp =**10°C***
*New temp = **-4°C.***
*The temp. of the drink dropped by **10°C** −(¯**4°C**)*
= 10°C + 4°C
= 14°C

Example 3

A teacher a wards 4 marks for every correct answer and deducts a mark for every wrong answer.
(a). If a pupils gets 12 correct answers in a test of 20 numbers, how many marks does he get ?

Correct answers = 12
Wrong answers = 20 -12
= 8
Marks scored = (12 x 4) – (8x1)
= 48 - 8
= 40 .

(b).If pupil gets 60 marks in a test of 30 questions, how wrong answers will he have got?

Let the wrong answers be m
Correct answers = 30 - m
4(30 - m)-(mx1) = 60
120 – 4m – m = 60
120 – 5m = 60
120 – 120 – 5m = 60 -120
-5m = - 60

$$\frac{-5m}{-5} = \frac{-60^{12}}{-5_1}$$

m = 12 wrong answers

Mathematics is the Key

Try these

1. Flavia was born in 2BC and she died in 38AD after her birthday. How old was she when she died?

2. John left a balance of shs 1,000 with the milk vendor. He then bought 5 litres of milk from the milk vendor atsh.1000 each litre. How much did he pay to meet his bill?

3. Iganga FC arrived at Nakivubo Football stadium 15 minutes before the start of the football match. The team left the stadium 15 minutes after the end of a 45 minutes first half of the match. How long was the team in the stadium?

4. In an examination you are awarded 7 marks of every correct answer and 3 marks deducted for every wrong answer. A candidate had 9 questions correct and 5 questions wrong. What mark did the candidate score?

REFERENCE

A New MK Primary Mathematics 2000 Bk 7 Pg 362 - 363 (New Edition)

FINITE/MODULAR SYSTEM

Finite system/modular system is a system of writing remainders

SUB TOPIC: writing numbers in finite system

1.Write the following in finite system.

(a) 8 in finite 5

8 = 8 ÷ 5 (finite 5)

8 = 1 rem 3 (finite 5)

8 = 3(finite 5)

2. 40 in finite 12

40 = 40÷12(finite 12)

40 = 3 rem 4 (finite 12)

40 = 4 (finite 12)

Write;

(a) **25 in finite 4**

(b) **16 in mod 7**

(c) **39 in finite 12**

(d) **100 in finite 6**

(e) **485 in mod 9**

Mathematics is the Key

SUBTOPIC: Writing equivalences in finite system

i. Write equivalent numbers of 2(mod 5)

2(mod 5) = {2, 7, 12, 17, 22, 27 …}

ii. Write the first 5 equivalent numbers of 7(finite 9)

7(finite 9) = {7, 16, 25, 34, 43}

iii. Write the first eight equivalent numbers of;

1. **3(finite 5)**
2. **2(finite 9)**
3. **11(finite 12)**
4. **6(finite 9)**
5. **1(finite 5)**

SUBTOPIC: Addition of numbers in finite system

Examples:

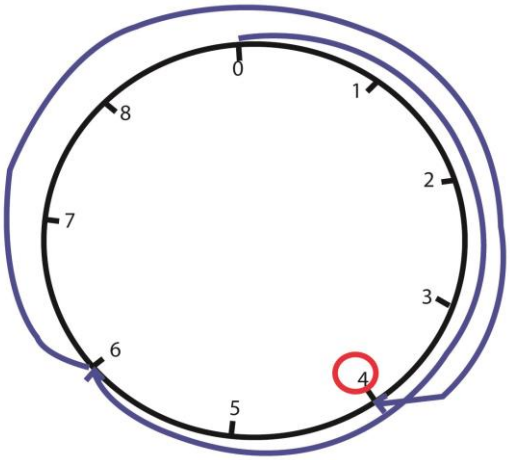
(i) Add: 6 + 7 = ___ (finite 9)

6 + 7 = ___(finite 9)

13 ÷ 9 = 1 rem 4 (finite 9)

∴ 6 + 7 = 4 (finite 9)

Using a dial / clockface



∴ 6+7 = 4 (finite 9)

(ii) Add: 8 + 6 + 3 = _____ (finite 13)

(8 + 6) + 3=___ (finite 13)

17 ÷ 13 = 1 rem 4(finite 13)

∴ 8 + 6 + 3 = 4 (finite 13)

Mathematics is the Key

(iii) Workout :3 + 4 + 5 = x (finite 7)

x = 3 + 4 + 5 (finite 7)

x = 12 ÷7 (finite 7)

x = 1 rem 5 (finite 7)

x = 5 (finite 7)

(iv) Workout the following

- $5 + 8 = ___(mod\ 9)$
- $6 + 3 = ____(finite\ 7)$
- $2 + 11 + 7 = k\ (mod\ 12)$

SUB TOPIC: SUBTRACTION IN THE FINITE SYSTEM

Workout the following

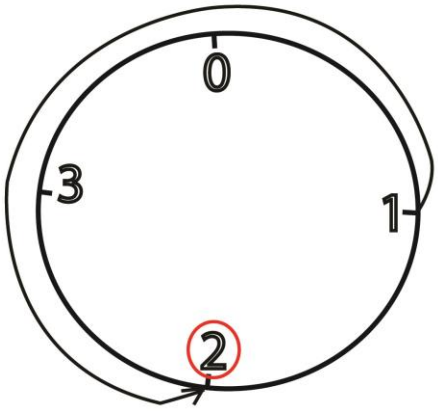
(i) 1 – 3 = ____ (finite 4)

(1 + 4) – 3___(finite 4)

5 – 3 = 2 (finite 4)

∴ 1 – 3 = 2 (finite 4)

Using a dial / clock face



∴ 1 – 3 = 2(finite 4)

(ii) $2^2 - 5 =$ ____ (finite 7)

(2 x 2) – 5 = ___ (finite 7)

4 – 5 = ___ (finite 7)

4 + 7 – 5 =___(finite 7)

11 – 5 = 6 (finite 7)

∴ 2^2 – 5 = 6 (finite 7)

(iii) $2 - 6 - 4 - 8 = ___\ (finite\ 9)$

(iv) $10 - 6 = ___(mod\ 12)$

(v) $3 - 6 = ____(mod\ 7)$

(vi) $2 - 49 = ____(finite\ 9)$

Mathematics is the Key

Examples:

Workout the following

(i) *5 x 7 = ____ (finite 9)*

5 x7 =____(finite 9)

35 ÷ 9 = 3 rem 8 (finite 9)

∴ 5 x 7 = 8 (finite 9)

(ii) 2^3 = ___(finite 7)

2^3= 2 x 2 x 2

= 4 x 2

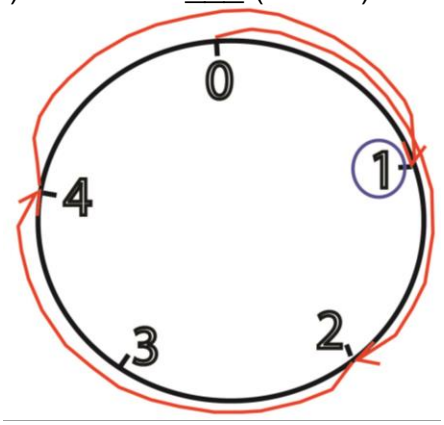
= 8

2^3= 8÷3 =1 rem 1(finite 7)

2^3= 1 rem 1(finite 7)

∴ 2^3 = 1 (finite 7)

(iii) 3 x 2 = ___ (mod 5) using a dial



∴ 3 x 2 = 1 (mod 5)

(iv) $4 \times 6 =$ _____$(mod\ 12)$

(v) $3 \times 5 =$ _____$(mod\ 7)$

(vi) $8 \times 9 =$ _____$(mod\ 4)$

(vii) $4 \times 6 =$ _____$(mod\ 9)$

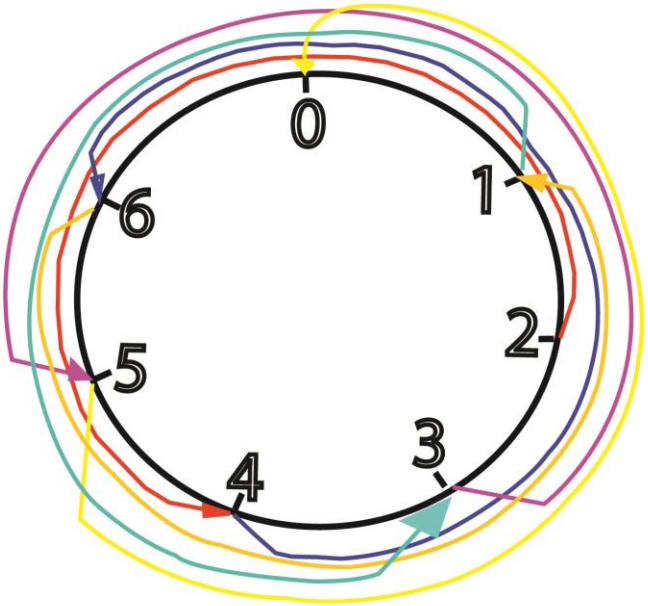
Mathematics is the Key

Example:

1. Divide 2 ÷ 5 = ___ (Mod 7)

$2 \div 5 = __ \ (mod\ 7)$
$2(mod\ 7) = \{2, 9, 16, 23, 30 \ldots\}$
$30 \div 5 = 6\ (mod\ 7)$
$\therefore\ 2 \div 5 = 6\ (mod\ 7)$

Using a dial / clock face



2. Work out the following

(a) $\mathbf{2 \div 6 = ____(mod\ 7)}$
(b) $\mathbf{4 \div 6 = ____(mod\ 5)}$
(c) $\mathbf{8 \div 11 = ____(mod\ 12)}$

SUB TOPIC: Application of finite 7 in days of the week.

(i) Today is Thursday, what day of the week will it be 82 days from today?

Thursday stands for 4
4 + 82 = ___ (finite 7)
86 = ___ (finite 7)
86 ÷ 7 = 12 rem 2 (finite 7)
2 stands for Tuesday
It will be Tuesday

Mathematics is the Key

(ii) Today is Tuesday what day of the week was it 85 days ago.

2 represents Tuesday

2 – 85 = ___ (finite 7)

85 ÷ 7 = 12 rem 1(finite 7)

85 = 1 (finite 7)

2 – 1 = 1 (finite 7)

1 stands for Monday

<u>The day was Monday.</u>

(iii) Today is Wednesday, what day of the week was it 30 days ago?

(iv) Today is Saturday, what day of the week will it be after 58 days?

SUB TOPIC: Application of finite 12 in months of the year

Digits representing specific months in the year.

JAN	FEB	MAR	APRIL	MAY	JUN	JULY	AUG	SEPT	OCT	NOV	DEC
1	2	3	4	5	6	7	8	9	10	11	0

Example:

(i) It is July now, which month of the year will it be after 2132 months?

7 represents July

7 + 2132 = __(finite 2)

2139 = __ (finite 12)

2139 ÷ 12 = 178 rem 3 (finite 12)

3 stands for March

<u>The month will be March.</u>

(ii) It is April now, which month of the year was it 346 months ago?

4 stands for April

4 – 346 = ___ (finite 12)

346÷ 12 = 28 rem 10 $(finite\ 12)$

$$\begin{array}{r} 28 \\ 12\overline{)346} \\ -24\downarrow \\ \hline 106 \\ -96 \\ \hline 10 \end{array}$$

346 = 10 (finite 12)

4 – 10 = (fin 12)

(4 + 12) – 10 =____ (finite 12)

16 – 10 = 6 (finite 12)

6 stands for June

<u>The month was June</u>

(iii) It is March now, which month of the year was it 206 months ago?

(iv) It is July now, which month of the year will it be after 2890 months?

Mathematics is the Key

SUB TOPIC: Applications of finite 12 in 12 hour clock

NOTE:

When the quotient is odd, the units will change (pm to am, am to pm)

When the quotient is even, the units will not change.

Example:

(ii) It is 7:00 am. What time will it be after nine hours from now?

7 + 9 = __ (finite 12)
16 = __ (finite 12)
16 ÷ 12 = 1 rem 4(finite 12)
It will be 4:00pm
(It will change to pm if the quotient is an odd number)

(iii) It is 11:00 pm what time will it be nineteen hours from now?

11 + 19 = __ (finite 12)
30 = __ (finite 12)
30 ÷ 12 = 2 rem 6
11+19 = 6 (finite 12)
It will be 6:00pm
(it will remain in pm since the quotient is an even number.)

(iv) Given that time now is 4:00am. What time of the day was it be 95 hours ago?

(v) Anitah travelled for 81 hour after leaving her home at 2:30pm. At what time did she arrive the final destination?

(vi) It is 7:00 am. What time will it be after 9 hours from now?

SUB TOPIC: Applying more than one finite at ago.

Example 1

Find the least number of oranges when divided by 6 or 8, there is always a remainder of 5.

4(mod 8) = {4, 12, 20, 28, 36 .....}
4(mod 6) = {4, 10, 16, 22, 28, 34 .....}
28 oranges

Mathematics is the Key

Example: 2

A Headmaster bought some pens. Teachers grouped them in groups of nines but seven pens were left and when they grouped them in groups of 8, 4 pens were left. When they grouped them in 3's only 1 pen was left. How many pens were bought by the headmaster?

7 (finite 9) = {7, 16, 25, 34, 43, 52, 61……}
4 (finite 8) = {4, 12, 20, 28, 36, 44, 52, 60….}
1 (finite 3) = {1, 4, 7, 10, 13, 16, 19, 22, 25, 28, 31,34, 37, 40, 43, 46, 49, 52, 55….}
The headmaster bought 52 pens.

Try these

- π A P.7 class teacher 2018 arranged his candidates in groups of 8, 6 remained when he grouped them in 11, only 2 remained and when he grouped them in 5, 1 pupil remained. How many candidates are in P.7 2018?

- π Find the least number of fruits when shared by 15 pupils or 18 pupils there is always a remainder of 3 fruits

SUB TOPIC: SOLVING EQUATIONS USING THE FINITE SYSTEM

Examples:

(i) x – 4 = 3 (mod 7)
x – 4 + 4 = 3 + 4)mod 7)
x + 0 = 7 (mod 7)
x = 7 ÷ 7 (mod 7)
x = 1 rem 0 (mod 7)
x = 0 (mod 7)

(ii) m + 4 = 3 (mod 5)
m + 4 – 4 = 3 – 4 (mod 5)
m + 0 = (3 + 5) – 4 (mod 5)
m = 8 – 4 (mod 5)
m = 4 (mod 5)

(iii) 2x – 3 = 3 (finite 4)
2x – 3 + 3 = 3 + 3 (finite 4)
2x + 0 = 6 (finite 4)
$\frac{2x}{2} = \frac{6}{2}$ ***(finite 4)***
x = 3 (finite 4)

Mathematics is the Key

(iv) 2(2x – 1) = 4 (finite 7)

2 x 2x – 1 x 2 = 4 (finite) 7)

4x – 2 = 4 (finite 7)

4x – 2 + 2 = 4 + 2 (finite 7)

4x = 6 (finite 7)

4x = 6 + 7 (finite 7)

4x = 13 + 7 (fin 7)

$$\frac{4x}{4} = \frac{20^{5}}{4_{1}}$$

X = 5

Try these

Solve the following

(a) $p + 2 = 4\ (finite\ 5)$

(b) $3\ (m - 2) = 1\ (finite\ 5)$

(c) $\frac{3y + 6}{5} = 2\ (finite\ 5)$

(d) $2(2k - 1) = 4\ (mod\ 7)$

(e) $3y = 4\ (finite\ 7)$

TOPICAL TEST

1. Find the additive inverse of the following
   a) -5
   b) 4
   c) -12
2. Work out the following without a number line
   a) -6 +- 2
   b) +5- ¯6
   c) -3 x -5
3. Workout the following using a number line
   a) -4 + ⁺5
   b) 6 - ¯3
   c) +3 x ¯ 4
4. Evaluate 33 = ___ (mode 7)
5. Write the equivalent numbers of 3(finite 5)
6. Simplify: 2 – 4 = ___ (finite 5)
7. Simplify : 5 x 6 = ___(finite 7)
8. Solve (i) y – 5 = 4 (finite 5)
   (ii) 2(x – 2) = 3 (finite 6)
9. Divide 1÷ 5 = __ (finite 6)
10. Today is Tuesday. What day of the week will it be after 46 days?
11. Today is Friday. What day of the week was it 37 days ago?
12. Find the least number when divided by 12 or 15 leaves 6 as a remainder

Mathematics is the Key

ALGEBRA

SUB TOPIC: algebraic phrases and expressions

PHRASE	EXPRESSION
Sum of p and q	$p+q$
Multiply h by six	$6\times h=6h$
Add five to b	$b+5$
Subtract p from x	$x-p$
Divide y by five	$\frac{y}{5}$
Two more than p	$p+2$
P more than three	$3+p$
Five less than k	$k-5$
K less than six	$6-k$
Double p	$p+p=2p$
Triple f	$f+f+f=3f$
Twice d	$2\times d=2d$
Three times w	$w\times 3=3w$
Two years younger than h	$(h-2)years$
Five years older than k	$(k+2)years$
Double m and add 9 to the result	$2m+9$
Square of n	$n\times n=n^2$
Square root of m	$\sqrt[2]{m}$

SUB TOPIC: SUBSTITUTITON

1. $If\ a=5, b=4\ and\ c=0$
$Find\ the\ value\ of\ a+b+c$
$5+4+0$
$9+0$
9

1. $Given\ that\ x=2\ and\ y=-2$
$Evaluate\ x-y$
$(x)-(y)$
$2-(-2)$
$2+2$
4

2. $Given\ a=\frac{3}{4}, b=\frac{1}{3}. Find\ the\ value\ of\ a+b$
$(a)+(b)$
$\frac{3}{4}+\frac{1}{3}$
$\frac{9+4}{12}$
$\frac{13}{12}$
$1\frac{1}{12}$

3. $4. If\ y=2,$
$(a). what\ is\ the\ value\ of\ 3y^2?$
$3y^2=3\times y\times y$
$=3\times 2\times 2$
$=3\times 4$
$=12$
$(b) what\ is\ the\ value\ of\ (3y)^2?$
$(3y)^2=3y\times 3y$
$=3\times 2\times 3\times 2$
$=6\times 6$
$=36$

4. $Given\ that\ a=3, b=4\ and\ c=5$
$(a). What\ is\ 3a\ x\ 3b$
$(b) What\ is\ c\ (b-a)$
5. $If\ m=2, what\ is\ the\ value\ of\ m^6?$
6. $If\ a=½, c=\frac{2}{3}\ and\ d=¼. Evaluate\ ac+d$
7. $If\ m=4, n=3\ and\ p=2, what\ is\ \frac{n^3\ x\ m^2}{mp}$

Mathematics is the Key

SUB TOPIC: Collecting and simplifying like terms

Examples:

1. $a + a + a = 3a$

2. $2p + 3p + p = 6p$

3. $2ab + ab + 5ab = 8ab$

4. $x + y + x + y + x$
   $x + x + x + y + y$
   $3x + 2y$

5. $3p - 6f - p + 2f$
   $3p - p + 2f - 6f$
   $2p - 4f$

   Simplify the following

   (a) $2m + m + 4m$

   (b) $6k + 4p - 3k - 5p$

   (c) $2xy - y + 5xy - y$

SUB TOPIC: Addition and subtraction

1. **Simplify the following**

   (a) $\frac{2m}{3} + \frac{m}{2}$

   $\frac{\mathbf{2m}}{\mathbf{3}} \times \frac{\mathbf{2}}{\mathbf{2}} + \frac{\mathbf{m}}{\mathbf{2}} \times \frac{\mathbf{3}}{\mathbf{2}}$

   $\frac{\mathbf{4m}}{\mathbf{6}} + \frac{\mathbf{3m}}{\mathbf{6}}$

   $\frac{\mathbf{4m + 3m}}{\mathbf{6}}$

   $\frac{\mathbf{7m}}{\mathbf{6}}$

   $\mathbf{1\frac{1}{6}m}$

   (b) $\boldsymbol{p - \frac{p}{3}}$

   $\frac{p}{1} - \frac{p}{3}$

   $\frac{\frac{p}{1} \times 3 - \frac{p}{3} \times 3}{3}$

   $\frac{3p - p}{3}$

   $\frac{2p}{3}$

2. Simplify the following

   (a) $\frac{3d}{4} + d + \frac{d}{2}$

   (b) $\frac{3r}{7} - \frac{2r}{6} + \frac{r}{4}$

SUB TOPIC: multiplication and division

1. **Simplify the following.**

   (a) $\frac{3k}{7} \times \frac{1}{6}$

   $\frac{\mathbf{3k}}{\mathbf{7}} \times \frac{\mathbf{1}}{\mathbf{6}}$

   $\frac{\mathbf{3k}}{\mathbf{42}}$

   $\frac{\boldsymbol{k}}{\mathbf{14}}$

   (b) $\frac{4m}{11} \div \frac{m}{15}$

   $\frac{\mathbf{4m}}{\mathbf{11}} \div \frac{\boldsymbol{m}}{\mathbf{15}}$

   $\frac{\mathbf{4m}}{\mathbf{11}} \times \frac{\mathbf{15}}{\boldsymbol{m}}$

   $\frac{\mathbf{60}}{\mathbf{11}}$

   $\mathbf{5\frac{5}{11}}$

   (c) $\frac{6x}{9} \times \frac{1}{2} \div \frac{x}{4}$

   (d) $\frac{3b}{13} \times \frac{3b}{5}$

Mathematics is the Key

SUB TOPIC: Removing brackets

REMEMBER:

- *When removing brackets, multiply the factor by every term inside brackets.*
- *A negative integer before brackets affects every sign inside brackets.*
- *A positive integer before brackets cannot affect the signs inside brackets.*

Remove the brackets and simplify.

Example:

1. $3(x + y)$

   $3(x + y)$

   $\underline{3x + 3y}$

2. $2(a - b)$

   $2(a - b)$

   $\underline{2a - 2b}$

3. $\mathbf{4(2x - 6)}$
4. $\mathbf{-9(m - 4)}$

5. $Add: x + 4 \ to \ x + 1$

   $(x + 4) + (x + 1)$

   $X + 4 + x + 1$

   $X + x + 4 + 1$

   $\underline{2x + 5}$

6. $Subtract \ y - 1 \ from \ 2y + 3$

   $(2y + 3) - (y - 1)$

   $2y + 3 - y + 1$

   $2y - y + 3 + 1$

   $\underline{y + 4}$

7. $Add. x - 4 \ to \ 3x - 5$
8. $Subtract \ 3p - 1 \ from \ 5p - 3$
9. $Find \ the \ supplement \ of \ (x - 20)°$

SUB TOPIC: Removing brackets involving fractions

Example:

Remove brackets and simplify

1. $\frac{1}{3}(3a + 9b)$

   $\frac{1}{3}(3a + 9b)$

   $(\frac{1}{3} \times 3a) + (\frac{1}{3} \times 9b)$

   $\underline{a + 3b}$

2. $\frac{3}{4}(8m - 12p)$

   $\frac{3}{4} \times 8m - \frac{3}{4} \times 12p$

   $3 \times 2m - 3 \times 3p$

   $\underline{6m - 9p}$

3. $Half \ of \ (2x + 4y) \ plus \ a \ third \ of \ (6x + 9y)$

   $\frac{1}{2}(2x + 4y) + \frac{1}{3}(6x + 9y)$

   $\frac{1}{2} \times 2x + \frac{1}{2} \times 4y + \frac{1}{3} \times 6x + \frac{1}{3} \times 9y$

   $x + 2y + 2x + 3y$

   $x + 2x + 2y + 3y$

   $\underline{3x + 5y}$

Mathematics is the key

4. $Subtract\ \frac{1}{2}(4x - 2y)\ from\ \frac{1}{3}(6x - 9y)$

$\frac{1}{3}(6x - 9y) - \frac{1}{2}(4x - 2y)$

$\frac{1}{3}\ x\ 6x - \frac{1}{3}\ x\ 9y - \frac{1}{2}\ x\ 4x + \frac{1}{2}\ x\ 2y$

$2x - 3y - 2x + y$

$2x - 2x - 3y + y$

$\underline{-2y}$

5. $Subtract\ \frac{2}{3}(6x - 3y)\ from\ \frac{1}{4}(8x - 12y)$
6. Remove brackets and simplify. $\frac{2}{5}(5x + 15y) - \frac{1}{6}(12x - 24y)$

SUB TOPIC: *POWERS or INDICES(Addition and subtraction with powers)*

Example:

Simplify the following

1. $\mathbf{2^2 + 2^4}$

$(2\ x\ 2) + (2\ x\ 2\ x\ 2\ x\ 2)$

$2\ x\ 2 + 2\ x\ 2\ x\ 2\ x\ 2$

$\underline{20}$

2. $\boldsymbol{p^2 + p^2}$

$p^2 + p^2$

$\underline{2p^2}$

3. $\mathbf{3m^3 + 4m^3}$

$3m^3 + 4m^3$

$\underline{7m^3}$

4. $\mathbf{3p^2 - 2p^3}$

$3p^2 - 2p^3 (they\ are\ unlike\ terms)$

5. $\mathbf{4m^2 - m^2}$
6. $\mathbf{20k^4 + 17k^4}$
7. $\boldsymbol{b^5 - b^3}$

SUB TOPIC: POWERS or INDICES (multiplication of powers with similar bases)

NOTE:
When multiplying powers with similar bases, write a single base and add the powers.

Example:

Simplify the following

a) $4^3\ x\ 4^2$

$\mathbf{4 \times 4 \times 4 \times 4 \times 4}$

$\mathbf{4^5}$

OR

$\mathbf{4^3\ x\ 4^2}$

$\mathbf{4^{3+2}}$

$\mathbf{4^5}$

b) $x^3 \times x^2$

$\boldsymbol{x \times x \times x \times x \times x}$

$\boldsymbol{x^5}$

OR

$\boldsymbol{x^3 \times x^2}$

$\boldsymbol{x^{3+2}}$

$\boldsymbol{x^5}$

Simplify the following

(a) $\boldsymbol{m^2 \times m \times m^4}$

(b) $\mathbf{3^2 \times 3^5}$

(c) $\boldsymbol{b^7 \times b^6}$

Mathematics is the Key

SUB TOPIC: *POWERS or INDICES*
(Division of powers with similar bases)

NOTE:
When dividing powers with similar bases, write a single base and subtract the powers.

Example:
Simplify the following.

1. $3^4 \div 3^2$

$$\frac{3 \times 3 \times 3 \times 3}{3 \times 3}$$
$$3^2$$

OR

$$3^4 \div 3^2$$
$$3^{4-2}$$
$$\underline{\underline{3^2}}$$

2. $p^8 \div p^2$

$$\frac{p \times p \times p \times p \times p \times p \times p \times p}{p \times p}$$
$$p \times p \times p \times p \times p \times p$$
$$p^6$$

OR

$$p^8 \div p^2$$
$$p^{8-2}$$
$$p^6$$

3. $n^7 \div n^9$

$$\frac{n \times n \times n \times n \times n \times n \times n}{n \times n \times n \times n \times n \times n \times n \times n \times n}$$
$$\frac{1}{n \times n}$$
$$\frac{1}{n^2}$$
$$n^{-2}$$

OR

$$n^7 \div n^9$$
$$n^{7-9}$$
$$n^{-2}$$

4. **Simplify the following**
   - **(a).** $m^2 \div m$
   - **(b).** $3^2 \div 3^5$
   - **(c).** $b^3 \div b^6$

SUB TOPIC: *POWERS or INDICES*
(Multiplication and Division of powers with similar bases)

1. Simplify the following.

i. $\frac{k^4 \times k^3}{k^5}$

$$(k^4 \times k^3) \div k^5$$
$$(k^{4+3}) \div k^5$$
$$k^7 \div k^5$$
$$k^{7-5}$$
$$k^2$$

ii. $\frac{w^3 \times w^0 \times w^6}{w^{10}}$

iii. $\frac{p^5 \times p^3}{p^4}$

Mathematics is the Key

SUB TOPIC: POWERS or INDICES (Solving for un known powers)

1. Solve for the unknowns

(a) $2^x = 8$

$2^x = 8$

$2^x = 2^3$

$\underline{x = 3}$

2	8
2	4
2	2
	1

$8 = 2^3$

(b) $3^m \times 3^2 = 81$

$3^m \times 3^2 = 81$

$3^{m+2} = 3^4$

$m + 2 = 4$

$m + 2 - 2 = 4 - 2$

$\underline{m = 2}$

3	81
3	27
3	9
3	3
	1

$81 = 3^4$

(c) $4^{2x} \div 16 = 64$

$4^{2x} \div 16 = 64$

$4^{2x} \div 4^2 = 4^3$

$4^{2x-2} = 4^3$

$2x - 2 = 3$

$2x - 2 + 2 = 3 + 2$

$2x = 5$

$\frac{2x}{2} = \frac{5}{2}$

$x = 2\frac{1}{2}$

4	64
4	16
4	4
	1

$64 = 4^3$

4	16
4	4
	1

$16 = 4^2$

(d) $5^k = 125$

(e) $2^{m+4} \times 8 = 1$

SUB TOPIC: Solving simple equations.

Example: Solve the following equations

a) $\boldsymbol{x + 5 = 13}$

$\boldsymbol{x + 5 - 5 = 13 - 5}$

$\underline{\boldsymbol{x = 8}}$

b) $\boldsymbol{2x + 6 = 18}$

$\boldsymbol{2x + 6 - 6 = 18 - 6}$

$\boldsymbol{2x = 12}$

$\boldsymbol{\frac{2x}{2} = \frac{12}{2}}$

$\underline{\boldsymbol{x = 6}}$

c) $\boldsymbol{y - 3 = 5}$

$\boldsymbol{y - 3 + 3 = 5 + 3}$

$\underline{\boldsymbol{y = 8}}$

d) $\boldsymbol{3a - 8 = 7}$

$\boldsymbol{3a - 8 + 8 = 7 + 8}$

$\boldsymbol{3a = 15}$

$\boldsymbol{\frac{3a}{3} = \frac{15}{3}}$

$\underline{\boldsymbol{a = 5}}$

e) $\boldsymbol{6m = 24}$

f) $\boldsymbol{5k - 3 = 37}$

g) $\boldsymbol{4 - x = 7}$

h) $\boldsymbol{16 = 9 + 2p}$

Type equation here.

SUB TOPIC: Solving equations involving brackets.

Solve the following equations

a) $2(m + 4) = 20$

$\boldsymbol{2(m + 4) = 20}$

$\boldsymbol{2m - 8 = 20}$

$\boldsymbol{2m - 8 + 8 = 20 + 8}$

$\boldsymbol{2m = 28}$

$\boldsymbol{\frac{2m}{2} = \frac{28}{2}}$

$\underline{\boldsymbol{m = 14}}$

b) $2(k - 2) - 3(k - 4) = -10$

$\boldsymbol{2(k - 2) - 3(k - 4) = -10}$

$\boldsymbol{2k - 4 - 3k + 12 = -10}$

$\boldsymbol{2k - 3k - 4 + 12 = -10}$

$\boldsymbol{-k + 8 = -10}$

$\boldsymbol{-k + 8 - 8 = -10 - 8}$

$\boldsymbol{-k = -18}$

$\boldsymbol{\frac{-k}{-1} = \frac{-18}{-1}}$

$\underline{\boldsymbol{k = 18}}$

c) $6(z - 4) = 0$

d) $3x - (2 - x) = 14$

e) $5(m - 2) + 6(m - 3) = 16$

Mathematics is the Key

SUB TOPIC: Solving equations involving fractions

When solving fractional equations, multiply the LCD (LCM of the denominators) on each algebraic term.

Solve the following equations

1. $\frac{1}{2}p = 6$

$$\frac{1}{2}p = 6$$
$$LCD = 2$$
$$2 \times \frac{p}{2} = 6 \times 2$$
$$\underline{p = 12}$$

2. $\frac{13t}{3} + 2 = 15$

$$\frac{13t}{3} + \frac{2}{1} = \frac{15}{1}$$
$$LCD = 3$$
$$3 \times \frac{13t}{3} + \frac{2}{1} \times 3 = \frac{15}{1} \times 3$$
$$13t + 6 = 45$$
$$13t + 6 - 6 = 45 - 6$$
$$13t = 39$$
$$\frac{13t}{13} = \frac{39}{13}$$
$$\underline{t = 13}$$

3. $0.4P + 0.5 = 2.1$

$$\frac{4P}{10} + \frac{5}{10} = \frac{21}{10}$$
$$10 \times \frac{4P}{10} + \frac{5}{10} \times 10 = \frac{21}{10} \times 10$$
$$4p + 5 = 21$$
$$4p + 5 - 5 = 21 - 5$$
$$4p = 16$$
$$\frac{4p}{4} = \frac{16}{4}$$
$$\underline{P = 4}$$

4. $3x + 7 - \frac{3x}{4} = 10$

$$\frac{3x}{1} + \frac{7}{1} - \frac{3x}{4} = \frac{10}{1}$$
$$LCD = 4$$
$$4 \times \frac{3x}{1} + \frac{7}{1} \times 4 - \frac{3x}{4} \times 4 = \frac{10}{1} \times 4$$
$$12x + 28 - 3x = 40$$
$$12x - 3x + 28 = 40$$
$$9x + 28 = 40$$
$$9x + 28 - 28 = 40 - 28$$
$$\frac{9x}{9} = \frac{12}{9}$$
$$x = 1\frac{1}{3}$$

5. $\frac{3m}{4} = 9$
6. $\frac{2p}{3} - p = 5$
7. $\frac{2k}{5} + k = 12$
8. $1.5y - 2.5 = 5.0$
9. $2p - 5 - \frac{3p}{5} = 10$

Mathematics is the Key

SUB TOPIC: Solving more equations involving fractions.

Examples:

Solve the following equations

1. $\frac{m+1}{3} + \frac{m}{4} = 2$

$$\frac{\boldsymbol{m+1}}{\boldsymbol{3}} + \frac{\boldsymbol{m}}{\boldsymbol{4}} = \boldsymbol{2}$$

$$\boldsymbol{LCD = 12}$$

$$\boldsymbol{12 \times \frac{m+1}{3} + \frac{m}{4} \times 12 = 2 \times 12}$$

$$\boldsymbol{4(m+1) + m \times 3 = 2 \times 12}$$

$$\boldsymbol{4m + 4 + 3m = 24}$$

$$\boldsymbol{4m + 3m + 4 = 24}$$

$$\boldsymbol{7m + 4 = 24}$$

$$\boldsymbol{7m + 4 - 4 = 24 - 4}$$

$$\boldsymbol{7m = 20}$$

$$\boldsymbol{\frac{7m}{7} = \frac{20}{7}}$$

$$\boldsymbol{m = 2\frac{6}{7}}$$

2. $\frac{(3x+1)}{4} = \frac{(x+2)}{2}$

$$\frac{(3x+1)}{4} = \frac{(x+2)}{2}$$

$$LCD = 4$$

$$4 \times \frac{(3x+1)}{4} = \frac{(x+2)}{2} \times 4$$

$$3x + 1 = 2(x + 2)$$

$$3x + 1 = 2x + 4$$

$$3x + 1 - 1 = 2x + 4 - 1$$

$$3x = 2x + 3$$

$$3x - 2x = 2x - 2x + 3$$

$$\underline{x = 3}$$

3. $\frac{3x-1}{4} = = \frac{7x+1}{6}$

4. $\frac{w-5}{3} - w = \frac{2w+4}{5}$

5. $\frac{3}{k+3} = \frac{2}{2k-5}$

SUB TOPIC: *Solving equations involving squares and square roots*

Examples:

Solve the following equations

1. $m^2 - 4 = 21$

$$\boldsymbol{m^2 - 4 = 21}$$

$$\boldsymbol{m^2 - 4 + 4 = 21 + 4}$$

$$\boldsymbol{m^2 = 25}$$

$$\boldsymbol{\sqrt{m^2} = \sqrt{25}}$$

$$\underline{\boldsymbol{m = 5}}$$

2. $\frac{1}{2} p^2 = 8$

$$\tfrac{1}{2}\boldsymbol{p^2 = 8}$$

$$\boldsymbol{2 \times \frac{p^2}{2} = 8 \times 2}$$

$$\boldsymbol{p^2 = 16}$$

$$\boldsymbol{\sqrt{p^2} = \sqrt{16}}$$

$$\underline{\boldsymbol{p = 4}}$$

3. $\sqrt{2k} = 14$

$$\boldsymbol{\sqrt{2k} = 14}$$

$$\boldsymbol{\sqrt{2k}^2 = 14^2}$$

$$\boldsymbol{2k = 196}$$

$$\boldsymbol{\frac{2k}{2} = \frac{196}{2}}$$

$$\underline{\boldsymbol{k = 98}}$$

4. $\frac{1}{4} x^2 = 16$

$$\tfrac{1}{4}\boldsymbol{x^2 = 16}$$

$$\boldsymbol{4 \times \frac{x^2}{4} = 16 \times 4}$$

$$\boldsymbol{x^2 = 64}$$

$$\boldsymbol{\sqrt[2]{x^2} = \sqrt[2]{64}}$$

$$\underline{\boldsymbol{x = 8}}$$

5. $\boldsymbol{b^2 = 49}$

6. $\boldsymbol{6m^2 = 54}$

7. $\boldsymbol{2w^2 - 18 = 224}$

8. $\boldsymbol{\frac{2p^2}{3} = 54}$

Mathematics is the Key

Example:

1. Baker bought 2kg of suagr at sh. 3p and 1kg of salt at sh (p + 200). Find P if Baker paid sh 3700.

The cost of 2kg of sugar is

$\boldsymbol{sh\ (2\ x\ 3p) = sh\ 6p}$

The cost of 1kg of salt is

$\boldsymbol{sh\ (p\ +\ 200)}$

$$\boldsymbol{Sh6p + sh.p + shs.200 = shs.3700}$$
$$\boldsymbol{Sh7p + sh.200 = sh.3700}$$
$$\boldsymbol{Sh7p + sh.200 - shs.200 = sh.3700 - sh.200}$$
$$\boldsymbol{Sh.7p\ =\ sh.3500}$$
$$\boldsymbol{\frac{Sh.7p}{sh.7} = \frac{sh.3500}{sh.7}}$$
$$\boldsymbol{\underline{p = 500}}$$

2. **In a market, the cost of a pawpaw is sh.800 more than the cost of a mango. A mango costs two thirds the cost of a pine apple. The total cost of three fruits is sh 4300. Calculate the cost of a pineapple.**

Let the cost of a pineapple be m

pawpaw	*pineapple*	*mango*
$\frac{2}{3}m + sh.800$	m	$\frac{2}{3}m$

$$\boldsymbol{m + \frac{2}{3}m + \frac{2}{3}m + sh.800 = sh.4,300}$$
$$\boldsymbol{\frac{m}{1} + \frac{2m}{3} + \frac{2m}{3} + \frac{sh.800}{1} = \frac{sh.4,300}{1}}$$
$$\boldsymbol{\frac{m}{1} \times 3 + \frac{4m}{3} \times 3 + \frac{sh.800}{1} \times 3 = \frac{sh.4300}{1} \times 3}$$
$$\boldsymbol{3m + 4m + sh.2,400 = sh.12,900}$$
$$\boldsymbol{7m + sh.2,400 = sh.12,900}$$
$$\boldsymbol{7m + sh.2,400 - sh.2,400 = sh.12,900 - sh.2,400}$$
$$\boldsymbol{7m = sh.10,500}$$
$$\boldsymbol{\frac{7m}{7} = \frac{sh.10,500}{7}}$$
$$\boldsymbol{\underline{m = sh.1,500}}$$

Mathematics is the Key

3. **A cup costs twice as much as a fork and a plate costs sh.600 more than a fork. If the total cost of all the three items is sh.3600, find the cost of each item.**

4. **James, Joan and Peter shared a certain amount of money. James got three times as much as Peter. Joan got sh.900 more than Peter. If Peter and James got sh.2,800, how much did Joan get?**

SUBTOPIC: Application of algebra in ages

Examples.

1. **Amon is twice as old as Bob. If their total age is 33 years. How old is each?**

Let Bob's age be A

Amon	Bob	TL
$2A$	A	33years

$$2A + A = 33$$
$$3A = 33$$
$$\frac{3A}{3} = \frac{33}{3}$$
$$A = 11years$$

Amon	Bob
$2A$ $2 \times 11 = 22yrs$	A $11years$

2. **A father is 18years older than his son. In 5 years ,their total age will be 48years. How old is each?**

Let the son's age be m

	father	son	TL
now	$m + 18$	m	
then	$m + 18 + 5$	$m + 5$	$48years$

$$m + 18 + 5 + m + 5 = 48years$$
$$m + m + 18 + 10 = 48years$$
$$2m + 28 = 48years$$
$$2m + 28 - 28 = 48 - 28$$
$$2m = 20$$
$$\frac{2m}{2} = \frac{20}{2}$$
$$\underline{m = 10years}$$

father	son
$m + 18$ $10 + 18 = 28yrs$	$10years$

Mathematics is the Key

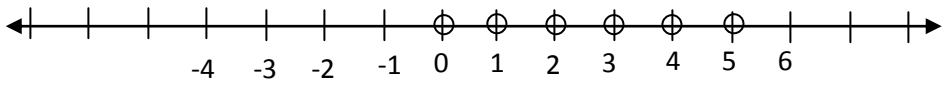
3. Alex is 15 years older than Moses. If their total age is 40 years, how old is each?
4. Jacob is 10 years younger than Jerome. Six years ago, Jerome was twice as old as Jacob. How old is Jacob?
5. A son is a half of his mother's age while the daughter is a third of his mothers age. If the total age of the son and the daughter is 30 years, how old is the mother?
6. January is a third as old as March. Four years ago the ratio of their age was 1:5.How old is each now?

SUB TOPIC: Writing solution sets

Examples:

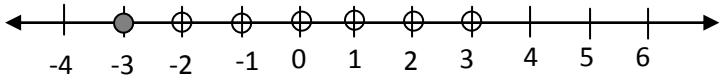
1. Write down the integers for the following inequalities.

(i) $x < 6$



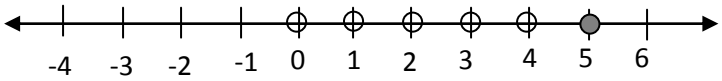
$x = \{5,4,3,2,1,0,-1 \ldots.\}\ (infinite\ set)$

(ii) $m \geq -3$



$m = \{-3,-2,-1,0,1,2 \ldots.\}\ (infinite\ set)$

(iii) $k \leq 5 (where\ k\ is\ a\ whole\ number)$



$k = \{5,4,3,2,1,0\}$

2. Write the solution sets for the following

h≥ 9

b< −4

y≤ −5

Mathematics is the Key

When diving by a negative co-efficient, the sign changes at the step of division.

Examples:

Solve the following and write the solution set

1. $4X > 20$

$4X > 20$

$\frac{4X}{4} > \frac{20}{4}$

$X > 5$

$X = \{6, 7, 8, 9, 10 \ldots.\}$

2. $-4m > 20$

$-4m > 20$

$\frac{-4m}{-4} < \frac{20}{-4}$

$m < -5$

$\boldsymbol{m} = \{\boldsymbol{-6}, \boldsymbol{-7}, \boldsymbol{-8}, \boldsymbol{-9} \ldots\}$

3. $3x + 6 < 9$

$3x + 6 - 6 < 9 - 6$

$3x < 3$

$\frac{3x}{3} < \frac{3}{3}$

$X < 1$

$x = \{0, -1, -2, -3, \ldots.\}$

4. $\frac{x}{7} - 5 > -4$

$\frac{x}{7} - 5 > -4$

$7 \times \frac{x}{7} - 5 \times 7 > -4 \times 7$

$x - 35 > -28$

$x - 35 + 35 > -28 + 35$

$x > 7$

$x = \{8, 9, 10, 11, \ldots.\}$

Mathematics is the Key

Solve the following and write the solution sets

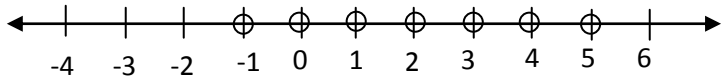
a) $5m < 20$
b) $6p > -18$
c) $2(x + 1) > 4$
d) $3(2x + 3) < 18$
e) $3y + 2 < 11$
f) $4 - k \geq 9$
g) $\frac{2w}{3} - 12 > 0$

SUB TOPIC: Compound inequalities(writing solution sets)

Examples

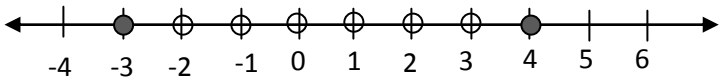
1. Write the solution set for

(a) $-2 < d < 6$



$d = \{-1,0,1,2,3,4,5\}$

(b) $4 \geq m \geq -3$



$m = \{-3, -2, -1,0,1,2,3,4\}$

(c) $-6 < w < 2$
(d) $1 < p < 9$
(e) $7 > x - 4$

SUB TOPIC: Solving and writing solution sets with compound inequalities.

Examples

Solve the following and write the solution sets

1. $8 > 2x > 2$

$8 > 2x > 2$

$\frac{8}{2} > \frac{2x}{2} > \frac{2}{2}$

$4 > x > 1$

$x = \{2,3\}$

Mathematics is the Key

2. $12 < -3x < 24$

$\mathbf{12} < -3\boldsymbol{x} < 24$

$\frac{\mathbf{12}}{\mathbf{-3}} > \frac{\mathbf{-3x}}{\mathbf{-3}} > \frac{\mathbf{24}}{\mathbf{-3}}$

$\mathbf{-4} > x > -8$

$\underline{\boldsymbol{x} = \{-5, -6, -7\}}$

3. $13 \geq 3x - 2 \geq 4$

$\mathbf{13} \geq \mathbf{3x - 2} \geq \mathbf{4}$

$\mathbf{13 + 2} \geq \mathbf{3x - 2 + 2} \geq \mathbf{4 + 2}$

$\mathbf{15} \geq \mathbf{3x} \geq \mathbf{6}$

$\frac{\mathbf{15}}{\mathbf{3}} \geq \frac{\mathbf{3x}}{\mathbf{3}} \geq \frac{\mathbf{6}}{\mathbf{3}}$

$\mathbf{5} \geq \boldsymbol{x} \geq \mathbf{2}$

$\underline{\boldsymbol{x} = \{2, 3, 4, 5\}}$

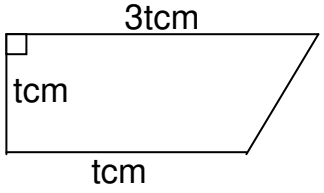
4. $12 > 3m > 3$
5. $15 \leq -5m \leq 40$
6. $-12 \geq 6b > 18$

TOPICAL WORK ON ALGEBRA

1. $Solve: x + 4x = 5$
2. $Find\ the\ value\ of\ \frac{5a - (m - a)}{a}\ when\ a = 3\ and\ m = 6$
3. Solve for b in $\frac{3}{5}(2b - 3) = 3$
4. If $\frac{1}{6}x = 1$. Find the value of x.
5. Solve $\frac{2x + 2}{3} = \frac{x + 3}{2}$
6. What is the value of $\frac{bc-d}{c^2}$ when b = 8, c = 3 and d = 6?
7. Solve: $x - 1 = 2x + 5$
8. Simplify: $(3x + 5) - (x + 1)$
9. Solve: ½ $(3y - 2) = \frac{2}{3}(2y + 3)$
10. Solve: $3(p - 4) - 2(3p - 1) = 2p - 15$
11. Simplify: $(4p - 3q) - (2q + p)$
12. Solve: $\frac{12}{x} + 2 = 6$

Mathematics is the Key

13. The area of the trapezium is 50cm^2. Find the value of t.



14. Given that a = ½, b = $\frac{1}{3}$ and c = ¼ .Find the value of $b + 2c + 3a$.

15. Subtract $2x - 4$ $from$ $5x - 4$

16. Zahara's mother bought 8 books at shs $(x - 150)$ each and 2 Mathematical sets at $sh(x + 100)$ each. She spent shs 5300 altogether. Find the amount of money spent on books.

17. Tom has three daughters; Amanda, Brenda and Kate. Brenda is 2 years younger than Amanda, Kate's age is ½ that of Brenda. The total age of the three girls is 27 years. How old is Kate?

18. Find the solution set for the following inequalities:

(i) $x > 3$ $(ii)x < -5$ $(iii)x < 2$

$(iv)x > 2$ $(v)x < 4$

(ii) Solve and give the solutions for x.

(i) $-3x < -9$ (ii)$-30 < 6x$

(iii) $3x + 2 < 11$ (iv) $4x - 5 < 19$

(iii) Solve and find the solution set for y.$\frac{y}{3} + 4 < 6$

(iv) Solve the inequality below:

$8 > 2x > -4$

Mathematics is the Key

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P.7 MATHEMATICS

TERM ONE

Mathematics is the Key

- THEME: **SETS**

❖ **SET CONCEPTS**……8

- Finite and infinite sets
- Describing parts of a venn diagram
- Listing elements from a venn diagram
- Representing sets on venn diagrams
- Subsets
- Number of elements in a venn diagram
- Solving problems using a venn diagram[i]
- Application of sets
- Revision questions

- **THEME:NUMERACY**

❖ **WHOLE NUMBERS**……20

- Forming numerals from digits
- Place values and values of numbers up to hundred millions
- Writing in words
- Writing in figure
- Expanded form
- Standard form
- Rounding off
- Roman numerals

- **BASES**……26

- Basic names of bases
- Place values and values of bases
- Converting from non decimal bases to decimal bases
- Converting from decimal bases to non decimal bases
- Converting from non decimal bases to non decimal bases
- Addition of bases
- Subtraction of bases
- Multiplication of bases
- Division of bases
- Solving for unknown bases

❖ **OPERATION ON WHOLE NUMBERS**.....32
- Addition of big numbers
- Subtraction of big numbers
- Multiplication of big numbers
- Division of big numbers
- Distributive property
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- Associative property
- Laws of indices
- Application of indices

❖ **NUMBER PATTERNS AND SEQUENCES**.....37
- Divisibility tests
- Types of numbers
- Finding sum of consecutive counting numbers using the formula
- Factors and multiples
- Prime factorisation
- LCM and HCF
- Application of LCM and HCF
- Consecutive numbers
- Squares and square roots
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TERM TWO

❖ **FRACTIONS**.....49
- Addition and subtraction of fractions
- Multiplication of fractions
- Division of fractions
- Mixed operation on fractions (using BODMAS)
- Application of fractions
- Application of fractions involving "of the remainder"
- Application of fractions involving "taps"

• **DECIMALS**
- Changing vulgar fractions to decimals
- Changing non recurring decimals to vulgar fractions
- Changing recurring decimals to vulgar fractions
- Addition and subtraction of decimals
- Multiplication of decimals
- Division of decimals
- Mixed operations

Mathematics is the Key

- Application of decimals
- **RATIOS AND PROPORTIONS**.....60
- Expressing quantities as ratios
- Sharing in ratios
- Solving problems on ratios
- Increase and decrease in ratios
- Finding ratio of increase and decrease
- Finding numbers increased in ratio
- Finding numbers decreased in ratios
- Direct proportions
- Inverse proportions
- **PERCENTAGES**.....66
- Expressing quantities as percentages
- Expressing one quantity as a percentage of another
- Forming and solving equations
- Increasing or decreasing quantities using percentages
- Finding percentage of increase and decrease
- Finding original numbers after increase
- Finding original numbers after decrease
- Percentage increase and decrease
- Percentage profit and loss
- Finding selling price(SP) when cost price (CP) percentage profit or loss are given
- Finding cost price(CP) when given selling price (SP) and percentage profit.
- Finding cost price(CP) when given selling price (SP) and percentage loss.
- Mixed application of profit and loss
- Finding discount
- Percentage discount
- Finding marked price when given percentage discount and cash price
- Finding simple interest
- Finding rate
- Finding time
- Finding principal
- More about simple interest

❖ **INTEGERS**.....85

- Arranging and ordering integers using a number line
- Addition and subtraction of integers with and without a number line.
- Multiplication of integers with and without a number line.
- Division of integers with and without a number line.
- Writing mathematical statements / sentences

Mathematics is the Key

- **FINITE / MODULAR SYSTEM**
  - Writing numbers in finite system
  - Equivalences in finite system
  - Addition in finite system
  - Subtraction in finite system
  - Multiplication in finite system
  - Division in finite system
  - Application of finite system in days of the week.
  - Application of finite system in 12 and 24 hour time.
  - Application of finite system in months of the year.
  - Applying more than one finite in solving problems
  - Solving equations

THEME:INTERPRETATION OF GRAPHS AND DATA

DATA HANDLING……99

- Revision about graphs
- Solving problems on pie charts
- Construction of pie charts
- Measures of central tendency and range (statistics)
- Complex mean / average
- Probability
- Plotting coordinates
- Plotting and joining coordinates
- Completing tables using equation of line
- Drawing lines for given ordered pairs

THEME:GEOMETRY

LINES, ANGLES AND GEOMETRIC FIGURES……122

- Names of polygons
- Interior and exterior angles
- Finding number of sides of a polygon
- Finding number of triangles and right angles
- Finding number of sides when given right angles and triangles
- Finding interior angle sum
- Finding number of sides when given interior angle sum
- Angles of an isosceles triangle
- Interior and exterior angles of a triangle
- More about angles on triangles
- Interior angles of other polygons

Mathematics is the Key

- *Exterior angles of polygons*
- *Angles on parallel lines*
- *More about angles on parallel lines*
- *Properties of quadrilaterals*
- *Complementary angles*
- *Supplementary angles*

- ***CONSTRUCTION***

- *Constructing special angles*
- *Constructing other angles*
- *Constructing perpendicular bisectors*
- *Constructing perpendicular lines from a point*
- *Construction of parallel lines*
- *Construction of a pentagon when given side*
- *Construction of polygons using a centre angle*
- *Construction of a square when given a side*
- *Construction of a square in a circle*
- *Construction of a square using diagonals*
- *Construction of a rectangle when given sides*
- *Construction of a rectangle when given one side and diagonals*
- *Construction of a triangle when given sides(**SSS**)*
- *Construction of a triangle when given two sides and one angle(**SAS**)*
- *Construction of a triangle when given two angles and one side(**ASA**)*
- *Construction of a rhombus when given diagonals*
- *Construction of a rhombus when given side and angle*
- *Construction of a parallelogram when given side and angle*
- *Construction of a parallelogram when given diagonals and side*
- *Construction of a parallelogram when given sides and one diagonal*
- *Construction of a trapezium*

- ***BEARING AND SCALE DRAWING***

- *Rotations and revolutions*
- *Angles on a compass and clock face*
- *Ordinary bearing (directions)*
- *True bearing*
- *More about true bearing*
- *Opposite bearing*
- *Expressing distance in a given scale*
- *Scale drawing*

Mathematics is the Key

◈ THEME: MEASUREMENTS

❖ TIME……..162

- Converting from 12 hr clock to 24 hr clock
- Converting from 24 hr clock to 12 hr clock
- Duration
- Distance, speed and time
- Changing from km/hr to m/sec and viceversa
- Average speed
- Time tables
- Travel graphs
- Drawing travel graphs

TERM THREE

❖ LENGTH, MASS AND CAPACITY……181

- Conversion of length, mass and capacity. (review)
- Finding perimeter. (review)
- Finding area of simple shapes. (review)
- Finding area of square, rhombus and kite using diagonals.
- Finding perimeter and area of parallelogram
- Comparing sides of polygons
- Using apothem to find area
- More about area
- Circle properties
- Finding circumference of a circle and parts of a circle
- Finding perimeter of a circle and parts of a circle
- Finding radius or diameter when given circumference
- Finding radius or diameter when given perimeter
- More about perimeter (irregular figures)
- Finding area of a circle and parts of a circle
- Finding radius or diameter when given area
- Finding area of combined shapes
- Finding shaded area
- More about circumference (revolutions)
- More about perimeter. (no. of poles)

• VOLUME AND SURFACE AREA……169

- Converting from square metres (cm^2) to square centimetres (cm^2) and viceversa
- Converting from square kilometres (km^2) to square metres (m^2) and viceversa
- Converting from cubic metres (cm^3) to cubic centimetres (cm^3) and viceversa
- Volume and capacity of cylinders

Mathematics is the Key

- Finding missing sides when given volume of a cylinder
- Volume and capacity of triangular prisms
- Finding missing sides when given volume of a triangular prism
- More about cylinders
- Volume and capacity of trapezoidal prisms
- TSA of cubes and cuboids
- Find missing sides when given TSA of cubes and cuboids
- TSA of a triangular prism
- TSA of a trapezoidal prism
- TSA of closed cylinders
- TSA of cylinders closed one end
- TSA of hollow cylinders
- Packing boxes in boxes
- Packing cylinders in boxes
- Comparing volume of different objects

THEME: ALGEBRA

ALGEBRA.....213

- Substitution
- Collecting like terms
- Addition and subtraction of fractional algebraic terms
- Multiplication and division of fractional algebraic terms
- Factorizing completely
- Removing brackets
- Removing brackets in fractional algebraic terms
- Solving simple equations
- Solving equations involving squares and square roots
- Solving equations involving brackets
- Solving equations involving fractions
- Forming and solving equations
- Application of algebra in ages
- Finding solution sets
- Solving and writing solution sets
- Finding solution sets with compound inequalities
- Solving and writing solution sets with compound inequalities

Mathematics is the Key

TERM ONE: SET CONCEPTS

Key words: *universal, complement, subsets, union, intersection, empty, finite, infinite, probability*

SUBTOPIC: FINITE AND INFINITE SETS

A ***finite*** set is a set whose members can be listed down and has an end.
e.g set T = {even numbers between 4 and 12}
T = {6, 8, 10}

An ***infinite*** set is a set whose members are endless.
e.g. a set of odd numbers, a set of all stars in the sky, a set of all integers.
Set K= {all prime numbers}
K= {2, 3, 5, 7, 11, 13…..}

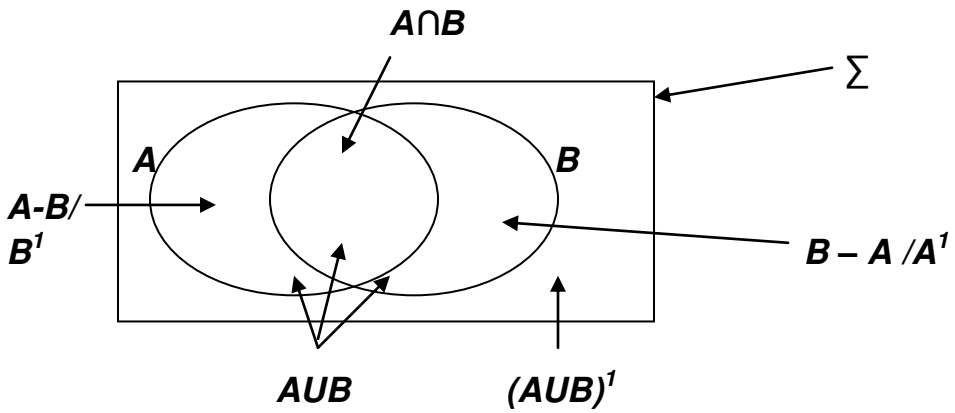
Activity

1. State whether the following sets are finite or infinite:

G = {girls in your class}
B = {boys in your class}
W= {days of the week}
K = {square numbers}
P= {pupils who like football}
T = {multiples of three}
H = {all alphabetical letters}
F = {months of the yea}

REFERENCE
Fountain pri. maths book 7 pg 9
New MK pri. maths book 7 page 16-17

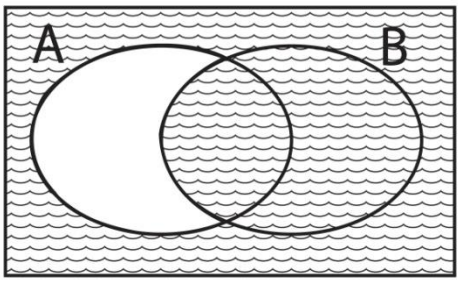
SUBTOPIC:Regions/describing points of venn diagram

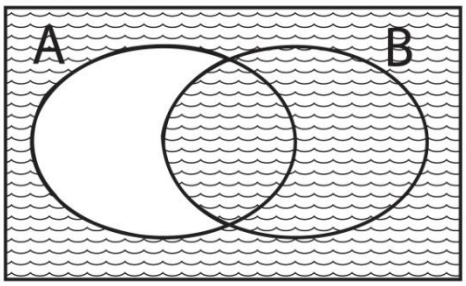


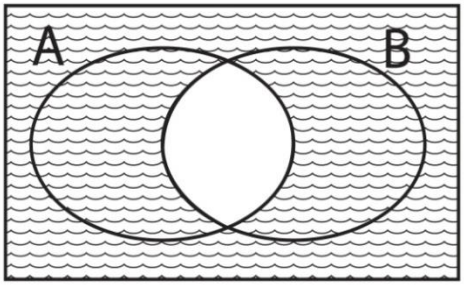
Mathematics is the Key

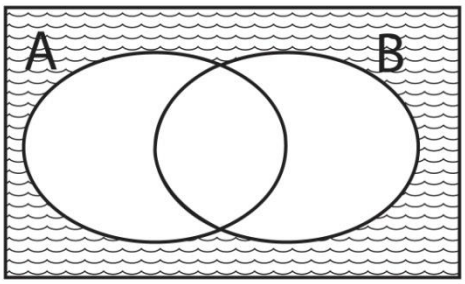
Activity

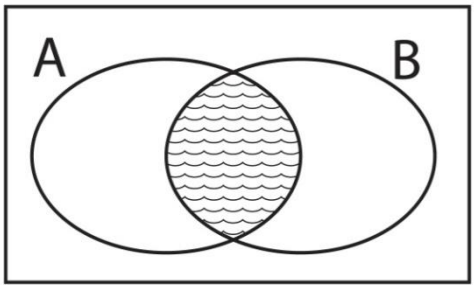
Describe the shaded regions

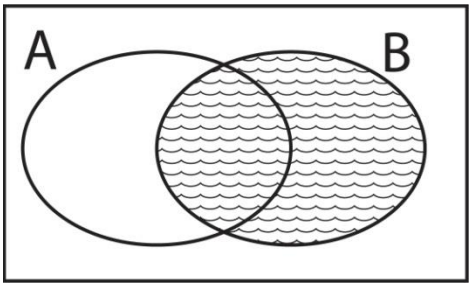






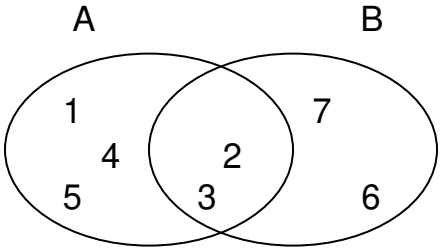






SUBTOPIC: LISTING ELEMENTS

1. Given the venn diagram below:



List members of the following using the above venn diagram:

(i) Set B
(ii) Set A^1
(iii) (B∩A)
(iv) (AUB)
(v) A-B

Mathematics is the Key

SUBTOPIC:REPRESENTING SETS ON VENN DIAGRAMS

Example:

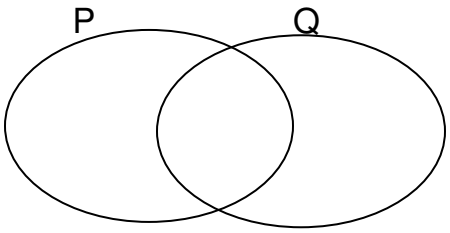
If P = {Factors of 24}

Q= {Multiples of 4 less than 25}

(i) List elements of : P = {1, 2, 3, 4, 5, 6, 8, 12, 24, }

Q = {4, 8, 12, 16, 20, 24}

(ii) Represent the above sets on a venn diagram below:



(iii) What is: (a) P ∩ Q (b) n(P∪Q)

Activity:

1. Given that set A = {Even numbers less than 15}
   B = {Composite numbers less than 15}
   (a) List down the members of the above sets.
   (b) Represent the above sets on a venn diagram

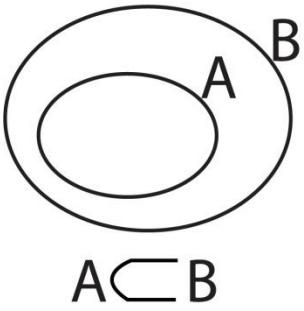
2. Given that $\mathcal{E}$ = {whole numbers less than 15}
   Set P = {4, 6, 14, 8, 0, 12, 3, 7}
   Set Q = {1, 3, 5, 7, 9, 11, 13}
   (a).Write down the numbers of P∩Q
   (b).Represent the above sets on a venn diagram

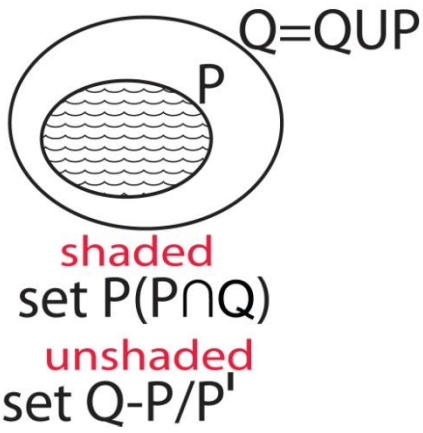
SUB TOPIC : SUBSETS

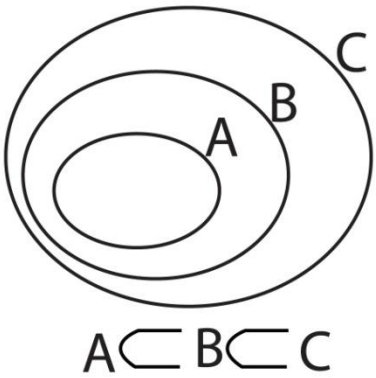
A subset is a set that can be got from another set.

The symbol for **"is a subset of"** is ⊂

Subsets on venn diagram







Mathematics is the Key

Activity

1. Draw a venn diagram to show that;

(a). all dogs(D) are animals (A)

(b) all girls(G) are females(F)

(c) teachers(T) and pupils(P) are found in a school(S)

SUBTOPIC: FINDING THE NUMBER OF SUBSETS AND PROPER SUBSETS

1. Given that set A= { a, b }.

a) Find the number of subsets in set A

By listing: { }, { a }, { b }, { a, b }

No. of subsets in (A) = 4 subsets

Using: ***No. of subsets = 2^n*** *(Where 'n' = number of elements)*

$= 2^2$

$= 2 \times 2$

= 4 subsets

b) Find the number of proper subsets in set A

By listing: { }, { a }, { b }

No. of proper subsets in set A = 3 subsets

Using : ***No. of proper subsets = $(2^n) - 1$***

$= 2^2$

$= 2 \times 2 - 1$

$= 4 - 1$

=3 proper subsets

2. Set A has 8 subsets. Find the number of elements in set A.

Using 2^n = no. of subsets

2^n = 8 – factorise

$2^n = 2^3$

n= 3

n (A)= 3

2	8
2	4
2	2
	1

$8=2^3$

Activity

1. List the subsets for each of the following sets:
   a) B = {p, q } b) C= {x, y, z} c) D= { t } d) E={ p, q, r, s}
2. How many subsets are in each of the sets above?
3. Find the number of elements in a set with 16 subsets
4. Set P has 15 proper subsets. How many elements are in set P?
5. Find the number of elements in a set with the following number of subsets
   a) 4 subsets b) 32 subsets c) 64 subsets

Mathematics is the Key

REFERENCE

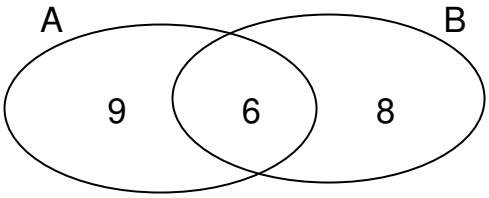
a New MK primary maths book 7 page 2 – 4

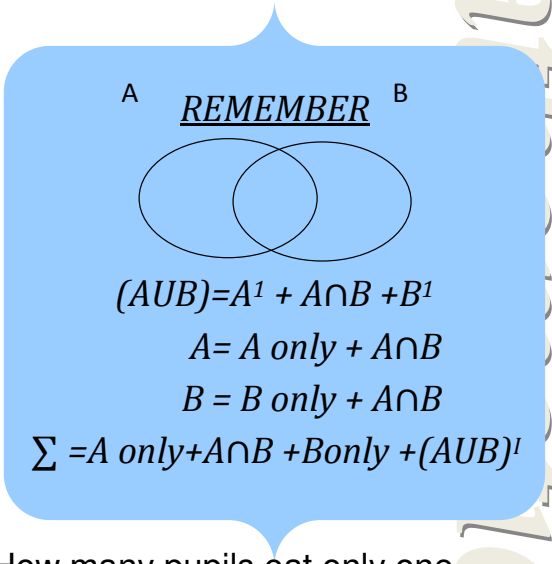
Fountain primary maths book 7 page 2

SUB TOPIC: NUMBER OF ELEMENTS ON VENN DIAGRAMS

Example

The diagram below shows the number of pupils who eat apples (A) and beans (B). Use it to answer the questions that follow:





(i) How many pupils eat both apples and beans?

6 pupils

(ii) How many pupils eat beans?

n(B) = 6 + 8 = 14

(iii) How many pupils eat apples?

9 + 6 = 15 pupils

(iv) How many pupils eat only one type of food?

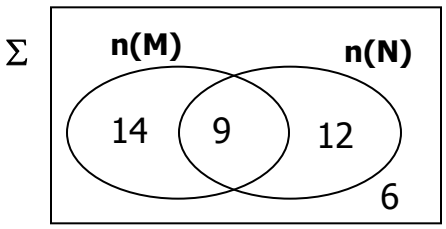
9 + 8 = 17 pupils

(v) Find the number of pupils in the whole class.

9 + 6 + 8 = 23 pupils

Try these

1. Study the venn diagram below and use it to answer the questions that follow



Find

(a) n(M)

(b) n(N)

(c) n($M \cup N$)

(d) n($M \cap N$)^{I}

(e) n(Σ)

REFERENCE

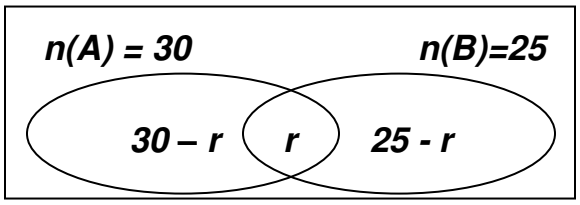
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Mathematics is the key

SUB TOPIC: SOLVING PROBLEMS USING VENN DIAGRAMS

1. Given that n(A) = 30, n(B) = 25 and n(AUB) = 45.

(a) Draw a venn diagram to show the above information.



(b) Find n(A∩B)

Let the number in (A∩B) be r.

$30 - r + r + 25 - r = 45$

$30 + 25 + r - r - r = 45$

$55 - r = 45$

$55 - 55 - r = 45 - 55$

$-r = -10$

$\frac{-r}{-1} = \frac{-10}{-1}$

$r = 10$

(ii) n(A only)

$n(A\ only) = 30 - r$

$= 30 - 10$

$= 20$

(c).If a member is picked at random, find the probability of selecting a member in $(A \cap B)^{I}$

$n(A \cap B)^{I} = (30 - r) + (25 - r)$

$= (30 - 10) + (25 - 10)$

$= 20 + 15$

$= 35$

$n(E) = 35$

$SS = 45$ $\quad$ $Probability = \frac{35}{45}$

REFERENCE

A New MK Primary Maths ppls Bk 7 Pg 10 – 11

Mathematics is the Key

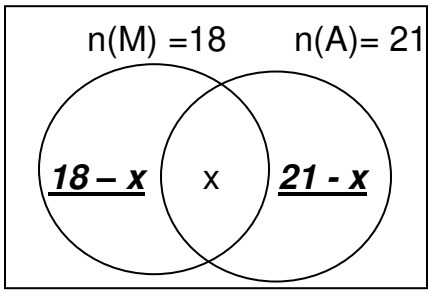
SUB TOPIC: APPLICATION OF SETS

Examples

1. In a class of 30 pupils 18 like music (M), 21 like Art (A) and some like both.

a) Represent the above information on a Venn diagram.

n(∑)= 30



b) How many pupils like both subjects?

$18 - x + x + 21 - x = 30$

$18 + 21 - x = 30$

$39 - x = 30$

$39 - 39 - x = 30 - 39$

$-x = -9$

$\frac{-x}{-1} = \frac{-9}{-1}$

$x = 9$

:. 9 Pupils like both subjects

(c).How many pupils like one subject ?

$18 - x + 21 - x$

$18 - 9 + 21 - 9$

$9 + 12$

21pupils

(d).What is the probability of selecting a pupil who likes one subject?

$n(E) = 21$

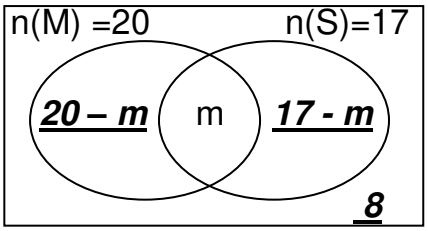
$SS = 30$

$Probablity = \frac{21}{30}$

2. In a class of 40 pupils, 20 like mathematics (M), 17 like science (S), m like both subjects while 8 do not like any of the subjects.

a) Represent the above information on a Venn diagram.

n(∑)=40



b) How many pupils like both subjects?

$8 + 20 - m + m + 17 - m = 40$

$28 + 17 - m = 40$

$45 - m = 40$

$45 - 45 - m = 40 - 45$

$-m = -5$

$\frac{-m}{-1} = \frac{-5}{-1}$

$m = 5$

:. 5 Pupils like both subjects

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c) What is the probability of selecting a pupil who likes only one subject?

(20 –x) + (17 – x)

(20 - 5) + (17 - 5) ***Prob (only one subject) =*** $\frac{27}{40}$

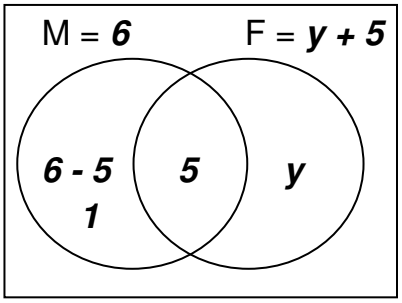
15 +12

27 pupils

3. In a family of 10 members, 6 members eat meat (M), 5 members eat both meat and fish (F) while 'y' members eat only fish.

   i) Represent the above information on a Venn diagram

   n(∑)=***10***



   ii) How many members eat only fish?

y + 5 + 1 = 10

y + 6 = 10

y + 6 – 6 = 10 – 6

y = 4

   iii) Find the number of pupils who eat fish.

(y + 5) Pupils

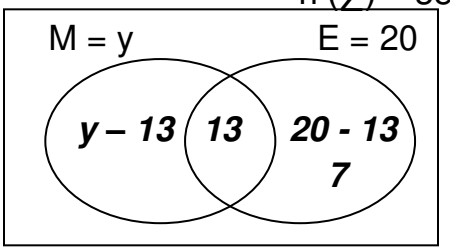
4 + 5

9 Pupils

4. In a class of 35 pupils, y like mathematics (M), 20 like English (E) while 13 like both subjects.

   a) Using a Venn diagram, show the above information

   n (∑) = 35



Mathematics is the Key

b) Find the number of pupils who like mathematics.

$y - 13 + 13 + 20 - 13 = 35$

$y + 7 = 35$

$y + 7 - 7 = 35 - 7$

$y = 28$

OR

$y + 20 - 13 = 35$

$y + 7 = 35$

$y + 7 - 7 = 35 - 7$

$y = 28$

OR

$y - 13 + 20 = 35$

$y + 7 = 35$

$y + 7 - 7 = 35 - 7$

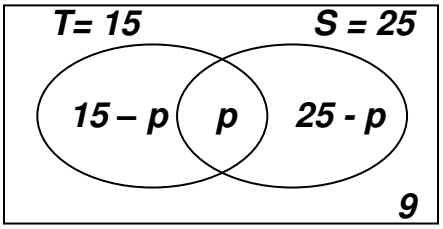
$y = 28$

∴ 28 Pupils like mathematics

5. In a group of 40 people, they all play football(F), 9 play football only, 15 play tennis(T) and football, 25 swim(S) and play football and some enjoy all the three games.

a. Draw a Venn diagram to represent the above information

$n(\varepsilon) = n(F) = 40$



b. How many people participate in all the three activities?

$15 - p + p + 25 - p + 9 = 40$

$15 + 25 - p + 9 = 40$

$49 - p = 40$

$49 - 49 - p = 40 - 49$

$-p = -9$

$\frac{-p}{-1} = \frac{-9}{-1}$

$p = 9$

REFERENCES

Fountain primary maths Book 7 pages 16 to 17
MK Book 7 pages 10 to 11
Understanding math Book 7 page 9
Macmillan Book 7 page 9s
Functional math Book 7 pages12

Mathematics is the Key

TOPICAL QUESTIONS ON SET CONCEPTS

1. Given that:

Set P = {1, 2, 3, 4, 5, 6, 7}
K = {0, 2, 4, 8, 9, 10}
Find (i) P∩K
(ii) n(PUK)
(iii) P – K
(iv) K^1
(v) $(P \cap K)^1$

2. Draw a venn diagram to show that all dogs (D) are animals (A)

3. Given that Set A = {all pri me numbers less than 20} B = {all factors of 16}

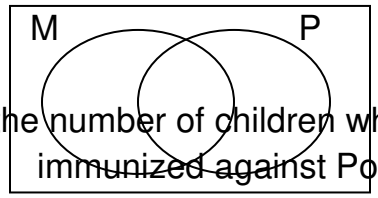
4. Given that a set has 32 subsets. How many elements has it?

5. In a class of 30 pupils, 10 pupils Like History (H) 14 like Geography(G) and 12 do not like either of the subjects.

(i) Draw a venn diagram to represent this information.
(ii) How many pupils like both subjects?
(iii) How many pupils like History?
(iv) How many pupils like one subject?

6. Seventy children were taken to a clinic for immunization,
45 children were immunized against Measles (M)
X children were immunized against Polio (P)
6 children were immunized against measles and Polio.
1 child was not immunized at all.

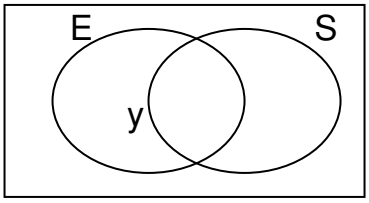
(a) Represent the information in the venn diagram



(b) Find the number of children who were immunized against Polio only.

7. In a class of 40 pupils, 25 like English (E),15 like Science (S) Y pupils like both English and Science and 8 do not like any of the 2 subjects.

(a) Complete the venn diagram.

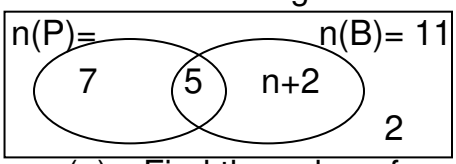


(b) Find the value of y.
(c) What is the probability of picking a pupil who likes only one subject?

8. In a class of 20 pupils where two languages are spoken, 14 speak Luganda (L), 15 speak Kiswahili (K).

(a) .Draw a venn diagram and show the information given.
(b) Find the number of pupils who speak both Luganda and Kiswahili.
(c) Find the number of pupils who speak only one language.

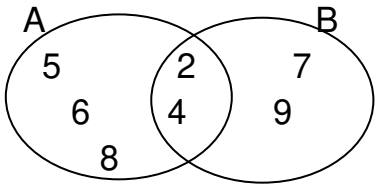
9. Use the venn diagram below.



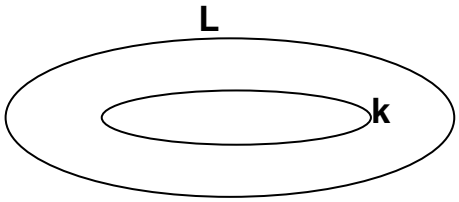
(a) Find the value of
(i) n
(ii) Universal set
(iii) $n(P \cap B)^1$

Mathematics is the Key

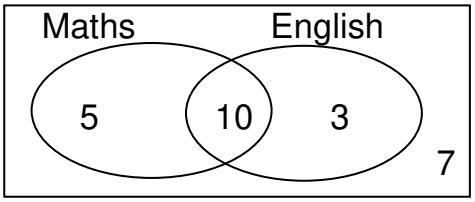
10. In a class of 60 pupils, all enjoy eating beans, 33 enjoy eating meat (M), 35 enjoy eating fish (F), If P pupils enjoy all the three while 2 enjoy eating beans only.
    (a) Represent the information on a venn diagram.
    (b) Find the value of P.
    (c) How many pupils enjoy only fish?
11. Given that Set X = {a, d, c, d}
    Find the number of:
    (i) Sub sets
    (ii) Proper subsets
12. Write two examples of empty sets
13. Draw a symbol for equivalent set
14. Given that K= {a,b,c,d,e,f }
    KUL={ a,b,c,d,e,f,g,h,i,j }. Find n(L)
15. In the figure below find A'B



16. Set k = {a,b,c }. List all subsets of set k
17. Given that M = {all prime numbers less than 15 }.Find n(M)
18. Given that A= {1,2,3,4,5} and B = {1,3,5,7,9}. Find the number of subsets in A∩B.
19. Describe the shaded part on the venn diagram

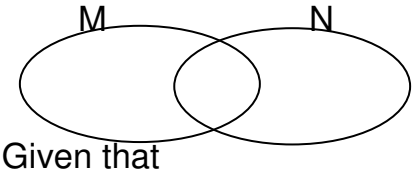


20. Draw a venn diagram to show that all cows are animals
21. Given that.
Set A={all counting numbers less than 10}
    B = {all odd numbers from 1 to 10}.
    Find n(AUB)
22. Set T has 16 subsets. How many elements has set T?
23. Study the venn diagram below and use it to answer the questions

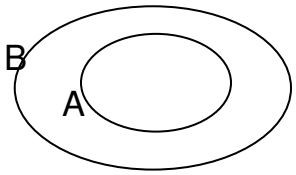


(a). How many pupils study mathematics?
(b) How many pupils do not study mathematics?
(c). Find the probability of selecting a pupil who studies either Mathematics or English.

24. Express the number of pupils who study one subject as a percentage of the whole class
25. Set K has 31 proper subsets. How many elements are in set K?
17. Shade M'∩N



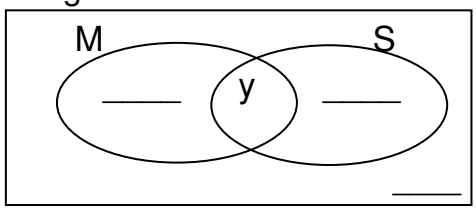
18. Given that
    X={p, q, r, s, t}
    Y={o, p, a, q, u, e}
    Find n(X-Y)
19. How many subsets are in a set with six elements?
20. What is the relationship between A and B as shown in the venn diagram below?



21. In a class of **50 boys**, **40** like mathematics **(M)** and **25** like science **(S)**.some boys **y** like both subjects and **2** do not like any of the **two** subjects.

Mathematics is the Key

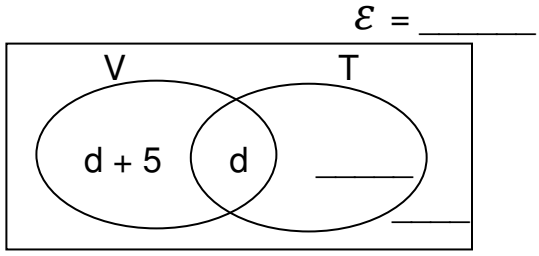
(a) Show the information in the venn diagram below. $\mathcal{E}$ = 50



(b).How many boys like mathematics only?

22. In a class, **31**pupils play tennis **(T)** and **(d+5)** play volley ball **(V)** only. **d** pupils play both games while **3** play neither of the games.

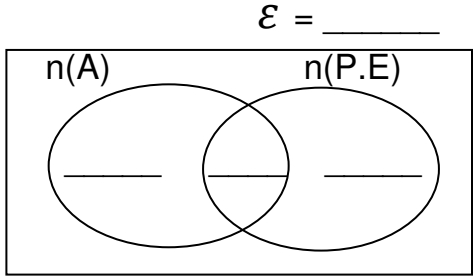
(a).Complete the venn diagram.



(b).If **27** pupils play volley ball altogether, find the value of d.

23.In a class of thirty five members, all of them like music (M,(3y-4)enjoy Art(A) and music only,(y+6) enjoy P.E and music and only (y+2) enjoy all the three activities, while (y+1)enjoy music only.

(a). Show the above information on a venn diagram below.



(b) How many members enjoy ;

(i).Music and P.E?

(ii).Music and art

(c).How many pupils are in the whole class?

d). What is the probability of selecting a member at random who likes only one subject?

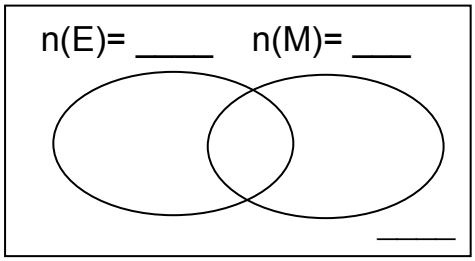
25.Given than n(Ɛ) = 25, n (A) = 15, n(B) = 18 and n (AUB)' = 2

(a) Draw a venn diagram to show the above information.

(b)Find n(A∩B)

26.In a class of 65 children, x + 31 like Maths (M), 12 like English only, 11 + x like both Math and English while X like neither of the two subjects.

(a)Represent the above information on the venn diagram below.



(b)Find the value of X

(c)If a boy is picked at random, what is the probability of picking a boy who likes one subject?

Mathematics is the key

WHOLE NUMBERS

SUBTOPIC: FORMING NUMERALS USING GIVEN DIGITS

CONTENT: Using digits to form smallest and largest numbers.
Finding the sum of/product/difference/quotient between the smallest and largest numbers formed from the given digits.

Examples:

- Write down all 3-digit numerals that can be formed using the digits; 4, 6, 7
  476 467 647 674 746 764
- Find the difference between the smallest and highest numerals formed.
  Smallest = 467
  Biggest = 764
  Difference = 7 6 4
  - 4 6 7
  2 9 7

Activity:

- ✓ Using digits **3, 0, 6 ,**form all 3 - digit numerals that can be formed.
- ✓ Find the product of the smallest and the biggest numerals formed.

- ❖ Write down all three digit even numerals that can be formed from ***8, 3, 4.***
- ❖ Find the sum of all 3-digit odd numbers that can be formed

SUBTOPIC: PLACE VALUES AND VLUES OF DIGITS UP TO HUNDRED MILLIONS

The place value chart

Million			Thousands			Units		
H	T	O	H	T	O	H	T	O
2	8	7	6	5	4	3	2	9

The table below shows the place values and values of the numeral above

Digit	***Place value in words***	***Place value in figures***	***Value (digit × P.V)***
9	Ones	1	$9 \times 1 = 9$
2	Tens	10	$2 \times 10 = 20$
3	Hundreds	100	$3 \times 100 = 300$
4	Thousands	1,000	$4 \times 1{,}000 = 4{,}000$
5	Ten thousands	10,000	$5 \times 10{,}000 = 50{,}000$
6	Hundred thousands	100,000	$6 \times 100{,}00 = 600{,}000$
7	Millions	1,000,000	$7 \times 1{,}000{,}000 = 7{,}000{,}000$
8	Ten millions	10,000,000	$8\times 10{,}000{,}000 =$ _____
2	Hundred millions	100,000,000	$2\times 100{,}000{,}000 =$ _____

Mathematics is the key

Example: Find the value of 6 in the number 2602

2 6 0 2
- 2 → One (1)
- 6 → Tens (10)
- 0 → Hundreds (100)
- 2 → Thousands (1000)

Value of 6 = 6 x 100 = 600

Activity:

1. Write the place value and value of 9 in
   (a). 345987
   (b).26490321
   (c).689458345
2. Find the sum of the value of seven and the place value of 9 in 23745893

SUB TOPIC: WRITING IN WORDS (UP TO HUNDRED MILLION)

Examples:

(i) Write 20,480 in words.

Thousand	Units
20	480

Twenty thousand, four hundred eighty.

(ii) 60,808,040

Million	Thousand	Units
60	808	040

Sixty million, eight hundred eight thousand forty.

Activity:

Write the following in words.

- 34,567
- 9,999,999
- 30,230,203

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SUB TOPIC: WRITING NUMERALS IN FIGURES

Examples:

Write in figures:

(i) Fifty seven million four hundred twenty one thousand nine hundred five.

57 million = 57,000,000

421 thousand + 421,000

905 905

57,421,905

(ii) A quarter of a million

A million = 1,000,0000

¼ of 1,000,000

$\frac{1}{4}$ x 1,000,000

= 250,000

(iii) Write " sixty million, four hundred thirty nine thousand, seven" in figures

(iv) Write " six hundred thirty nine thousand, seven" in figures

(v) Write " three million, thirty nine thousand, eight" in figures

(vi) Write " nine million, four hundred thirty nine thousand, six" in figures

(vii) Write "thirty nine thousand, fifty seven" in figures

SUB TOPIC: EXPANDED NOTATION

CONTENT: Expanding numerals using:

- **Place values**
- **Values**
- **Powers of ten/exponents**

Examples:

Expand: 5624 using:

Place values: **5624 = (5 x 1000) + (6 x 100) + (2 x 10) + (4 x 1)**

Values: **5624 = 5000 + 600 + 20 + 4**

10^3	10^2	10^1	10^0
5	6	2	4

Powers: **5624 = (5 x 10^3) + (6 x 10^2) + (2 x 10^1) + (4 x 10^0)**

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Activity:

Expand the following as instructed

a) 2,354 (place values)
b) 40,369 (place values)
c) 45,689 (values)
d) 29,542(values)
e) 890765 (exponents)
f) 2354 (powers)

SUB TOPIC: FINDING THE EXPANDED NUMBERS (SHORT FORM)

Examples:

Write as a single number.

(i) (6 x 10,000 + (4 x 10) + (5 x 1)
(6 x 10000) + (4 x 100) + (5 x 1)
= 60,000 + 400 + 5
= 60000
400
\+ 5
60405

(ii) 9000000 + 700 00 + 50000 + 1000 + 30 + 8
= 9 000 000
700 000
50 000
1 000
30
\+ 8
9 750 038

(iii) $(2 \times 10^5) + (4 \times 10^3) + (6 \times 10^0) + (7 \times 10^2)$
(2 x 10 x 10 x 10 x 10 x 10) + (4 x 10 x 10 x 10) + (6 x 1) + (7 x 10 x 10)
200,000 + 4000 + 6 + 700
200 000
4000
700
\+ 6
204706

Activity

What number has been expanded to give?

a) $3000 + 200 + 3$
b) $(5 \times 1000) + (9 \times 100) + (2 \times 10) + (8 \times 1)$
c) $(9 \times 10^4) + (9 \times 10^2) + (2 \times 10^1) + (8 \times 10^0)$

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SUB TOPIC: STANDARD FORM/SCIENTIFIC NOTATION

Writing whole numbers in Scientific notation

Examples:

(i) Write 453 in standard form

4.53 x 100

4.53 x 10 x 10

$\underline{4.53 \times 10^2}$

(ii) Express 650000 in Scientific notation.

650,000 = 6.5 x 100,000

=6.5 x 10 x 10 x 10 x 10 x 10

$\underline{=6.5 \times 10^5}$

Express the following decimals in standard notation/Scientific form.

(i) 365.72

$\underline{3.6572 \times 10^2}$

(ii) 0.67

$\underline{6.7 \times 10^{-1}}$

1. Write the following numbers in standard form
   - **652**
   - **9709**
   - **0.00034**
   - **29**
2. Find the decimal number expressed in standard form.
   a. 2.34×10^{-2}
   b. 6.1×10^{-2}

REFERENCE MTC Revision Hand Book P.6, 6, P.7 Pg 29

SUB TOPIC: ROUNDING OFF WHOLE NUMBERS

Examples:

Round off the following as instructed.

(i) 3864 to the nearest hundreds.

TH	*H*	*T*	*0*
3	8	~~6~~	~~4~~
+	1		
3	9	0	0

(ii) 214 (nearest tens

H	*T*	*O*
2	1	~~4~~
+	0	
2	1	0

(iii) 4.78516 to the nearest thousandths.

0	T^{th}	H^{th}	TH^{th}	T/TH^{th}
4.	7	8	5	~~1~~
+0.	0	0	0	
4.	7	8	5	

Mathematics is the Key

(iii) 75.634 to the nearest whole number nearest whole number

T	0	Tth	Hth	THth
7	5 .	6	3	4
+	1			
7	6 .			

Activity:

1. Round off the following as instructed in brackets
   a. 45637 (nearest hundreds)
   b. 99999 (nearest thousands)
   c. 780937887 (nearest millions)
   d. 89.58(nearest tenths)
   e. 23.786(nearest hundredths)
   f. 7.239(nearest two d.p)

REFERENCE

Macmillan Primary Mathematics Pupils' Bk 7 Pg 24
Mathematics Revision Hand Book P5, 6 & 7 Pg 28

SUB TOPIC: ROMAN NUMERALS (converting Hindu Arabic numerals to roman numerals)

BASIC ROMAN NUMERALS

1	***=I***
5	***=V***
10	***= X***
50	***=L***
100	***=C***
500	***=D***
1000	***=M***

NOTE:
All other numerals are got from basic roman numerals by adding or subtracting .

Example

1. What 124 in Roman numerals

H T O
1 2 4
100 20 4
100 + 20 + 4
100 = C
20 = XX
4 = IV
∴ 124 = CXXIV

ii) 1962
1000 + 900 + 60 +2
1000 = M
900 = CM
60 = LX
2 = II
∴ 1962= MCMLXII

Mathematics is the Key

Activity

Write the following in roman numerals

a) 49
b) 235
c) 333
d) 78
e) 140
f) 999
g) 1449

REFERENCE

Macmillan Pri MTC pupils bk 7 pg 16
A New MK Primary Mathematic Bk 7 pg 23

SUBTOPIC:ROMAN NUMERALS (conversion of Roman numerals to Hindu Arabic)

Write the following numbers in Hindu Arabic numerals

(i) MXLV

M + XL + V
M = 1000
XL = 40
V = 5
MXLV = 1045

(II) CD XCIV

CD + XC + IV
CD = 400
XC = 90
IV = 4
CDXCIV = 494

Activity

(i) Write the following in Hindu Arabic numerals

- *XLIV*
- *CVIII*
- *XCIX*
- *CDXCIV*
- *MXCIV*

(ii) A church was built in MDCCLXIV. Which year is this in Hindu Arabic?

REFERENCE

A New MK Primary Maths Pupils Bk 7 Pg 24
Macmillan Primary Maths Pupils' Bk 7 Pg 16

Mathematics is the Key

BASES

GENERAL NAMES OF BASES

NAMES OF BASES AND DIGITS USED

BASE	NAME	DIGITS USED
two	binary	0, 1
three	ternary	0, 1, 2
four	quaternary	0, 1, 2, 3
five	quinary	0, 1, 2, 3, 4
six	senary	0, 1, 2, 3, 4, 5
seven	septenary	0, 1, 2, 3 ,4, 5, 6
eight	octal	0, 1, 2, 3, 4, 5, 6, 7
nine	nonary	0, 1, 2, 3, 4, 5, 6, 7, 8
ten	denary / decimal	0, 1, 2, 3, 4, 5, 6, 7, 8, 9

SUBTOPIC: Changing from non decimal bases to decimal bases

Example:

(i) Change 234_{six} to base ten

2 3 4

4 → Ones (6^0)

3 → Sixes (6^1)

2 → Six sixes (6^2)

$(2 \times 6^2) + (3 \times 6^1) + (4 \times 6^0)$

$(2 \times 6 \times 6) + (3 \times 6) + (4 \times 1)$

$(12 \times 6) + 18 + 4$

$72 + 22$

94 ten

Activity:

Convert the following to base ten

(a) $\mathbf{241}_{five}$

(b) $\mathbf{10101}_{two}$

(c) $\mathbf{234}_{six}$

(d) 212_{four}

REFERENCE

A New MK Primary Maths Pupils' Bk 6 Pg 40

Mathematics is the Key

SUB TOPIC: Changing from decimal bases to non-decimal bases

Example:

Change 25 to base seven

7	25	r 4
7	3	r 3
	0	

25 = 34 seven

Activity

- ✓ **Express the following as instructed**
  - **(a) 83 to nonary base.**
  - **(b) 45 to base five**
  - **(c) 23 to base two**
  - **(d) 33 to quinary**

REFERENCE

A New MK Primary Maths Pupils' Bk 6 Pg 39

SUB TOPIC: Changing from non decimal bases to non decimal bases

Example:

(i) Change 123 five to base six

123_{five} to base ten

$1^2 2^1 3^0$

$(1 \times 5^2) + (2 \times 5^1) + (3 \times 5^0)$

$(1 \times 5 \times 5) + (2 \times 5) + (3 \times 1)$

$(5 \times 5) + 10 + 3$

$25 + 10 + 3$

$35 + 3$

38_{ten}

38_{ten} to base six

6	38	rem 2
6	6	rem 0
6	1	rem 1
	0	

102_{six}

$123_{five} = 102_{six}$

Activity

- **(a) Change 12_{three} to base five**
- **(b) Change 34_{five} to base six**
- **(c) Change 212_{three} to base seven**
- **(d) Change 10101_{two} to base five**
- **(e) 2t $_{eleven}$ to base nine**

REFERENCE

A New MK Primary Maths Pupils' Bk 6 Pg 39

Mathematics is the Key

SUB TOPIC: Operation on bases – ADDITION

Example:

$$\begin{array}{r} 2\,2\,5_{six} \quad 9 \div 6 = 1 \text{ rem } 3 \\ +\ 4\,3\,4_{six} \\ \hline 1\,1\,0\,3_{six} \end{array}$$

Activity

Workout the following

(a) $110_{two} + 101_{two}$

(b) $121_{three} + 212_{three}$

(c) $123_{five} + 342_{five}$

(d) $143_{five} + 11_{five}$ **(answer in base ten)**

(e) $23_{seven} + 12_{six}$ **(answer in base five)**

REFERENCE

A New MK Primary Maths Pupils' Bk 7 Pg 38

SUB TOPIC: Operation on bases - SUBTRACTION

Examples:

(I) 6 7 1 nine – 2 8 5 nine

$$\begin{array}{r} \cancel{6}^{5}\,\cancel{7}^{6}\,\cancel{1}^{10}{}_{nine} \\ -\ 2\,8\,5_{nine} \\ \hline 3\,7\ \ 5_{nine} \end{array}$$

9 + 1 = 10

9 + 6 = 15

Activity

Workout the following

(a) $110_{two} - 100_{two}$

(b) $1111_{two} - 101_{two}$

(c) $221_{three} - 12_{three}$

(d) $423_{five} - 142_{five}$

(e) $143_{five} - 11_{five}$ $(answer\ in\ base\ ten)$

(f) $345_{six} - 234_{six}$

REFERENCE

A New MK Old Edition Pupils Bk 7 Pg 39

Mathematics is the Key

SUB TOPIC: Operation on bases – MULITPLICATION

CONTENT: Example:

(i) $1^{1}\,2\,1_{three}$ × 2_{three} = $1\,0\,1\,2_{three}$

1 x 2 = 2
2 x 2 = 4
4 ÷ 3 = 1 rem 1
1 x 2 = 2 + 1
3 ÷ 3 = 1 rem 0

(ii) $3^{3}4^{3}5_{six}$ × $1\,4_{six}$ = $2^{1}3^{1}1\,2 + 3\,4\,5 = 1\,0\,2\,0\,2_{six}$

4 x 5 = 20
20 ÷ 6 = 3 rem 2
4 x 4 = 16 + 3 =19
19 ÷ 6 = 3 rem 1
3 x 4 = 12 + 3 =15
15 ÷ 6 = 2 rem 3
6 ÷ 6 = 1 rem 0
8 ÷ 6 = 1 rem 2

Activity

Multiply the following

(a) $11_{two} \times 10_{two}$

(b) $110_{two} \times 100_{two}$

(c) $121_{three} \times 11_{three}$

(d) $132_{five} - 12_{five}$

REFERENCE

A New MK Primary Maths Pupils' Bk 7 Pg 40 exercise 3:4

SUB TOPIC: Operation on bases – DIVISION

Examples:

(i) $204_{five} \div 14_{five}$.

204_{five} to base ten

(2 x 52) + (0 x 51) + (4 x 50)
(2 x 5 x 5) + (0 x 5) + (4 x 1) + (10 x 5) + 0 + 4
50 + 4
54_{ten}

14_{five} to base ten

(1 x 51) + (4 x 50)
(1 x 5) + (4 x 1)
5 + 4
9_{ten}

54 ÷ 9 ten
6_{ten}

6_{ten} to base five

5	6	rem 1
5	1	rem 1
	0	

$204_{five} \div 14_{five} = 11_{five}$

Mathematics is the Key

(ii) $\mathbf{448_{nine} - 17_{nine}}$ (answer in Septenary base)

REFERENCE

A New MK Old Edition Pupils Bk 7 Pg 41 - 42 exercise 3:5

SUB TOPIC: FINDING THE UNKNOWN BASE (missing base)

Examples:

(i) If 44p = 35 nine

$(4 \times p^1) + (4 \times p^0) = (3 \times 9^1) + (5 \times 9^0)$

$(4 \times p) + (4 \times 1) = (3 \times 9) + (5 \times 1)$

$4p + 4 = 27 + 5$

$4p + 4 = 32$

$4p + 4 - 4 = 32 - 4$

$4p + 0 = 28$

$\frac{4p}{4} = \frac{28}{4}$

$P = 7$

(ii) $X^2 = 71$ nine

(iii) 325 six = q^3

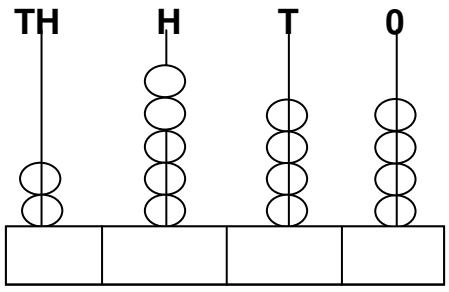
(iv) Solve for m. $44_m = 35_{nine}$

REFERENCE

A New MK Old Edition Pupils Bk 7 Pg 43

END OF TOPIC EXERCISE

1. Show 2843 on the abacus.
2. Write the number shown on the abacus in roman numerals.



3. Write the place value of each digit in 486349334.
4. Workout the sum of the value of 6, 8 and 7 in 4638047.
5. Workout the difference between that value of 7 and the place value of 9 in 49834734.
6. Write the product of the value of 6 and 3 in 8469 in roman numerals.
7. Write 4009009 in words.
8. Write "Two hundred thirty six thousand forty nine" in expanded form using exponents.
9. Expand 963.07 using values.
10. Which number was expanded to give $(6x10^4) + (8 \times 10^2) + (3 \times 10^{-1}) + (7x10^{-2})$
11. Round off 9999 to the nearest thousands.
12. Round off 67.987 to the nearest hundredths.

Mathematics is the Key

13. Round off 99.999 to the nearest hundredth.
14. Round off 16.873 to the nearest whole number.
15. Expand 635.057 using exponents.
16. St. Mary's college was constructed in MCMLXXXVII. In which year was it constructed?
17. Write 18.487 in words.
18. Find the sum of the value of 7 and the value of 3 in 3.467.
19. Write forty six and eighty seven thousandths in figures.
20. Change 16 to ternary.
21. Write all digits used in base six.
22. Write the value and place value of 3 in 432_{five}.
23. Workout. $110_{two} \times 11_{two}$
24. If $22_n = 18_{ten}$. Find the value of n
25. Add $22_{five} + 101_{two}$ (Answer in base six)
26. Solve for x. $x^2 + x^2 = 112_{five}$.
27. Solve for P. $44p = 35_{nine}$
28. Divide $31_{five} \div 22_{three}$ (Answer in base ten)

OPERATION ON NUMBERS

SUB TOPIC: ADDITION OF LARGE NUMBERS

Examples:

Add correctly:

(i)

$$\begin{array}{r} 615\ 146\ 144 \\ +\ 320\ 005\ 614 \\ \hline 935\ 151\ 758 \end{array}$$

(ii) The population in four countries of a district shows that county A is 23,467, county B is 21 602, county C is 19466 and county D is 25 102. What is the total population in the district?

County A	***23 467***
County B	***21 602***
County C	***19 466***
County D	***+25 012***
	89 547

Emphasis on place value arrangement and re-grouping.

Activity

1. Add correctly
   - $\mathbf{23,456 + 89,045}$
   - $\mathbf{668,433 + 998,765}$
   - $\mathbf{4,677 + 78,890}$
2. In a certain country, 467,883 patients contracted COVID-19 in March and 349,277 patients in April and 89,898 patients in May. How many patients contracted COVID-19 in the three months of the year 2020?

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REFERENCE

A New MK Bk 7 Pg 45

Primary School Mathematics BK 7

SUB TOPIC: SUBTRACTION OF LARGE NUMBERS

CONTENT: Examples:

Subtract correctly:

(i) ***596 148 320***
- 239 610 510
356 537 810

(ii) What is the difference between 3060 and 186?

3 060
- 186
2 874

Emphasis on place value arrangement and regrouping.

Activity

1. Subtract correctly
   - $4657 - 2379$
   - $100{,}000 - 46{,}575$
   - $87{,}565 - 7{,}389$

2. 78,377 patients contracted COVID-19 in April 2020 in a certain country. If 2,567 died and 45,671 recovered. How many patients remained with Corona Virus Disease 2019 (COVID-19)

REFERENCE

A New MK Bk 7 Pg 45

Primary School Mathematics Bk 7 Pg 11.

SUB TOPIC: MULTIPLICATION OF LARGE NUMBERS

Examples:

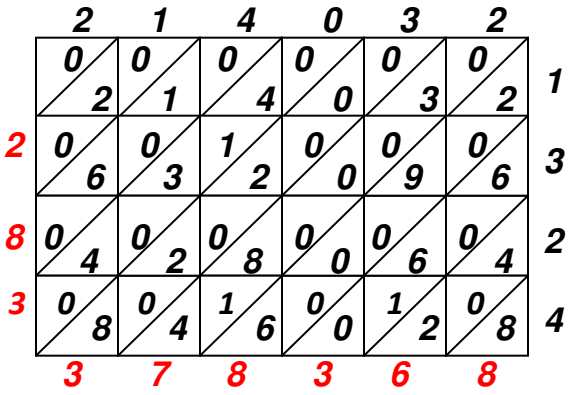
Multiply:

(i) 214 032 x 1324

214 032
X 1 324
856 128
4 280 640
64 209 600
+ 214 032 000
283 378 368

Mathematics is the Key

Lattice method(Napier's rod method)



∴214,032 x 1,324 = 283 378 368

(ii) A store can hold 1973 boxes each containing 34 pairs of shoes. How many pairs of shoes are in the store?

1 973
X 34
7 892
+59 190
67 082 pairs

Activity

1. **Multiply the following**
   - 458×234
   - 24307×45
2. **134 MPs contributed 9,570 kilograms of posho each on average during the time COVID-19. How many kilograms of posho did they contribute altogether?**

REFERENCE

New MK Bk 7 exercise 3:2 Pg 46

Mathematics is the Key

SUB TOPIC: DIVISION OF LARGE NUMBERS

Examples:

(i) Divide 3816648 by 132

```
        2 8 9 1 4
   ____________________
132 | 3 8 1 6 6 4 8
    -2 6 4
      1 1 7 6
     -1 0 5 6
        1 2 0 6
       -1 1 8 8
           1 8 4
         - 1 3 2
             5 2 8
           - 5 2 8
```

3816648 ÷ 132= 28914

(ii) There are 6315 books to be packed in 15 boxes. How many books should be packed in each box?

```
      4  2 1 books
   ____________
15 | 6 3 1 5
     6 0
       3 1
     - 3 0
         1 5
        -1 5
```

Activity

1. **Divide the following**
   - $650075 \div 5$
   - $5868 \div 12$
2. **The RDC of a certain district shared sh.982,500 amongst 15 members on the COVID-19 task force in 2020. How much did each member get?**

REFERENCE

A New MK Bk 7 Pg 46

SUB TOPIC: PROPERTIES OF NUMBERS

DISTRIBUTIVE PROPERTY

Examples:

Use the distributive property to work out:

(i) (379 x 27) + (27 x 21)

Re-arrange(27 x 379) + (27 x 21)
= 27 x (379 + 21)
= 27 x (400)
= 27 x 400
= 10800

(ii) (137 x 42) – (37 x 42)

(137 x 42) – (37 x 42)
= (42 x 137) – (42 x 37)
= 42 x (137 – 37)
= 42 x 100
= 4200

Mathematics is the Key

Workout the following;

1. $(2 \times 17) + (2 \times 13)$
2. $(75 \times 29) - (75 \times 19)$
3. $(129 \times 37) - (129 \times 27)$
4. $(290 \div 70) - (10 \div 70)$
5. $(179 \div 13) - (10 \div 13)$

ASSOCIATIVE PROPERTY

Example

The alteration of the position of the brackets does not change the result.

Use the associative property to workout

(5+8)+2 = 5+(8+2) = (5+2)+8

13+2 = 5+10 = 7 +8

15 = 15 = 15

The alteration of the position of the brackets does not change the result.

(5x8) x 2 = 5x(8x2) = (5x2)+8

40x2 = 5x16 = 10x8

80 = 80 = 80

Conclusion : *the associative property holds for both addition and multiplication*

COMMUTATIVE PROPERTY

Example

4+3 = 3+4 (What you start with does not affect the result)

7 7

4x3 = 3x4 (What you start with does not affect the result)

12 = 12

Conclusion: *The commutative property holds for both addition and multiplication*

Given that t*y = ty + y

Find;

i) 2*3

ii) 5*7

REFERENCE

A new MK pri MTC bk 7 pg 47 (new edition)

Mathematics is the Key

END OF TOPIC EXERCISE

1. A wire of length 161 metres was shared by some boys the average length of wire each boy got was 23 metres. Find the number of boys which shared the wire.
2. In a village there are 680 males, 328 females and 462 children. How many people are in that village altogether?
3. Workout 23 – 48 + 37
4. In a league tournament, **3** points were awarded for a win, **1** point for a draw and **0** points for a loss. Five tournaments and the results were recorded as shown below.

Team	P	W	D	L	PTS
BURAMA FC	6	3	2	1	
BURUMA FC	6	4	0	2	
GADAMA FC	6	5	1	0	
ENDAKO FC	6	2	2	2	
PHILIPS FC	6	4	2	0	

P = played **W**= win **D**= Draw **L**= loss

Complete the table with the points for each team.

5. Musa's farm produces 1500 eggs everyday. If a tray of eggs is sold at sh.12000 and it holds 30 eggs.

(a) How many trays does he get everyday?

(b) How much money does he get every day?

(c) A trader bought ten trays of eggs from the farm and sold each at sh. 450.

(i)Calculate the profit made.

(ii) A trader bought other ten trays and 75 eggs got broken. If he sold the remaining eggs at sh. 500 each. Calculate the loss he made.

6. Write 0.0867 in standard form.
7. Write 187000 in standard form
8. A parallegogram has base (8×10^{2})m and height (6.5×10^{-2})m. find its area in standard form
9. Use distributive property to workout the following. (81 x 17) + (19 x 17)
10. Workout. (3.6 x 5) + (6.4 x 5)
11. Workout using distributive property.
    (65 ÷ 5) – (20 ÷ 5)
12. Change 16 to ternary.
13. Write all digits used in base six.
14. Write the value and place value of 3 in 432_{five}.
15. Workout. $110_{two} \times 11_{two}$
16. If $22_{n} = 18_{ten}$. Find the value of n
17. Add $22_{five} + 101_{two}$ (Answer in base six)
18. Solve for x. $x^2 + x^2 = 112_{five}$.
19. Solve for P. 44p = 35nine
20. Divide $31_{five} \div 22_{three}$ (Answer in base ten)
21. Divide 32 ÷ 8 using repeated subtraction.
21. Workout 4x6 using repeated addition
22. Workout 273900 ÷ 4565

Mathematics is the Key

PATTERNS AND SEQUENCES

SUB TOPIC: DIVISIBILITY TESTS

Divisibility for 2.
A Number is divisible by 2 if the digit in the one's place is 0, 2, 4, 6, or 8 eg 1460

Test for 3:
A number is divisible by 3 if the sum of its digits is divisible by 3 eg 741 = 7 + 4 + 1 = 12

Test for 4:
A number is divisible by 4 if the number formed by its last two digits is divisible by 4. eg 572. The last two digits are 7 and 2 therefore the number formed is 72 which is divisible by 4. Hence 572 is divisible by 4.

Test for five (5):
A number is divisible by 5 if the last digit in the ones place is either 0 or 5. eg 360 or 805.

Activity

1. Write any two numbers divisible by 2
2. Which of the numbers is divisible by 3
   34 236 11190 2783
3. Which of the numbers is divisible by 4
   4612 139 8500 7869

Test for 6:
A number is divisible by 6 if it is divisible by 2 and 3. In other words a number is divisible by 6 if it is even and the sum of its digits is divisible by 3.

Example:
618 is divisible by 6 since it is an even number and the sum of its digits 6 + 1 + 8 = 15 is divisible by 3.

738 is divisible by 6 since it is an even number and the sum of its digits 7 + 3 + 8 = 18 is divisible by 3. Therefore 738 is divisible by 6.

Test for 7:
When the last digit of a number is doubled and the result is subtracted from the number formed by the remaining digits, the outcome is divisible by 7.

Example: Take the number 861. the last digit is 1 and the number formed by the remaining digits is 86, double 1 to give (1+1)= 2

Mathematics is the Key

Subtract 2 from 86 to give (86 – 2) = 84
84 is divisible by 7. Hence 861 is also divisible by 7.

Test for 8:
A number is divisible by 8 if the number formed by the last three digits is divisible by 8.
Example:
In the number 7960,760 is number formed by the last three digits. It is divisible by 8 therefore 7960 is divisible by 8.

Test for 9:
A numbers is divisible by 9 if the sum of its digits is divisible by 9.
Example: 198 the sum of 198 is 1+9+8 = 18
18 is divisible by 9 therefore 198 is divisible by 9.

Test for 10:
A number is divisible by 10 if the digit in the ones place is 0 eg 70, 60, 120, 3010.
A number which is divisible by 10 is also divisible by 2 and 5.

Test for 11:
A number is divisble by 11 if the difference between the sum of the digits in even places and the sum of the digits in the odd place is zero (0) or divisible by 11.

eg Even position: 7 3 3 6 8 9

Odd position
Sum of the numbers in odd positions = 7 + 3 + 8 = 18
Sum of the numbers in even positions = 3 + 6 + 9 = 18
Difference between sums =18 – 18 = 11
Since difference is divisible by 11
∴ the number 676390 is divisible by 11.

Activity

1. Which of the following numbers is divisible by 6
   456 1476 129
2. Circle the numbers divisible by10
   34 290 190 2789
3. Which of the following numbers is divisible 9
   1476 91099 189 4567

REFERENCE
A New Edition MK Primary Maths Pupils BK 7 Pg 60-63

Mathematics is the Key

SUB TOPIC: WHOLE, NATURAL, ODD, EVEN AND PRIME NUMBERS

(i) Whole numbers:
All positive numbers with zero (0) inclusive form a set of whole numbers
eg 0, 1, 2, 3, 4, 5, 6, 7, 8, 9,……

(ii) Natural numbers:
Natural numbers are counting numbers. The first natural number is 1
eg 1, 2, 3, 4, 5, 6, 7, 8, 9, …..

(iii) Odd numbers:
Any number which I not exactly divisible by 2
eg 1, 3, 5, 7, 9, …..

(iv) Even numbers:
Any number which is exactly divisible by 2. The first even number is 0
eg 2, 4, 6, 8,

(v) Prime numbers:
Numbers with only two factors. One and itself. The first prime number is 2. 2 is the only even/prime number.
eg 2, 3, 5, 7, ….

Activity

1. Find the sum of the first five;
(a) Prime numbers
(b) Even numbers
(c) Odd numbers
2. Find the product of the fourth prime number and the third whole number.

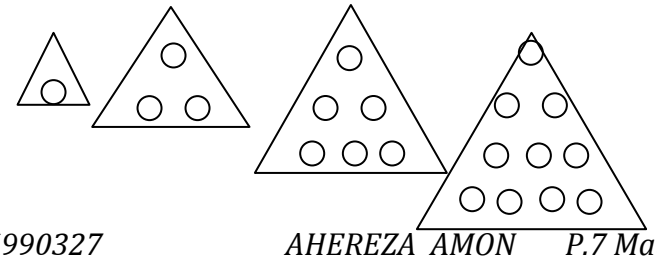
REFERENCE

A New MK Primary Mathematics Bk 7

SUB TOPIC: COMPOSITE, TRIANGULAR, SQUARE, CUBE NUMBERS

(i) Composite numbers:
Numbers with more than two factors. Eg 4, 6, 8, 9 , 10, 12,……

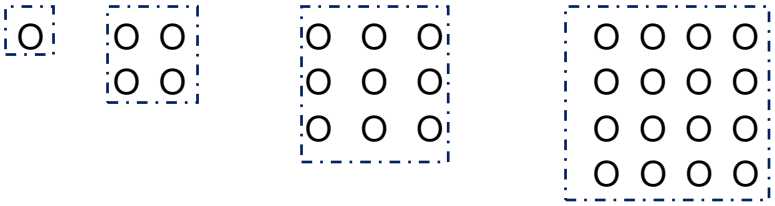
(ii) Triangular numbers:
Numbers got by adding consecutive counting numbers eg 1, 3, 6, 10, ….



Mathematics is the Key

(iii) Square numbers:

Numbers got by adding consecutive odd numbers starting from 1.



1 1 + 3 1 + 3 + 5 1 + 3 + 5 + 7

1 4 9 16

OR

Numbers got after squaring consecutive counting numbers

1 x 1 2 x 2 3 x 3 4 x 4 5 x 5

1 4 9 16 25

(iv) **Cube numbers**:

Numbers got by multiplying a number by itself three times.

Eg 1 x 1 x 1 = $1^3 - 1$

2 x 2 x 2 = $2^3 = 8$

3 x 3 x 3 = $3^3 = 27$

4 x 4 x 4 = $4^3 = 64$

5 x 5 x 5 = $5^3 = 125$

1. Find the sum of the first 8 composite numbers.
2. Find the sum of the third and the seventh triangular numbers.
3. Find the product of the fourth square number and the sixth cube number.

REFERENCE

A New MK Primary Mathematics Bk 7 exercise 4:3 Pg 65

Mathematics is the Key

SUB TOPIC: Finding sum of consecutive counting numbers using the formula

Sum of consecutive counting numbers

$$n(\frac{n+1}{2})$$

Examples .

1. Find the sum of the first 20 counting numbers.

$$n(\frac{n+1}{2})$$

$$20(\frac{20+1}{2})$$

$$20 \times \frac{21}{2}$$

$$10 \times 21$$

$$\underline{210}$$

2. Find the sum of the first 15 counting numbers.
3. Find the sum of the first 40 counting numbers
4. What is the 100th triangular number?

SUB TOPIC: MULTIPLES AND FACTORS

(i) Multiples:

These are numbers which are obtained by multiplying a number by consecutive counting numbers ie. x1 x 2 x 3 , etc

Examples:

(i) M6 = {6 x 1, 6 x 2, 6 x 3, 6 x 4, 6 x 5, 6 x 6, 6 x 7……}
6 12 18 24 30 36 42

(ii) M8 = {8 x 1, 8 x 2, 8 x 3, 8 x 4, 8 x 5, 8 x 6, 8 x 7 ….}
8 16 24 32 40 48 56 ….

(ii) M9 = {9 x 1, 9 x 2, 9 x 3, 9 x 4, 9 x 5, 9 x 6, 9 x 7…..}
9 18 27 36 45 54 63 ….

(ii) Factors:

Any one of a pair of numbers which when multiplied gives the same multiple is called a Factor.

List examples:

All factors of 6

6 ÷ 1 = 6 ***1 x 6 = 6***
6 ÷ 2 = 3 ***2 x 3 = 6***
6 ÷ 3 = 2 ***F_6 = {1, 2, 3, 6}***

Mathematics is the Key

6 ÷ 6 = 1
F_6 = 1, 2, 3, 6
Note F_6 means factors of 6.

Find factors of 9.
1 x 9 = 9
3 x 3 = 9
F_9 = {1, 3, 9}

Activity

1. Find the first 10 multiples of;
   - 5
   - 6
   - 12
   - 9
2. Find the 20th multiple of 5
3. Find all factors of;
   - 12
   - 15
   - 24
   - 29
   - 36

REFERENCE
A New MK Primary Mathematics Bk 7 Pg 81

SUB TOPIC: L.C.M AND H.C.F

(i) Find the LCM of 24, 36 and 40.

2	***24***	***36***	***40***
2	***12***	***18***	***20***
2	***6***	***9***	***10***
3	***3***	***9***	***5***
3	***1***	***3***	***5***
5	***1***	***1***	***5***
	1	***1***	***1***

= 2 x 2 x 2 x 3 x 3 x 5
= 4 x 6 x 15
= 4 x 90
= 360

(ii) Find the HCF of 6, 8 and 12.

2	***6***	***8***	***12***
	3	***4***	***6***

= 2

Activity

1. Find the LCM of 4 and 12
2. Find the LCM of 12 and 16
3. Find the GCF of 15 and 18
4. Find the GCF of 24 and 36

REFERENCE
Mathematics Revision Hand Book for Primary 5 – 7 Pg 62
A New MK Primary Six Mathematics

Mathematics is the Key

SUB TOPIC: APPLICATION OF LCM AND GCF

REMEMBER

The least number that is divided by more than one numbers in called LCM.

The biggest number that divides more than one number at ago is called GCF.

The product of the LCM and GCF is equal to the product of the two numbers.

TRY THESE

(i) Find the least number which is exactly divisible by 6, 8 and 12.

(ii) What is the smallest number of sweets that can be shared by 3, 4 or 6 pupils leaving 5 sweets as a reminder?

(iii) Two bells are used in Star p/s at intervals of 30 minutes and 40 minutes respectively. They are first rung together at 8:45 am, when will the two bells ring together again?

(iv) The product of two numbers is 240. One of them is 60, workout their:

(a) LCM

(b) GCF

(v) The LCM of x and y is 48 and HCF is 4. If x=16 find y.

REFERENCE

MK Primary Mathematics Bk 6 Pg 85 (Old Edition)

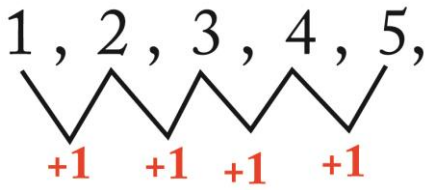
Oxford Primary Mathematics Bk 6 Pg 35

SUB TOPIC: CONSECUTIVE NUMBERS

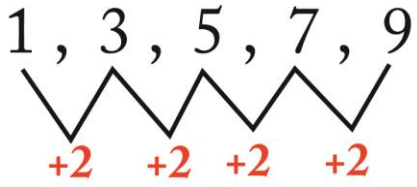
Consecutive numbers are numbers which follow each other using a defined pattern.

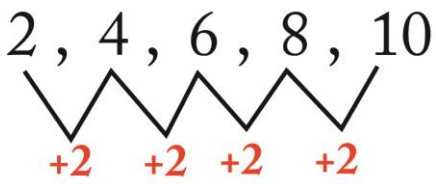
NOTE THE FOLLOWING

- ***Counting number, integers and whole numbers have a range / a pattern of one.***



- ***Even numbers and odd numbers have a range of two.***





Mathematics is the Key

Examples:

(i). *The sum of three consecutive counting numbers is 18. Find the numbers.*

Let the first number be r.

1st	2nd	3rd	Sum
R	R + 1	R + 2	18

$$R + R + 1 + R + 2 = 18$$
$$R + R + R + 1 + 2 = 18$$
$$3R + 3 = 18$$
$$3R + 3 - 3 = 18 - 3$$
$$3R = 15$$
$$\frac{3R}{3} = \frac{15}{3}$$
$$\underline{R = 5}$$

1ST NO.

$R = 5$

2ND NO.

$R + 1 \; but \; R = 5$

$5 + 1 = 6$

3RD NO.

$R + 2 \; where \; R = 5$

$5 + 2 = 7$

The numbers are

5, 6, AND 7

Example ii.

(ii).The sum of 3 consecutive odd numbers is 15. Find the numbers

Let the first number be y.

1st No.	2nd No.	3rd No	Total
Y	Y + 2	Y + 4	15

$$Y + Y + 2 + Y + 4 = 15$$
$$Y + Y + Y = 2 + 4 = 15$$
$$3Y + 6 = 15$$
$$3Y + 6 - 6 = 15 - 6$$
$$3Y = 9$$
$$\frac{3Y}{3} = \frac{9}{3}$$
$$\underline{Y = 3}$$

1st No.

$y = 3$

2nd No.

$y + 2 = y$

$Where \; y = 3$

$3 + 2 = 5$

3rd No.

$y + 4$

$where \; y = 3 \;\; 3 + 4 = 7$

The numbers are

3, 5, and 7

(iii) The sum of 4 consecutive even numbers is 76. What are the numbers?

(iv) The sum of three consecutive integers is 84. Find the numbers

(v) The sum of 3 consecutive odd numbers is 39. Find the numbers

REFERENCE

A New MK Primary Bk 6 Pg 76 Old Edition)

Mathematics is the Key

SUB TOPIC: SQUARES AND SQUARE ROOTS

Examples:

(i) Find the square root of 4.

$\sqrt{4} = 2$

4
2
1

$= \sqrt{2 \times 2} = 2$

(ii) Find the square root of $7\frac{1}{9}$

$$\sqrt{7\frac{1}{9}} = \sqrt{\frac{64}{9}}$$

64
32
16
8
4
2
1

9
3
1

$\sqrt{9} = 3$

$$\sqrt{7\frac{1}{9}} = \sqrt{\frac{64}{9}} = \frac{8}{3} = 2\frac{2}{3}$$

$\sqrt{64} = 2 \times 2 \times 2 = 8$

(iii) Find the square root of the following

- 81
- 196
- 400
- $20\frac{1}{4}$

(iv) Find the square root of 0.36

REFERENCE

A New MK Pupils Bk 6 (Old Edition) Pg 90 – 92

SUB TOPIC: CUBE ROOTS

Example:

Find the cube root of 8.

$\sqrt[3]{8}$

8
4
2
1

$\sqrt[3]{8} = 2$

Mathematics is the Key

Method 2:

$\sqrt[3]{\mathbf{8}} = (\mathbf{2^3})^{\frac{1}{3}}$

$\mathbf{2^{(3\times\frac{1}{3})}} = \mathbf{2^1} = \mathbf{2}$

Find the cube root of;

(a) 27

(b) 64

(c) 125

REFERENCE

Teachers' collection

SUB TOPIC: FINDING MISSING NUMBERS WHEN GIVEN SSEQUENCES

REMEMBER:

- Increasing sequences use addition patterns and multiplication patterns
- Reducing sequences use subtraction patterns and division patterns
- Some sequences fall under types of numbers
- Only prime numbers and composite numbers are the only types of numbers without defined patterns.

Examples

1. Find the next numbers in the sequences below.

a) 2, 3, 5, 8, 12, **17**, **23**

$2 + 1 = 3$

$3 + 2 = 5$

$5 + 3 = 8$

$8 + 4 = 12$

$12 + 5 = \mathbf{17}$

$17 + 6 = \mathbf{23}$

b) 18, 17, 14, 9, **2** , **-7**

$18 - 1 = 17$

$17 - 3 = 14$

$14 - 5 = 9$

$9 - 7 = \mathbf{2}$

$2 - 9 = \mathbf{-7}$

c) 2, 3, 5, 7, 11, **13**, **17**

They are prime numbers

Mathematics is the Key

2. Find the next numbers in the following sequences.
   A) 2, 3, 6, 12, 22, _____, _____
   B) 64, 32, 16, 8, 4, _____,_____
   C) 1, 3, 6, 10, _____, _____
   D) 81, 64, 49, 36, _____, _____
   E) 3, 4, 12, 39,_____,_____

TOPICAL EXERCISE:

1. Add: 426 + 1519 + 3
2. Subtract 105 from 200
3. Evaluate $3^x \div 3^2 = 27$
4. $5^3 \times 5^{-2} \div 5^1$
5. There were 32 apples in each box and 12 boxes in each carton. How many apples did Annet get if she bought 124 cartons?
6. What is the sum of 8456 litres of petrol and 45631 litres?
7. There were 38600 chicken on the teacher's farm. 12364 were sold on Idd day. How many remained?
8. At a party, 4848 people were served with sodas each. How many crates of soda were bought if each crate contains 24 bottles?
9. Work out (a) 2.5 x 13 + 2.5 x 7
10. 4.5 x 75 – 4.5 x 25
11. What number must be added to 54068 to give 60000?
12. Find the sum of even numbers between 13 and 31.
13. List down all the composite numbers between 2 and 15.
14. Find the G.C.F of 8 and 12.
15. What is the Lowest Common Multiple of 6, 8 and 16?
16. Workout the square root of 961.
17. The sum of 3 consecutive natural numbers is 63. Find the numbers.
18. Find the next number in the sequence: 4, 7, 6, 9, 8, 11, …
19. What is the Smallest number which when divided by 9 and 11 leaves a remainder of 2?
20. Bulangiti buses leave for Kasese every 3 hours and Gateway buses leave for Soroti every four hours. Two buses set off from Kampala's bu park at 7:30am. When will the two buses leave together again?
21. The G.C.F of two numbers is 2 and their L.C.M is 24. If one of the numbers is 8, find the second number.
22. The sum of 3 consecutive even numbers is 36. Find their range.
23. Find the cube root of 64.
24. The area of a square garden is 169m2. Fin d its perimeter.
25. Find the square root of 0.81

Mathematics is the Key

TERM TWO:FRACTIONS

SUB TOPIC: OPERATIONS OF FRACTIONS(Addition and subtraction)

Examples:

1. ***workout*** $\frac{1}{3}+\frac{1}{2}$

$$\frac{1}{3}+\frac{1}{2}=\frac{2+3}{6}$$
$$=\frac{5}{6}$$

2. ***Workout:*** $1\frac{3}{4}+1\frac{5}{6}$

$$1\frac{3}{4}+1\frac{5}{6}$$
$$\frac{7}{4}+\frac{11}{6}$$
$$\frac{21\ +\ 22}{12}=\frac{43}{12}$$
$$3\ \frac{7}{12}$$

3. ***Workout:*** $\frac{3}{4}-\frac{1}{3}$

$$\frac{3}{4}-\frac{1}{3}$$
$$\frac{9-4}{12}$$
$$\frac{5}{12}$$

4. **Workout:** $3\ \frac{5}{6}-1\frac{4}{5}$

$$3\ \frac{5}{6}-1\frac{4}{5}$$
$$\frac{23}{6}-\frac{9}{5}$$
$$\left(\frac{23}{6}\times\frac{5}{5}\right)-\left(\frac{9}{5}\times\frac{6}{6}\right)$$
$$\frac{115-54}{30}$$
$$\frac{61}{30}$$
$$2\ \frac{1}{30}$$

Workout the following

(a) $\frac{1}{5}+\frac{2}{3}$

(b) $\frac{7}{8}-\frac{3}{5}$

(c) $2\frac{1}{2}+3\frac{4}{7}$

(d) $5\frac{4}{5}-3\frac{2}{7}$

REFERENCE

A New MK Primary Mathematics Bk 7 Pg 73/74

Mathematics is the Key

SUB TOPIC: OPERATION ON FRACTIONS(multiplication of fractions)

Examples:

1. ***Workout***: $\frac{1}{5} \times 3$

$$\frac{1}{5} \times 3$$
$$\frac{3}{5}$$

2. ***Workout:*** $\frac{1}{3} \times \frac{3}{4}$

$$\frac{1}{3} \times \frac{3}{4}$$
$$\frac{1}{4}$$

3. ***Workout:*** $2\frac{1}{4} \times 1\frac{1}{5}$

$$\frac{9}{4} \times \frac{6}{5}$$
$$\frac{27}{10}$$
$$2\frac{7}{10}$$

4. ***Workout the following***

(a) $\frac{3}{7} \times 35$

(b) $\frac{2}{3} \times \frac{3}{10}$

(c) $\frac{5}{11} \times 1\frac{1}{5}$

(d) $4\frac{3}{7} \times 3\frac{2}{3}$

REFERENCE

A New MK Primary Mathematics Pgs 75/76

SUB TOPIC: OPERATION ON FRACTIONS (Division of fractions)

Examples:

1. ***Workout:*** $\frac{2}{5} \div 2$

$$\frac{2}{5} \div 2$$
$$\frac{2}{5} \times \frac{1}{2}$$
$$\frac{1}{5}$$

2. ***Workout:*** $\frac{3}{4} \div \frac{1}{2}$

$$\frac{3}{4} \div \frac{1}{2}$$
$$\frac{3}{4} \times \frac{2}{1}$$
$$\frac{3}{2}$$
$$1\frac{1}{2}$$

Try these:

1. ***Workout the following.***

(a) $\frac{3}{4} \div \frac{1}{3}$

(b) $\frac{4}{5} \div \frac{1}{8}$

(c) $\frac{5}{11} \div \frac{7}{22}$

(d) $5\frac{3}{4} \div 3\frac{1}{2}$

REFERENCE

A New MK Primary Mathematics Bk 7 Pg 80

Mathematics is the Key

SUB TOPIC: **USE OF BODMAS (combined operations)**

Brackets
Of
Division
Multiplication
Addition
Subtraction

Examples:

1. Workout : $\frac{2}{3} of \frac{3}{4} - \frac{1}{3}$

$$\frac{2}{3} of \frac{3}{4} - \frac{1}{3}$$
$$\left(\frac{2}{3} \times \frac{3}{4}\right) - \frac{1}{3}$$
$$\frac{1}{2} - \frac{1}{3}$$
$$\left(\frac{1}{2} \times \frac{3}{3}\right) - \left(\frac{1}{3} \times \frac{2}{2}\right)$$
$$\frac{3}{6} - \frac{2}{6}$$
$$\frac{3-2}{6}$$
$$\frac{1}{6}$$

2. : $\boldsymbol{Workout \frac{5}{6} - \frac{3}{4} \div \frac{3}{2}}$

$$\boldsymbol{\frac{5}{6} - \frac{3}{4} \div \frac{3}{2}}$$
$$\boldsymbol{\frac{5}{6} - \left(\frac{3}{4} \div \frac{3}{2}\right)}$$
$$\boldsymbol{\frac{5}{6} - \frac{3}{4} \times \frac{2}{3}}$$
$$\boldsymbol{\frac{5}{6} - \frac{1}{2}}$$
$$\boldsymbol{\frac{\left(\frac{5}{6} \times 6\right) - \left(\frac{1}{2} \times 6\right)}{6}}$$
$$\boldsymbol{\frac{5-3}{6}}$$
$$\boldsymbol{\frac{2}{6}}$$
$$\boldsymbol{\frac{1}{3}}$$

Activity

1. **Workout the following.**
   - **(a)** $\boldsymbol{\frac{1}{2} - \frac{3}{4} + \frac{5}{6}}$
   - **(b)** $\boldsymbol{\frac{2}{3} \times \frac{1}{3} \div \frac{3}{4}}$
   - **(c)** $\boldsymbol{\frac{3}{7} of \frac{5}{6} + 3\frac{1}{3}}$

REFERENCE

A New MK Primary Mathematics Pg 127 (Old Edition)

Mathematics is the Key

SUB TOPIC: APPLICATION OF FRACTIONS IN REAL LIFE SITUATION

1. ***A boy had a jerry can full of water. He used $\frac{13}{20}$. What fraction remained?***

$$1 - \frac{13}{20} = \frac{20}{20} - \frac{13}{20} = \frac{7}{20}$$

2. Mary bought a cake and she ate $\frac{1}{3}$ in the morning, $\frac{5}{12}$ in the afternoon and the rest in the evening. What fraction of the cake did she eat in the evening.

$$1 - \left(\frac{1}{3} + \frac{5}{12}\right)$$
$$1 - \left[\left(\frac{1}{3} \times \frac{4}{4}\right) + \frac{5}{12}\right]$$
$$1 - \left(\frac{4}{12} + \frac{5}{12}\right)$$
$$1 - \frac{9}{12}$$
$$\frac{12}{12} - \frac{9}{12}$$
$$\frac{3}{12}$$
$$\frac{1}{3}$$

3. If $\frac{2}{3}$ of a number is 40. What is the number?

Let the number be m

$$\frac{2}{3} of\ m = 40$$
$$\frac{2}{3} \times m = 40$$
$$\frac{2m}{3} = 40$$
$$3 \times \frac{2m}{3} = 40 \times 3$$
$$2m = 120$$
$$\frac{2m}{2} = \frac{120}{2}$$
$$\underline{m = 40}$$

4. $\frac{3}{4}$ of a number is 180. Find the number.
5. How many half litre cups of water can fill a 20 litre jerrycan?
6. In a class, $\frac{2}{5}$ are boys and the rest are girls.
   (a) Find the fraction of girls.
   (b) If there are 45 girls, how many pupils are in the class?
   (c) If $\frac{1}{3}$ of the pupils have black shoes, how many pupils do not have black shoes?

Mathematics is the Key

7. The tank was $\frac{2}{3}$ full of water. One day , James used $\frac{1}{4}$ of the water for washing and 100 litres remained.
   (a) What fraction of the tank was used for washing?
   (b) How many litres of water can it hold when full?
8. A, B and C contributed to start a Company. A paid $^{3}/_{10}$ of the cost and B contributed $^{5}/_{10}$ of the cost.
   i. What fraction did C contribute?
   ii. If C contributed shs 30,000 what was their total contribution?

REFERENCE A New MK Primary Mathematics Bk 7 Pgs 74 – 78

SUB TOPIC: APPLICATION OF FRACTIONS(of the remainder)

Examples:

1. Twaha spent $^{1}/_{3}$ of his money on books and $^{1}/_{6}$ of the remainder on transport.
   (i) What fraction of his money was left?

Fraction spent on books = $^{1}/_{3}$

Remaining fraction: $1 - \frac{1}{3} = \frac{3}{3} - \frac{1}{3} = \frac{2}{3}$

Fraction spent on transport: $\frac{1}{6}\ of\ \frac{2}{3} = \frac{1}{6} \times \frac{2}{3}$

$= \frac{1}{9}$

transport and books: $\frac{1}{3} + \frac{1}{9}$

$\frac{1}{3} \times \frac{3}{3} + \frac{1}{9} = \frac{3}{9} + \frac{1}{9} = \frac{4}{9}$

Remained fraction = $1 - \frac{4}{9} = \frac{9}{9} - \frac{4}{9} = \frac{5}{9}$

(ii) If he was left with shs 15,000= how much did he have at first?

Let the total be y.

$\frac{5}{9}\ of\ y = sh.15,000$

$\frac{5}{9} \times y = sh.15,000$

$\frac{5y}{9} = sh.15,000$

$\frac{9}{5} \times \frac{5y}{9} = sh.15000\ x\ \frac{9}{5}$

$y = sh.3000\ x\ 9$

$y = sh.27,000$

He had sh.27,000 at first

2. A father shared his land as follows, $\frac{1}{3}$ was given to the son, $\frac{1}{4}$ of the remaining land to the daughter and the rest was remained for the parents.
(a).What fraction of the land remained for the parents
(b).if the son got 12 hectares more than the daughter, calculate the total size of the land.

REFERENCE: A New MK Primary Mathematics Bk 7 Pg 78

Mathematics is the Key

SUB TOPIC: APPLICATION OF FRACTIONS(taps)

1. Tap A can fill the tank in 6 minutes and tap B can fill the same tank in 3 minutes. How long will both taps take to fill the tank if they are opened at the same time?
Method 1:

Tap A ***Tap B***

$^{1}/_{6}$ $^{1}/_{3}$

$$\textbf{\textit{Tap A and B}} = \frac{1}{6} + \frac{1}{3} = \frac{1+2}{6} = \frac{3}{6} = \frac{1}{2}$$

$$\textbf{\textit{In 1 minute the tank will be}}\ 1 \div ½ = 1 \times \frac{2}{1}$$

$$= 2\ \textbf{\textit{minutes}}$$

Note: ½ (1 part is filled in 1 minute)

$^{2}/_{2}$ (2 parts are filled in 2 minutes)

2. Tap **A** can fill the tank in 3 minutes while tap **B** can empty the same tank in 5 minutes. If they are opened at the same time, how long will they take to fill the tank?
3. Tap F can fill the tank in 6 hours, tap G can fill the tap in 8 hours and tap H can empty the tank in 12 hours. If they are opened at the same time, how long will they take to fill the tank?

REFERENCE

MK math Bk 7 Pg 79

SUB TOPIC: CHANGING VULGAR FRACTIONS TO DECIMALS

Examples

1. Convert $\frac{5}{8}$ to a decimal fraction

$$\begin{array}{r} 0.625 \\ 8\overline{)\,50} \\ -48 \\ \hline 20 \\ -16 \\ \hline 40 \\ -40 \\ \hline 00 \end{array}$$

$\frac{5}{8} = 0.625$

Try these

1. Convert the following fractions to decimals

(a) $\frac{1}{2}$ ***(b)*** $\frac{1}{4}$ ***(c)*** $\frac{1}{8}$

Mathematics is the Key

SUB TOPIC: CHANGING DECIMALS TO VULGAR FRACTIONS

Examples:

1. Convert the following decimals to fractions

(a) 0.125

$$0.125 = \frac{\cancel{125}^{1}}{\cancel{1000}_{8}}$$

$$0.125 = \frac{1}{8}$$

$(b)\ 7.25$

$$7.25 = 7 + \frac{\cancel{25}^{1}}{\cancel{100}_{4}}$$

$$0.25 = 7 + \frac{1}{4}$$

$$0.25 = 7\frac{1}{4}$$

Activity

1. Convert the following decimals to fractions
   (a) 0.5
   (b) 0.75
   (c) 0.45
   (d) 1.4
   (e) 12.08

REFERENCE

A New MK Primary Mathematics Bk 7 Pg 88

SUB TOPIC: CHANGING VULGAR FRACTIONS TO RECURRING DECIMALS

Examples: Convert the following to decimal

(a) $\frac{3}{11}$

```
   0.2727...
11 | 30
   -22
    80
   -77
     30
    -22
      80
     -77
       30
```

$\frac{5}{8} = 0.2727...$

(b) $\frac{1}{12}$

```
   0.8333...
12 | 100
   - 96
     40
    - 36
      40
     - 36
       40
      - 36
        4
```

$\frac{5}{8} = 0.8333...$

Convert the following to decimal

Mathematics is the Key

(a) $\frac{4}{11}$ (c) $\frac{7}{9}$

(b) $\frac{1}{15}$ (d) $\frac{9}{11}$

SUB TOPIC: CHANGING RECURRING DECIMALS TO VULGAR FRACTIONS

Examples:

- Changing recurring decimals to rational numbers:

1. $0.333\ldots$

$Let\ the\ No.be\ y$

$y = 0.333\ldots$

$10 \times y = 0.333\ldots \times 10$

$10y = 3.33\ldots$

$10y = 3.33\ldots.$

$-y\ -0.33\ldots$

$\frac{9y}{9} = \frac{3}{9}$

$y = \frac{1}{3}$

$t = 0.4545\ldots..$

$100 \times t = 0.4545\ldots \times 100$

$100t = 45.45\ldots$

$\underline{-t\ \ -0.45\ldots}$

$99t = 45$

$\frac{99t}{99} = \frac{45}{99}$

$y = \frac{5}{11}$

2. $0.4545\ldots..$

$Let\ the\ No.be\ t$

3. $0.1666\ldots..$

$Let\ the\ No\ be\ a$

$a = 0.1666\ldots$

$10 \times a = 0.1666\ldots \times 10$

$10a = 1.666\ldots..$

$100 \times a = 0.166\ldots. \times 1000$

$100\,a = 16.666\ldots$

$100a = 16.666\ldots.$

$\underline{-10a = -1.666\ldots.}$

$90a = 15$

$\frac{90a}{90} = \frac{15}{90}$

$a = \frac{1}{6}$

Activity.

Convert the following recurring decimal fractions to vulgar fractions.

(a) 0.333… **(b) 0.1212....**

Mathematics is the Key

(c) 0.6363… **(d) 0.01666…**

REFERENCE

A New MK Primary Mathematics Bk 7 Pg 91

SUB TOPIC: DECIMALS (Addition and of decimals)

Examples:

Workout the following

1. 3.4 + 0.23

$$\begin{array}{r} 3.4 \\ +0.23 \\ \hline 3.63 \\ \hline \end{array}$$

2. 5 – 0.03

$$\begin{array}{r} 5.00 \\ -0.03 \\ \hline 4.97 \\ \hline \end{array}$$

Activity

Workout the following

(a) $4.57 + 4.94$

(b) $4.01 - 2.97$

(c) $5.47 + 23.98$

(d) $2 - 0.45$

Emphasis on:

(i) arrangement of numbers according to place value.

REFERENCE

New MK Primary Mathematics Bk 7 Pg 94 (Old Edition)

SUB TOPIC: DECIMALS (Multiplication of decimals)

Examples:

Examples:

Workout the following

a. 27.36 x 6

$$\begin{array}{r} 27.36 \\ \times \quad 6 \\ \hline 164.16 \\ \hline \end{array}$$

b. 11.9 x 0.3

$$\frac{119}{10} \times \frac{3}{10}$$

$$\frac{357}{100}$$

$$3.57$$

Mathematics is the Key

Multiply the following.

(a) 4.25×0.08

(b) 12.45×3.6

(c) 90.06×1.5

REFERENCE

New MK Primary Mathematics Bk 7 Pg 96 (Old Edition)

SUB TOPIC: DECIMALS (Division of decimals)

Examples:

1. $0.72 \div 9$

$\frac{72}{100} \div \frac{9}{1}$

$\frac{72}{100} \times \frac{1}{9} = \frac{8}{100}$

0.8

2. $0.12 \div 0.3$

$\frac{12}{100} \div \frac{3}{10}$

$\frac{12}{100} \times \frac{10}{3} = \frac{4}{10}$

0.4

Workout the following

(a) $6.4 \div 0.08$

(b) $1.25 \div 2.5$

(c) $1.6 \div 1.2$

REFERENCE

New MK Primary Mathematics Bk 7 Pg 97 (Old Edition)

SUB TOPIC: DECIMALS (using BODMAS)

Examples

1. **Workout**. $8 - 5.16 + 3.07$

Re-arrange first 8 + 3.07 – 5.16

8 .0 0	***11 . 0 7***
+ 3. 0 7	***- 5. 1 6***
11.0 7	***5. 9 1***

2. Workout :$0.2 \times 1.6 - 2.7$

$(0.2 \times 1.6) - 1.7$

$3.2 - 1.7$

1.5

3. $Workout$: $2.4 \div 1.2\ of\ 0.2$

$2.4 \div (1.2\ of\ 0.2)$

Mathematics is the Key

$$2.4 \div (1.2 \times 0.2)$$

$$\frac{24}{10} \div \left(\frac{12}{10} \times \frac{2}{10}\right)$$

$$\frac{24}{10} \div \left(\frac{24}{100}\right)$$

$$\frac{24}{10} \times \frac{100}{24}$$

$$\underline{\underline{10}}$$

Activity

Workout the following

(a) $5.6 - 7.8 + 6.12$

(b) $1.6 + 0.6 \times 1.2$

(c) $3.5 \times 0.12 \div 0.4$

(d) $1.0\ of\ 6.4 \div 0.08$

SUB TOPIC: DECIMALS (mixed operation)

Examples:

Simplify the following

1. $\frac{0.24 \times 0.3}{0.8}$

$$\left(\frac{24}{100} \times \frac{3}{10}\right) \div \left(\frac{8}{10}\right)$$

$$\frac{24}{100} \times \frac{3}{10} \times \frac{10}{8}$$

$$\frac{3 \times 3}{100} = \frac{9}{100}$$

$$\underline{\underline{0.09}}$$

2. $\frac{0.06 \times 2.4}{1.2}$

3. $\frac{0.24 \times 1.6}{3.6}$

4. $\frac{2.7 \times 0.54}{1.63 + 0.17}$

REFERENCE

New MK Primary Mathematics Bk 7 Pg 135 (Old Edition)

Mathematics is the Key

SUBTOPIC: Word problems on decimals

1. A carpenter bought 3 pieces of timber each measuring 1.97m.Find the total length of the timber he bought.

$$1.97 \times 3m$$
$$\frac{197}{100} \times \frac{3}{1} m$$
$$\frac{591}{100} m$$
$$\underline{5.91\,m}$$

2. How many 0.5 litre cups can be got from a 20 litre jerry can?

$$20 \div 0.5$$
$$20 \div \frac{5}{10}$$
$$20 \times \frac{10}{5}$$
$$4 \times 10$$
$$40\ cups$$

3. **How many 0.25 litre cups can fill a 15 litre jerrycan of water?**
4. **James cut 2.5 m pieces of cloth from a 40 metre piece of cloth. How many pieces did he get?**
5. **How many 0.5 litre cups can fill a 12 bucket of water?**

RATIOS

A ratio is a comparison of objects

SUB TOPIC: Expressing quantities as ratios

Examples:

1. A class has 20 boys and 30 girls. What is the ratio of boys to girls?

$$\textit{The ratio of boys to girls.}$$
$$\underline{\textit{Number of boys}}$$
$$\textit{Number of girls}$$
$$\frac{20}{30}$$
$$\frac{2}{3}$$

$$\underline{\textit{The ratio of boys to girls is } 2:3 \textit{ and the ratio of girls to boys is } 3:2}$$

2. On Mr.Okello's farm, there are 40 cows, 25 goats, 60 hens and 15 pigs. Find the;
   (a) Ratio of goats to cows
   (b) Ratio of hens to pigs

Mathematics is the Key

(c) Ratio of pigs to cows
(d) Ratio of cows to the total number
(e) Cows to goats to pigs to hens

REFERENCE
New MK Primary Mathematics Bk 7 Pg 96 (Old Edition)

SUB TOPIC: Sharing quantities in ratios

Examples:

1. Bob, Bonny and Ben shared 60 oranges in the ratio of 2:3:5 respectively. How many oranges did each boy get?

$$\underline{\boldsymbol{Total\ ratio}}$$
$$\mathbf{2+3+5=10}$$
$$\underline{\boldsymbol{Bob}}$$
$$\frac{\mathbf{2}}{\mathbf{10}}\times\mathbf{60}=\mathbf{2}\times\mathbf{6}=\mathbf{12}\ \boldsymbol{Oranges}$$
$$\underline{\boldsymbol{Bonny}}$$
$$\frac{\mathbf{3}}{\mathbf{10}}\times\mathbf{60}=\mathbf{3}\times\mathbf{6}=\mathbf{18}\ \boldsymbol{Oranges}$$
$$\underline{\boldsymbol{Ben}}$$
$$\frac{\mathbf{5}}{\mathbf{10}}\times\mathbf{60}=\mathbf{5}\times\mathbf{6}=\mathbf{30}\ \boldsymbol{Oranges}$$

2. Share 18 in the ratio 4:5

$$\boldsymbol{Total\ ratio}\ =\ \mathbf{4}\ +\ \mathbf{5}\ =\ \mathbf{9}$$
$$\boldsymbol{1st\ share}\ =\ \frac{\mathbf{4}}{\mathbf{9}}\times\mathbf{18}\ =\ \mathbf{4}\times\mathbf{2}\ =\ \mathbf{8}$$
$$\boldsymbol{2nd\ share}\ =\ \frac{\mathbf{5}}{\mathbf{9}}\times\ \mathbf{18}=\ \mathbf{5}\ \times\mathbf{2}=\mathbf{10}$$

3. In a class of 80pupils,the ratio of boys to girls is 3:5
   (a) Find the number of girls
   (b) Find the number of boys
   (c) If $\frac{3}{4}$ of the girls have school uniform, how many girls don't have uniform?
4. James, Jack and Oscar shared sh.24,000 in the ratio of 3:7:2 respectively. How much money did each get?

REFERENCE
New MK Primary Mathematics Bk 7 Pg 99 (Old Edition)

Mathematics is the Key

SUB TOPIC: Finding the number shared in the given ratio

Examples:

1. Mary, Jane and shared money in the ratio 2:3:1 respectively. If Mary got shs 12,000. How much money did they share?

$$\textbf{Total ratio} = 2 + 3 + 1 = 6$$

$$\textbf{Mary had 2 parts rept } sh.12,00$$

$$1\ part\ repts\ \frac{sh.12000}{2}$$

$$6\ parts\ rept\ \frac{sh.12000}{2} \times 6$$

$$sh.12000 \times 3$$

$$sh.36,000$$

$$\underline{They\ shared\ sh\ 36,000}$$

2. **The ratio of boys to girls in a class is 2:3. If there are 45 girls, how many pupils are in the class?**
3. **The number of goats, cows and sheep on a certain farmare in the ratio of 4:3:5 respectively. There are 40 more sheep than goats on the farm. Find the number of each type of animal on the farm**

REFERENCE

New MK Primary Mathematics Bk 7 Pg 112 (Old Edition)

SUB TOPIC: Increasing and decreasing quantities in a given ratio

Example1: Increase 80kg in the ratio of 5:4

$$\frac{5}{4} \times 80kg$$

$$5 \times 20kg$$

$$\underline{100kg}$$

Example 2: Decrease sh.2000 in the ratio of 3:5

$$\frac{3}{5} \times sh.2,000$$

$$3 \times sh.400$$

$$\underline{sh.1,600}$$

Decrease the following as instructed

(a) 400g in the ratio of 1:4

(b) Sh.10,000 in the ration of 7:20

Increase the following as instructed

(a) 8,000g in the ratio of 1:4

(b) Sh.28,000 in the ration of 7:20

Mathematics is the Key

REFERENCE

New MK Primary Mathematics Pg 97 (Old Edition)

SUB TOPIC: FINDING RATIO OF INCREASE OR DECREASE

$$\boldsymbol{Ratio\ of\ increase/decrease\ =\ \frac{New\ no.}{old\ no.}}$$

$$\boldsymbol{Ratio\ of\ increase/decrease\ =\ new\ number\ :\ old\ number}$$

Examples:

1. In what ratio must 30 be decreased to 24?

   $\boldsymbol{New: old}$

   $\boldsymbol{24:30}$

   $\boldsymbol{\frac{24}{6}:\frac{30}{6}}$

   $\underline{\boldsymbol{4:5}}$

2. The number of pupils in a school increased from 480 by 60. In what ratio did it increase?

   $\boldsymbol{Old\ no.} = 480$

   $\boldsymbol{New\ no.} = 480 + 60 = 540$

   $\boldsymbol{New: old}$

   $\boldsymbol{540:480}$

   $\boldsymbol{\frac{540}{60}:\frac{480}{60}}$

   $\underline{\boldsymbol{9:8}}$

3. In what ratio must 90 be increased to 120
4. Allen's salary reduced from sh.90,000 to sh.85,000. In what ratio did Allen's salary reduce?
5. Dan's salary reduced from sh.90,000 to sh.85,000. In what ratio did Dan's salary reduce?
6. Jamada had 200 mangoes and later he sold 80 oranges. In what ratio did his oranges reduce?

REFERENCE

New MK Primary Mathematics Bk 7 Pg 97

Mathematics is the Key

SUB TOPIC: Finding numbers increased in ratios

1. **What number becomes 54 when increased in the ratio of 9:8?**
   Let the number becomes k

$$\frac{9}{8} \times k = 54$$
$$\frac{9k}{8} = 54$$
$$8 \times \frac{9k}{8} = 54 \times 8$$
$$9k = 54 \times 8$$
$$\frac{9k}{9} = \frac{54 \times 8}{9}$$
$$k = 6 \times 8$$
$$\underline{k = 48}$$

Activity

1. The number of pupils in a class increased in the ratio of 3:4 to 120. How many pupils were in class before?
2. What number becomes 30 when increased in the ratio of 4:5?
3. Peters new salary is sh.300,000. Find his old salary if it was increased in the ratio of 15:13.

SUB TOPIC: Finding numbers decreased in ratios

1. **What number becomes 64 when increased in the ratio of 8:11?**
   Let the number becomes k

$$\frac{8}{11} \times m = 64$$
$$\frac{8m}{11} = 64$$
$$11 \times \frac{8m}{11} = 64 \times 11$$
$$8m = 64 \times 11$$
$$\frac{8m}{8} = \frac{64 \times 11}{8}$$
$$m = 11 \times 8$$
$$\underline{m = 88}$$

Activity

1. The number of pupils in a class reduced in the ratio of 2:3 to 60. How many pupils were in class before?
2. What number becomes 63 when decreased in the ratio of 7:13?
3. After having an accident, Ann's eggs got broken and reduced in the ratio of 3:7.if she remained with 45 eggs, how many eggs did she have at first?

Mathematics is the key

SUB TOPIC: Direct proportion

Examples:

1. Two books cost shs 2000. Find the cost of 6 similar books.

$$\mathbf{2\ books\ cost\ sh\ 2000}$$
$$\mathbf{1\ book\ costs}\ \frac{\mathbf{sh\ 2000}}{\mathbf{2}}$$
$$\mathbf{6\ books\ cost}\ \frac{\mathbf{shs\ 2000}}{\mathbf{2}} \times \mathbf{6}$$
$$\mathbf{2000\ \times\ 3}$$
$$\underline{\mathbf{Shs\ 6,000}}$$

2. The cost of 4 rulers is sh.2,800.find the cost of 13 similar rulers.
3. A bicycle can cover a distance 20 km in just 40minutes. What distance can it cover in $2\frac{1}{2}hours$ moving at the same speed?
4. $^{2}/_{3}$ of the books in the book shop are school text books. How many books are in the book shop altogether if the school textbooks are 240?

REFERENCE

New MK Primary Mathematics Bk 7 Pg 115 (Old Edition)

SUB TOPIC: Indirect/inverse proportion

Examples:

1. 4 men take 9 days to complete a job. How long will 12 men take to finish the job at the same rate?

$$\mathbf{4\ men\ take\ 9\ days}$$
$$\mathbf{1\ man\ take\ 9\ \times 4\ days}$$
$$\mathbf{12\ men\ take}\ \frac{\mathbf{9\times\ 4}}{\mathbf{12}}\mathbf{\ days}$$
$$\underline{\mathbf{3\ days}}$$

2. If 12 girls can sweep the compound in 90 minutes, how long will 15 girls take to sweep the same compound?
3. A taxi can cover a distance in 4 hours at a speed of 60km/hour, at what speed can a taxi move in order to cover the same distance in 3hours

REFERENCE

New MK Primary Mathematics Bk 7 Pg 104 (New Edition)

Mathematics is the Key

SUB TOPIC: Expressing quantities as percentages

1. In a school, there are 150 boys and 100 girls. Express the number of;
   (a) girls as a percentage

$$\frac{100}{100+150}\times 100\%$$

$$\frac{10}{25}\times 100\%$$

$$10\times 4\%$$

$$40\%$$

   (b) boys as a percentage

$$\underline{100\%-40\%=60\%}$$

2. **On a farm, there are 20 goats and 15 sheep.**
   (a) Find the percentage of sheep on the farm
   (b) Find the percentage of goats on the farm
3. **James spent sh.5,000 and saved the rest of his sh.20,000 which he had.**
   (a) calculate the percentage of the money he spent.
   (b) calculate the percentage of the money he saved.
4. Write 20 as a percentage of 80.
5. Amos got 12 out of 25 in a Maths test. Express his mark as a percent.

SUB TOPIC: Expressing one quantity as percentage of another

1. **Express 15 minutes as percentage of an hour.**

$$\frac{15}{60}\times 100\%$$

$$\frac{1}{4}\times 100\%=25\%$$

2. **Express 60cm as a percentage of 2m**
3. **Express 9 items as a percentage of $2\frac{1}{2}\ dozens$.**
4. **What is 400m as a percentage of a kilometre?**
5. **Express 40 minutes as a percentage of 2 hours**

SUB TOPIC: Finding quantities equivalent to a percentage

Examples

1. **What is 20% of 60 mangoes?**

$$20\%\ of\ 60\ mangoes$$

$$\frac{20}{100}\times 60\ mangoes$$

$$2\times 6\ mangoes$$

$$12\ mangoes$$

Mathematics is the Key

2. **What is $33\frac{1}{3}$ *of* 45 *books*?**

$$33\frac{1}{3}\% \text{ of } 45 \text{ books}$$
$$33\frac{1}{3}\% \times 45 \text{ books}$$
$$\frac{33\frac{1}{3}}{100} \times 45 \text{ books}$$
$$\left(\frac{100}{3} \div 100\right) \times 45 \text{ books}$$
$$\left(\frac{100}{3} \times \frac{1}{100}\right) \times 45 \text{ books}$$
$$\frac{1}{3} \times 45 \text{ books}$$
$$\underline{15 \text{ books}}$$

3. **What is 78% of sh.40,000?**
4. **What is 34% of 250?**
5. **What is 60% of 50?**
6. **What is 12% of sh.69,000?**

SUB TOPIC: Solving problems involving percentages

Examples:

1. If 20% of a number is 40, what is the number?

$$\textit{Let the number be } m$$
$$20\% \text{ of } m = 40$$
$$\frac{20}{100} \times m = 40$$
$$\frac{m}{5} \times 5 = 40 \times 5$$
$$\underline{m = 200}$$

2. If 80% of the children at the health centre were immunized against measles in the month of April,
   (a) what percentage of the children were immunized in other months?

$$100\% - 80\% = 20\%$$

   (b) How many children were immunized altogether given that 1600 children were immunized in April?

$$\textit{Let the total number of children be } y$$
$$80\% \text{ of } y = 1600$$

Mathematics is the Key

$$\frac{80}{100} \times y = 1600$$
$$\frac{8y}{10} = 1600$$
$$10 \times \frac{8y}{10} = 1600 \times 10$$
$$8y = 1600 \times 10$$
$$\frac{8y}{8} = \frac{16000}{8}$$
$$y = 2,000\ children$$

(c) How many children were immunized in other months?

$$\frac{20}{100} \times 2000\ children$$
$$20 \times 20$$
$$400\ children$$

Activity

1. If 30% of my salary is spent on food and I save sh. 21,000. What is my salary?
2. If 15% of a number is 90. Find the number.
3. If 40% of a class is absent;
   a. What percentage is a present?
   b. How many pupils are in class if 24 pupils are absent in class?
4. 35% of the pupils in a school like rice while 10% like potatoes. If the rest like posho,
   (a) What percentage of pupils like posho?
   (b) How many pupils are in school if 63 pupils like posho?

SUB TOPIC: Solving problems involving percentages

Examples:

3. There are 20% more boys than girls in a class.
   a) Find the percentage of girls.

Let the %ge of girls be m

boys	girls	TL
m+20	m	100

$$m + m + 20 = 100\%$$
$$2m + 20 = 100$$
$$2m + 20 - 20 = 100 - 20$$
$$2m = 80$$
$$\frac{2m}{2} = \frac{80}{2}$$
$$\underline{m = 40\%}$$

Mathematics is the Key

b) Find the percentage of boys.

$$m + 20\%$$
$$40 + 20\%$$
$$60\%$$

c) If there are 90 boys in the class, how many pupils are in the class?

Let the total number of pupils be w

$$\frac{60}{100} \times w = 90$$
$$100 \times \frac{60w}{100} = 90 \times 100$$
$$60w = 90 \times 100$$
$$\frac{60w}{60} = \frac{90 \times 100}{60}$$
$$\underline{w = 150\ pupils}$$

4. If 20% of a number is 40, what is the number?

$$Let\ the\ number\ be\ m$$
$$20\%\ of\ m = 40$$
$$\frac{20}{100} \times m = 40$$
$$\frac{m}{5} \times 5 = 40 \times 5$$
$$\underline{m = 200}$$

- Nanyonjo earns sh. 12,000. She spends 75% and saves the rest.
  - How much does she spend?
  - How much does she save?

- 4.If 30% of my salary is spent on food and I save sh. 21,000. What is my salary?
- If 40% of a class is absent, what percentage is present?
  - What percentage is a present?

- 35% of the pupils in a school like rice while 10% like potatoes. If the rest like posho, what percentage of pupils like posho?

REFERENCE

New MK Primary Mathematics Bk 7 Pg 111 and 112 (New Edition)
New MK Primary Mathematics Bk 7 Pg 113 - 114 (New Edition)

Mathematics is the Key

SUB TOPIC: Increasing quantities using percentages

Examples:

1. Increase 800 by 20%

$$\boldsymbol{New\ amount} := \ \boldsymbol{100\%} + \boldsymbol{20\%\ of\ old\ amount}$$
$$= \ \boldsymbol{120\%} \times \boldsymbol{800}$$
$$= \frac{\boldsymbol{120}}{\boldsymbol{100}} \times \boldsymbol{800}$$
$$\underline{= \boldsymbol{960}}$$

2. Increase 800 pupils by 12 ½ %:

$$\boldsymbol{New\ number} \ = \ \boldsymbol{100\%} + \boldsymbol{12\ ½\ \%\ of\ old\ number}$$
$$= \ \boldsymbol{112\ ½\ \%\ of\ 800\ pupils}$$
$$= \frac{\boldsymbol{225\%}}{\boldsymbol{2}} \times \boldsymbol{800\ pupils}$$
$$= \frac{\boldsymbol{225}}{\boldsymbol{2}} \div \boldsymbol{100} \times \boldsymbol{800}$$
$$= \frac{\boldsymbol{225}}{\boldsymbol{2}} \times \frac{\boldsymbol{1}}{\boldsymbol{100}} \times \boldsymbol{800}$$
$$= (\boldsymbol{225} \times \boldsymbol{4})\ \boldsymbol{pupils}$$
$$\underline{= \boldsymbol{900\ pupils}}$$

3. Increase shs 4800 by 10% and then by 20%

$$\boldsymbol{Old\ amount} \ = \boldsymbol{shs\ 4800}$$
$$\boldsymbol{10\%\ increment} = \boldsymbol{100\%} + \boldsymbol{10\%} = \boldsymbol{110\%}$$
$$\boldsymbol{20\%\ increment} = \boldsymbol{100\%} + \boldsymbol{20\%} = \boldsymbol{120\%}$$
$$\boldsymbol{110\%} \times \boldsymbol{120\%\ of\ sh.4800}$$
$$\frac{\boldsymbol{110}}{\boldsymbol{100}} \times \frac{\boldsymbol{120}}{\boldsymbol{100}} \times \boldsymbol{sh.4800}$$
$$\boldsymbol{11} \times \boldsymbol{12} \times \boldsymbol{48}$$
$$\underline{\boldsymbol{Sh.6336}}$$

- **Increase the following as instructed**
  - **90 by 15%**
  - **400 by 60%**
  - **Sh.20,000 by 20% by 30%**

REFERENCE

New MK Primary Mathematics Bk 7 Pg 109 - 110 (New Edition)

Mathematics is the Key

SUB TOPIC: Decreasing quantities using percentages

1. Decrease sh. 1,500 by 10%

New amount as percentage

$$100\% - 10\% = 90\%$$

$$\textit{New amount}: = 90\% \textit{ of } sh.1500 =$$

$$\frac{90}{100} \times sh.1500$$

$$90 \times 15$$

$$\underline{sh.1350}$$

2. Decrease 720 dollar a by $33^1/_3\%$

$$\textit{New percentage} = 100\% - 33\frac{1}{3}\% = 66\frac{2}{3}\%$$

$$\textit{New amount} = 66\frac{2}{3}\% \textit{ of } 720 \textit{ dollars}$$

$$\frac{200}{3}\% \textit{ of } 720 \textit{ dollars}$$

$$\frac{200}{3} \times \frac{1}{100} \times 720 \textit{ dollars}$$

$$2 \times 240 \textit{ dollars}$$

$$\underline{480 \textit{ dollars}}$$

Decrease the following as instructed

(a) 800 by 15%

(b) 200 goats by 20%

(c) Sh.200,000 by 5% then 30%

REFERENCE

A New MK Primary Mathematics 2000 Bk 7 Pg 117

Mathematics Revision Handbook P5 – P7 Pg 101

SUB TOPIC: FINDING THE ORIGINAL NUMBER AFTER %age INCREASE

Examples:

1. What amount of money when increased by 20% becomes Sh.1440?

Let the amount be x.

$$\textit{New amount} = (100\% + 20) \textit{ of } x$$

$$120\% \times x = sh.1440$$

$$\frac{120\,x}{100} = sh.1440$$

$$10 \times \frac{12x}{10} = sh.1440\ x\ 10$$

$$\underline{12x = sh.14400}$$

Mathematics is the Key

$$\frac{12x}{12} = \frac{sh.14400}{12}$$
$$\underline{x = sh.1,200}$$

2. The number of pupils in a class increased by 10% to 44 pupils. Find the number of pupils before the increase.
3. What number becomes 10400 when increased by 30%?

REFERENCE

A New MK Primary Mathematics Bk 6 & 7 Pg 118

SUB TOPIC: FINIDNG THE ORIGINAL NUMBER AFTER THE DECREASE

Examples:

1. A worker's salary was decreased by 35% to sh.1560.

$$Let\ the\ old\ salary\ be\ x.$$
$$New\ salary = (100\% - 35\%)\ of\ x$$
$$1560 = \frac{65x}{100}$$
$$1560 \times 100 = \frac{65x}{100} \times 100$$
$$\frac{\cancel{65}\,x}{\cancel{65}} = \frac{1560 \times 100}{65}$$
$$\underline{x = shs.2400}$$

2. What number when decreased by 25% becomes 30,000?
3. What amount of money becomes sh.sh.7,200 when decreased by 10%?

REFERENCE

A New MK Primary Mathematics Bk 7 Pg 119

SUB TOPIC: FINDING PERCENTAGE INCREASE AND DECREASE

$$Percentage\ increase = \frac{increase}{old\ no.} \times 100\%$$
$$Percentage\ decrease = \frac{decrease}{old\ no.} \times 100\%$$

Mathematics is the Key

Examples:

1. By what percentage will 480 be increased to become 540?

   Old number = 480
   New number = 540
   Increase = 540 – 480
   = 60

   Percentage increase:

   $$\frac{60^{1}}{480_{8}} \times 100\%$$

   $$\frac{100}{8}\ \%$$

   12 ½ %

2. When 240 is decreased, it becomes 192. Calculate the percentage decrease.

   Old number = 240
   New number = 192
   Decrease = 240 – 192
   = 48

   Percentage decrease = $\frac{48}{240} \times 100\%$

   = 20%

3. **The number of pupils in a school increased from 500 to 650 in just one term. Calculate the percentage increase**
4. **Mary's salary decreased from sh.4,000,000 by sh.500,000. Calculate her percentage decrease.**

REFERENCE

A New MK Primary Mathematics Bk 6 & 7 Pg 121 - 122

Mathematics is the Key

SUB TOPIC: PERCENTAGE PROFIT

$$\textbf{Percentage profit} = \frac{\textbf{profit}}{\textbf{CP}} \times 100\%$$

$$\textbf{PROFIT} = \textbf{SP} - \textbf{CP}$$

Examples:

1. An article was bought at sh.100,000 and sold at sh.120,000. Calculate the percentage profit.

   $Cost\ price = sh.100{,}000$
   $Selling\ price = sh.120{,}000$
   $Profit = 120{,}000 - 100{,}000$
   $= 20{,}000$
   $\textbf{Percentage profit}$
   $\frac{sh.20{,}000}{sh.100{,}000} \times 100\%$
   $\frac{2}{10} \times 100\%$
   2×10
   $\underline{20\%}$

2. Alison bought a hankie at sh.1,600 and later sold it at sh.2,000. Find his percentage profit.
3. A man sold a goat at sh. 120,000 making a profit of sh.20,000. Calculate his percentage profit.
4. Moses bought a shirt for sh.6,000 and sold it making a profit of sh.2,000.
   (a) Find his selling price.
   (b) Find his percentage profit.

SUB TOPIC: PERCENTAGE LOSS

$$\textbf{Percentage loss} = \frac{\textbf{loss}}{\textbf{CP}} \times 100\%$$

$$\textbf{LOSS} = \textbf{CP} - \textbf{SP}$$

4. I bought a radio at sh.100,000 but I was forced to sell it at sh.80,000. Find my percentage loss.

   $\textbf{Buying price} = \textbf{sh.100,000}$
   $\textbf{Selling price} = \textbf{sh.80,000}$
   $\textbf{Loss} = \textbf{BP} - \textbf{SP}$
   $\textbf{sh.100,000} - \textbf{sh.80,000}$
   $\underline{\textbf{sh.20,000}}$

   $\underline{\textbf{Percentage loss}}$:
   $\frac{\textbf{loss}}{\textbf{CP}} \times 100\%$

Mathematics is the Key

$$\frac{20,000}{100,000} \times 100\%$$

$$\frac{100\%}{5} = 20\%$$

5. Kakuru bought a book for sh.5,000 and sold it for sh.4,500. Calculate his percentage loss.

6. Mugisha sold a rabbit for sh.15,000 making a loss of sh.4,000.calculate his percentage loss.
7. Mercy bought a blouse for sh.15,000 and sold it at a loss of sh.3,000.
   (a) At what price did he sell the blouse?
   (b) Find her percentage loss

REFERENCE

A New MK Primary Mathematics Bk 7 Pg 123 – 124
Mathematics Revision Hand book P.5 – P.7 Pg 104

SUB TOPIC: Finding SP when percentage profit/loss and CP are given

REMEMBER

- **The cost price (CP) is the old number.**
- **The selling price(SP) is the new number.**
- **When given percentage increase, increase the old number(CP) to get the new number(SP).**

$$If\ the\ \%ge\ profit\ is\ k\%$$
$$\frac{100\% + k\%}{100} \times CP = SP$$

- **When given percentage decrease, decrease the old number(CP) to get the new number(SP).**

$$If\ the\ \%ge\ loss\ is\ m\%$$
$$\frac{100\% - m\%}{100} \times CP = SP$$

Examples

1. After selling a shirt which he bought at sh.8,000, the shopkeeper made a profit of 20%. How much money did he sell the shirt?

$$SP = \frac{100 + 20}{100} \times sh.8,000$$
$$\frac{120}{100} \times sh.8,000$$
$$120 \times sh.80$$
$$\underline{sh.9,600}$$

Mathematics is the Key

2. James bought a goat at sh.120,000 and later sold it at a loss of 10%, how much did he get after selling the goat?

$$SP = \frac{100-10}{100} \times sh.120,000$$
$$\frac{90}{100} \times sh.120,000$$
$$90 \times sh.1,200$$
$$\underline{sh.108,s000}$$

3. **A skirt was bought at sh.10,000. How much was it sold if a profit of 20% was raised?**
4. **After selling a tray of eggs, a farmer made a profit of 5%. At what price did he sell the tray of eggs if the cost price of the tray of eggs is sh.9,000.**

SUB TOPIC: Finding CP when percentage profit and SP are given

Examples:

1. After selling a pair of shoes at sh. 21,000, a trader made a profit of 20%. Find the buying price of the pair of shoes.

$Cost\ price\ as\ a\ percentage = 100\%$

$Selling\ price\ as\ a\ percentage = 100\% + 20\% = 120\%$

$120\%\ represents = sh.21,000$

$$1\%\ represents = \frac{shs.21000}{120}$$

$$100\%\ represents = \frac{shs.700}{4} \times 100$$
$$= (25 \times 700)$$
$$\underline{= shs.17,500}$$

2. a) By selling a blanket at sh. 36000, a trader made a profit of 20%. Calculate the cost price of the blanket
   (b). At what price did should he sell it in order to gain 15%?

Mathematics is the Key

SUB TOPIC: **Finding CP when percentage loss and SP are given**

1. By selling his cow at sh. 34,000, Obala made a loss of 15%. How much did the cow cost?

Loss = 15%

CP = 100%

SP = 100% - 15%

= 85%

85% of CP = shs.34,000

$$\frac{85}{100}\ cp = shs.34,000$$

$$\cancel{100} \times \frac{85cp}{\cancel{100}} = shs.34,000 \times 100$$

$$85cp = shs.3,400,000$$

$$\frac{85cp}{85} = \frac{shs.3,400,000}{85}$$

CP = shs.40,000

2.A dealer sold a bicycle for sh. 45000 there by losing 10%
(a) Calculate the original price of the bicycle.
(b) How much did he lose

REFERENCE

A New MK Primary Mathematics Bk 7 Pg 125

SUB TOPIC: Mixed application of profit and loss

Example

1. Paul bought a bicycle at sh.300,000. He sold it to Tom at a profit of 10%. Tom sold it to Mary at a loss of 35%. What did Mary pay for the bicycle?

Tom paid

$$\frac{100\% - 10\%}{100} \times sh.300,000$$

$$90 \times sh.3,000$$

$$sh.270,000$$

Mary paid

$$\frac{100\% - 35\%}{100} \times sh.270,000$$

$$65 \times sh.2,700$$

$$sh.175,500$$

2. Alex bought a cow and sold it to Mary at a loss of 20%. Mary sold to Peter at a gain of 10%.Peter paid sh.240, 000 for it. How much money did Alex pay for the cow?

Mathematics is the Key

$$discount = MP - CP$$

$MP = Marked\ price$

$CP = Cash\ Price$

$$\%ge\ discount = \frac{Discount}{MP} \times 100\%$$

Example:

1. **The market price of a shirt was sh.1500. After a discount, a customer paid sh.1200.**

(a) How much was the discount?

Discount = Marked price – cash price

= sh.1500 – sh.1200

= sh.300

(b).**Express the discount as a percentage**

Percentage discount $= \frac{discount}{marked\ price} \times 100\%$

$= \frac{shs.300}{shs.1500} \times 100\%$

$= \frac{1}{5} \times 100\%$

= 20%

2. The marked price of a bicycle is shs 60,000. A customer is offered a discount of 15% How much money does the customer pay?

$100\% - 15\% = 85\%$

$$\text{Amount paid} = \frac{85}{100} \times shs.60,000$$

= 85 x shs.600

=shs.51,000

3. The marked price of a book is sh.4000. If a customer is offered a 10% discount:

(a) How much is the discount?

(b) How much does the customer pay?

REFERENCE

A New MK Primary Mathematics Bk 7 Pg 129

Mathematics is the Key

SUB TOPIC: PERCENTAGE DISCOUNT

$$\textbf{Percentage Discount} = \frac{profit}{CP} \times 100\%$$

Examples:

1. Alex paid sh.2,000 for an article that is for sh.2,500. Calculate his percentage discount.

$MP = sh.2,500$

$CP = sh.2,000$

$Discount = sh.2,500 - sh.2,000$

$= sh.5,00$

Percentage discount

$$\frac{sh.500}{sh.2,500} \times 100\%$$

$$\frac{1}{5} \times 100\%$$

$$20\%$$

2. Mercy paid sh.12,000 after being given a discount of sh.3,000. Calculate the percentage discount offered.
3. My mother paid sh.23,000 for items worth sh.25,000 in a super market. Calculate the percentage discount offered to the mother.

SUB TOPIC: Finding marked price when given %ge discount and cash price

Example:

1. Cissy paid sh.18,000 for a hand bag after being given a discount of 10%. Calculate the marked price.

Cost price as %age = 100%

Discount offered = 10%

Cissy paid = 100% - 10%

= 90%

Let the marked price be x

$$\frac{90}{100} \times x = shs.18,000$$

$$100 \times \frac{90x}{100} = shs.18,000 \times 100$$

$$90x = shs.18,000 \times 100$$

$$\frac{90x}{90} = \frac{shs.18,000 \times 100}{90}$$

$$x = shs.20,000$$

Mathematics is the Key

2. **After being given a discount of 15%, a man paid sh.76,500 for a blanket. Calculate the marked price of the blanket**

REFERENCE

A New MK Primary Mathematics Bk 7 Pg 130-131

SUB TOPIC: Finding simple interest

Example:

7. A Man deposited sh.40,000 for 5 years at a simple interest rate of 2½ % per year. Calculate his simple interest and the total amount after 5 years.

$$SI = PTR$$
$$= 40,000 \times 5 \times 2\tfrac{1}{2}\,\%$$
$$= 40,000 \times 5 \times \frac{2\frac{1}{2}}{100}$$
$$= 400 \times 5 \times \frac{5}{2}$$
$$= 200 \times 25$$
$$= shs\ 5,000$$

$$Amount = Principle + Interest$$
$$shs\ (40,000 + 5000)$$
$$shs\ (45,000)$$

8. Calculate the simple interest on sh.8000 for 2yrs at 10% per annum
9. Calculate the simple interest on sh.24000 for 8 months at simple interest rate of 15% per year.
10. Calculate the simple interest on sh. 24000 for 8 months at a simple interest rate of 2% per month.

REFERENCE

A New MK Primary Mathematics Bk 7 Pg 132 - 133

SUB TOPIC: FINDING THE PERCENTAGE RATE

Example:

1. Calculate the rate of interest if shs 30,000 can yield a simple interest of shs 1,125 in 9 months.

$$PTR = SI$$
$$\frac{shs.30,000}{1} \times \frac{9}{12} \times \frac{R}{100} = shs, 1,125$$
$$\frac{shs.2700R}{12} = Shs.1,125$$
$$12 \times \frac{shs.2700R}{12} = shs.1,125 \times 12$$
$$shs.2700R = shs.1,125 \times 12$$
$$\frac{\cancel{shs.2700R}}{\cancel{shs.2700}} = \frac{\cancel{shs.}13,\cancel{500}}{\cancel{shs.}2\cancel{700}}$$
$$R = 5\%$$

Mathematics is the key

2. Nabifo deposited sh.50000 on her saving s account. At the end of 3yrs the simple interest earned was sh.15000. Calculate the rate of interest.

RREFERENCE

A New MK Primary Mathematics Bk 7 Pg 138 - 139

SUB TOPIC: CALCULATING PRINCIPAL

Example:

1. What principal will yield shs 6,000 at 5% per year for 3 years?

SI = 6000
R = 5% per year
T = 3 years
P x R x T = Simple interest

$$P \times \frac{5}{100} \times 3 = 6000$$

$$\frac{15P}{100} = 6000$$

$$100 \times \frac{15P}{100} = 6000 \times 100$$

$$\frac{15P}{15} = \frac{600,000}{15}$$

P = shs.40,000

Principal = shs.40,000

2. A farmer borrowed money at 12 ½ per year. After 2 years, a simple interest of shs 8,000 was paid. Find the amount borrowed.

Solution:

SI = shs.8,000
T = 2 years
R = 12 ½ %

$$P = \frac{SI \times 100}{R \times T}$$

$$P = shs.\frac{8,000 \times 100}{12\frac{1}{2} \times 2}$$

$$P = shs.800,000 \div \frac{25}{2} \times 2$$

$$P = shs.\frac{800,000}{25}$$

P = shs.32,000

Principal = shs.32,000

3. Ali borrowed money from a bank that offers a 10% p.a rate for 4 years. If he paid sh.32,000 after 4 years. How much did he borrow?
4. What sum of money will yield sh.4,800 in 4 years at 3% p.a?

REFERENCE

A New MK Primary Mathematics Bk 7 Pg 140

Mathematics is the Key

SUB TOPIC: CALCULATING TIME

Example:

1. In what time will shs 12,000 yield an interest of shs 1,800 at 5% per year.

   P x T x R = SI
   SI = 1800=
   P = 12,000
   R = 5%

   P x R x T = SI
   12,000 x 5 x T =shs.1800
   100
   600 T = 1800³
   600 600₁
   T = 3 years

2. How long will sh.48,000 take to yield sh.5400 at 15% per year?

   P = sh.48,000
   R = 15% per year
   SI = sh.5400
   P x R x T = SI
   Shs.48,000 x 15 x T = sh.5400
   100

   shs.480 x 15T =shs.5400
   shs.7200T = shs.5400
   shs.7200 shs.7200
   T = ¾ years
   = (3/4 x 12)
   = 9 months

3. **How long will sh.48,000 take to yield sh.7,200 at a rate of 5% per year?**

REFERENCE

A New MK Primary Mathematics Bk 7 Pg 142

SUB TOPIC: More about simple interest

1. A man borrowed money in a bank which offers a rate of 10% p.a for 3 years. Calculate the sum of money he borrowed if he returned sh.26,000 after 3 years.

$$P + SI = AMOUNT$$
$$P + PRT = AMOUNT$$
$$P + P \times \frac{10}{100} \times 3 = sh.26,000$$
$$P + \frac{3P}{10} = sh.26,000$$
$$10 \times P + \frac{3P}{10} \times 10 = sh.26,000 \times 10$$
$$10P + 3P = sh.260,000$$
$$13P = sh.260,000$$
$$\frac{13P}{13} = \frac{sh.260,000}{13}$$
$$P = sh.20,000$$

Mathematics is the Key

2. Sarah deposited $sh.m$ in the bank which offers a 15% per annum for 9 month. If she got sh.534,000 after p months. Find the value of m.

TOPICAL EXERCISE ON FRACTIONS

1. Name the types of fractions and give an example on each.
2. Divide: $^2/_3 \div {}^1/_3$
3. Simplify: ½ - ¼ - $^1/_3$
4. Salim's bicycle got spoilt after he had covered a distance of 20km which was ¼ of his journey. How long was the journey?
5. In a class of 120 pupils, the ratio of girls to boys is 4:2. Find the number of boys.
6. Work out: ¼ + $^3/_5$.
7. Simplify: $\frac{0.27 \times 0.06}{0.9 \times 0.3}$
8. Work out: ¼ - $^1/_8$
9. Otim had 30km still to cover after traveling 3/5 of the journey. How was the journey?
10. Simplify: ½ ÷ ¼
11. Subtract: ½ - ¼
12. In Star Schools, ¾ of the pupils who sat for the Primary Leaving Examination passed.
    (a) If those who failed were 30, find the number of pupils who passed.
    (b) What percentage of pupils failed the examination?
13. $^2/_3 - ½$
14. Add: 35.7 + 0.35
15. A bus broke down after covering 5/7 of the journey. The remaining distance to complete the journey was 140km. How long was the whole journey?
16. Divide: 4.2 ÷ 0.03
17. Add: 4.05 + 11.4 + 2.36
18. Usamah spent ¼ of his salary on food, 1/3 of the remainder on debts and saved shs 3,600= .
    (a) How much did he spend on paying debts?
    (b) What are his earnings per month?
19. Arrange in ascending order: ½, ¾, 0.03 and 2/3.
20. Tap A takes 9 minutes to fill in the tank.
    Tap B takes 12 minutes and Tap C takes 18 minutes. How long will A, B and C take to fill the tank if opened together?
21. The cost of 4 rules is shs 800. What is the cost of 6 similar rulers?
22. 5 handkerchiefs take 30 minutes to dry when exposed to the sunshine. How long will 12 handkerchiefs take to dry if exposed to the same sunshine?
23. 12 men can build a classroom in 5 days.
    (a) How many men are needed to do the whole job in 1 day?
    (b) How long will 10 men take to do the job?

Mathematics is the Key

FRACTIONS (PERCENTAGES) TOPICAL QUESTIONS:

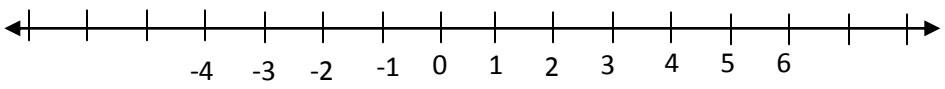
1. Express 2:5 as a percentage.
2. Change 0.8 as a percentage
3. Express 66.6% as a fraction to the lowest terms.
4. Express 40cm as a percentage of 2M.
5. What is 10% of 2200 pencils?
6. A bag of cement cost shs 5,600. How much will it cost after a 30% increase?
7. Asiimwe deposited shs 50,000 in Uganda Commercial Bank which offers an interest of 30% per year. How much money will Asiimwe have in the Bank after six months?
8. Okello bought a car at shs 2,500,000 and sold it to Otim at a profit of 20%. Otim then sold it to Tumwine at a loss of 15%. How much did Tumwine pay for the car?
9. If 280 is increased by x it become 392. Find the value of x.
10. Decrease 65kg by 5.
11. A farmer has the following animals:
    Chicken = 30
    Goats = 35
    Sheep = 15
    Rabbits = 10
    What percentage of the total animals are rabbits.
12. Milk was mixed with water to make tea. If 14 litres of milk was used and this was 40% more than the amount of water in the tea, how tea was prepared?
13. Mugisha bought about at shs 200,000 and sold it as shs 180,000 what was his percentage loss?
14. (a) Okello's wage was increased by 10% to shs 77,000 per month. Find his salary?
    (b) If his new wage of shs 77,000 was decreased by 5%, find his final wage.
15. A man spent 20% of his salary on food, 10% on transport, 40% on medical care and the rest on rent.
    (i) Find the percentage of his salary spent on rent.
    (ii) How much does he spend on medical care if he earns 800,000 as his salary?
    (iii) How much more is spent o food than transport?
16. Fatuma had shs 5,000 if she used 10% of her money to buy soap what was her balance?
17. The cost price of a 50kg bag of sugar is shs 45,000. At what price must he sell each kilogram in order to make a profit of 20%.
18. Kakeeto bought three bags of soya beans at shs. 21,000 each. If each bag weighed 70kg and sold each kg at shs 250.
    (a) Calculate his percentage gain or loss.
    (b) At what price must he sell each kg in order to make a profit of 20%?

Mathematics is the key

INTEGERS

SUB TOPIC: ORDERING AND ARRANGING INTEGERS ON A NUMBERLINE

The number line:



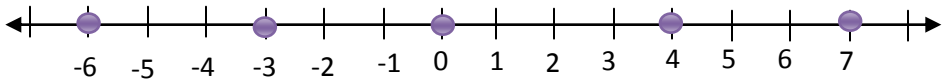
i) All integers to the left of zero are –ve.
ii) All integers to the right of zero are +ve
iii) Any integer is less than that on its right.
iv) Any integer is more than that on its left.
v) Integers on a number line are arranged in ascending order from left to right.

Examples

1. Use >, < or = to compare the pair of integers. Given:

(i) -6 < -3
(ii) -3 < 0
(iii) 0 < +4
(iv) 0 > -6
(v) -3 > -6
(vi) +7 > +4
(vii) +4 = +4
(viii) -8 = -8

2. Arrange in descending order/decreasing order the following integers:
-6, 0, +7, -3, +4



+7, +4, 0, -3, -6

3. Use >, < or = to compare the following pairs of integers.

(i) -2 ____0 **(ii) -1_____-3** **(iii) -6_____-6**
(iv) 8_____8 **(v) 5_____-5** **(vi) -7_____7**

4. Arrange the following integers in ascending order (increasing order)
-8, 2, -1, 5, -3, +7

5. Arrange the integers below in descending order.
0, -7, +4, -6, +1

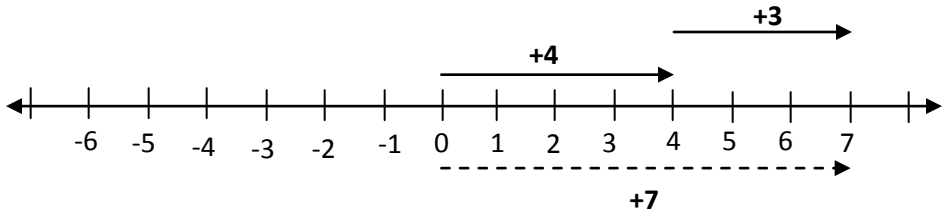
Mathematics is the Key

REFERENCE

A New MK Primary Mathematics 2000 Bk 7 Pg 348 (New Edition)

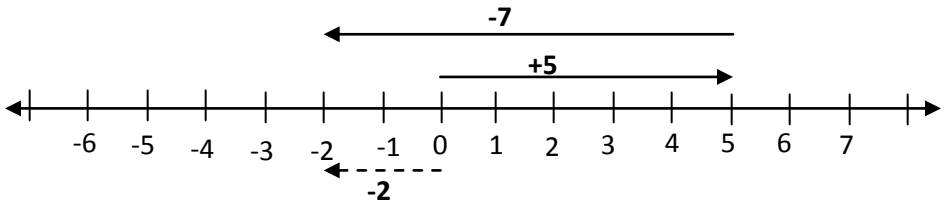
SUB TOPIC: ADDITION OF INTERS USING A NUMBER LINE

Example 1. Workout:***+4 + +3***



+4++3 = +7

Example 2. Workout:***+5 + -7***



+5 + -7 = -2

Add the following using a number line

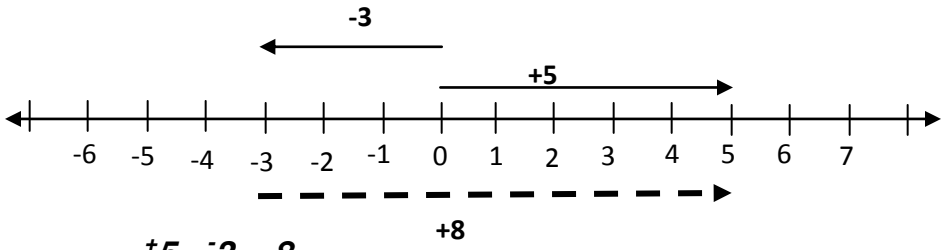
(i) -3 + +9 (ii) -4 + +5

REFERENCE

A New MK Primary Mathematics 2000 Bk 7 Pg 346 (New Edition)

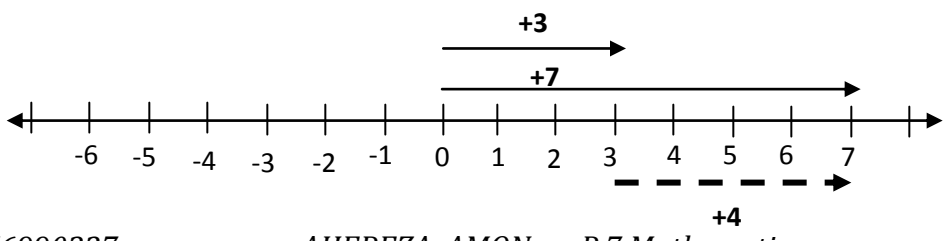
SUB TOPIC: SUBTRACTION OF INTEGERS USING A NUMBERLINE

Example 1. ***+5 - -3***



+5 - -3 = 8

Example 2. ***+7 - +3***



Mathematics is the Key

+7-+3 = +4

Workout the following using a number line

(i) -3 - -11 (ii) 8 - +8

REFERENCE

A New MK Primary Mathematics 2000 Bk 7 Pg 356 (New Edition)

SUB TOPIC: SUBTRACTING INTERGERS WITHOUT NUMBER LINES

Example 1.

1.Workout:+8 - +7

+8 - +7

+8 – 7

+1

Note - x + = -

+ + + + + + + +

- - - - - - -

+1

2.Workout: -8 - +3

-8 - +3

-8 – 3

-11

Note - x + = -

- - - - - - - -

- - -

-11

3.workout: -5 - -2

-5 + 2

+2 – 5

- 3

Note - x - = +

+ +

- - ***- - -***

-11

8. Subtract the following integers.

(i) +4 - +2 (ii) +7 - -4 (iii) -3 - +7

REFERENCE

A New MK Primary Mathematics 2000 Bk 7 356 (New Edition)

SUB TOPIC: ADDING INTEGERS WITHOUT USING A NUMBERLINE

Example 1.

1.Workout ***:+7 + +2***

+7 + +2

+7 + 2

+9

Note + x + = +

+ + + + + + +

+ +

+9

2.Workout ***:+7 + -2***

+ 7 + -2

+7 – 2

+5

Note + x - = -

+ + ***+ + + + +***

- -

+5

Mathematics is the Key

3.Workout :-7 + ¯2

-7 + -2

-7 - 2

-9

Note *+ x - = -*

- - - - - - -

- -

-11

Add the following integers.

(i) +1 + +7 (ii) +8 + -2 (iii) +18 + -18

REFERENCE

A New MK Primary Mathematics 2000 Bk 7 Pg 352 (New Edition)

SUB TOPIC: MULTIPLICATION OF INTEGERS

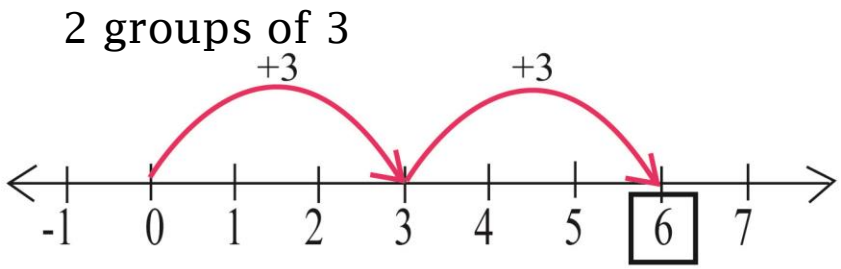
Examples:

1. +2 x +6 = +12
2. +2 x -6 = -12
3. -2 x -6 = +12

Multiplication of integers on a number line:

Examples:

1.Workout +2 x +3



2. Multiply:

(i) +4 x -2 (ii) -6 x 3

3.Workout -2 x 8 using a number line.

NOTE:

+ve x +ve = +ve

+ve x -ve = -ve

-ve x -ve = +ve

REFERENCE

A New MK Primary Mathematics 2000 Bk 7 Pg 352 (New Edition)

SUB TOPIC: DIVISION OF INTEGERS

NOTE:

$+ve \div +ve = +ve$

$+ve \div -ve = -ve$

$-ve \div +ve = -ve$

$-ve \div -ve = +ve$

Mathematics is the Key

Examples:

1. ***+16 ÷ +2 = +8***
2. ***+16 ÷ -2 = -8***
3. ***-16 ÷ +2 = -8***
4. ***-16 ÷ -2 = +8***

Divide:

(i) -9 ÷ -3 (ii) 27 ÷ -9

REFERENCE

A New MK Primary Mathematics 2000 Bk 7 Pg 361 (New Edition)

SUB TOPIC: APPLICATION OF INTEGERS

BC, LOSS, Time before, debts, below sea level are **negative.**

AD, profit, time after, above sea level are **positive**

Example 1:

A Scientist was born in 30BC and died immediately after his birthday in 76AD. How old was he when he died?

The man lived from -30 to +76

The Scientist lived for ***+76 -)-30)***

= 76 + 30

=106 years

Example 2

The temperature of a drink dropped from 10°C to -4°C. By how many degrees did drop?

*Old temp =**10°C***

*New temp = **-4**°C**.*

*The temp. of the drink dropped by **10°C** −(¯**4**°C)*

***= 10°C + 4**°C*

***= 14**°C*

Example 3

A teacher a wards 4 marks for every correct answer and deducts a mark for every wrong answer.

(a). If a pupils gets 12 correct answers in a test of 20 numbers, how many marks does he get ?

Correct answers = 12

Wrong answers = 20 -12

= 8

Marks scored = (12 x 4) – (8x1)

= 48 - 8

= 40 .

Mathematics is the Key

(b).If pupil gets 60 marks in a test of 30 questions, how wrong answers will he have got?

Let the wrong answers be m

Correct answers = 30 - m

4(30 - m)-(mx1) = 60

120 – 4m – m = 60

120 – 5m = 60

120 – 120 – 5m = 60 -120

-5m = - 60

$$\frac{-5m}{-5} = \frac{-60^{12}}{-5_1}$$

m = 12 wrong answers

Try these

1. Flavia was born in 2BC and she died in 38AD after her birthday. How old was she when she died?

2. John left a balance of shs 1,000 with the milk vendor. He then bought 5 litres of milk from the milk vendor atsh.1000 each litre. How much did he pay to meet his bill?

3. Iganga FC arrived at Nakivubo Football stadium 15 minutes before the start of the football match. The team left the stadium 15 minutes after the end of a 45 minutes first half of the match. How long was the team in the stadium?

4. In an examination you are awarded 7 marks of every correct answer and 3 marks deducted for every wrong answer. A candidate had 9 questions correct and 5 questions wrong. What mark did the candidate score?

REFERENCE

A New MK Primary Mathematics 2000 Bk 7 Pg 362 - 363 (New Edition)

FINITE/MODULAR SYSTEM

Finite system/modular system is a system of writing remainders

SUB TOPIC: writing numbers in finite system

1.Write the following in finite system.

(a) 8 in finite 5

8 = 8 ÷ 5 (finite 5)

8 = 1 rem 3 (finite 5)

8 = 3(finite 5)

2. 40 in finite 12

40 = 40÷12(finite 12)

40 = 3 rem 4 (finite 12)

40 = 4 (finite 12)

Mathematics is the Key

Write;

(a) 25 in finite 4
(b) 16 in mod 7
(c) 39 in finite 12
(d) 100 in finite 6
(e) 485 in mod 9

SUBTOPIC: Writing equivalences in finite system

1. Write equivalent numbers of 2(mod 5)

2(mod 5) = {2, 7, 12, 17, 22, 27 …}

2. Write the first 5 equivalent numbers of 7(finite 9)

7(finite 9) = {7, 16, 25, 34, 43}

3. Write the first eight equivalent numbers of;

a) 3(finite 5)
b) 2(finite 9)
c) 11(finite 12)
d) 6(finite 9)
e) 1(finite 5)

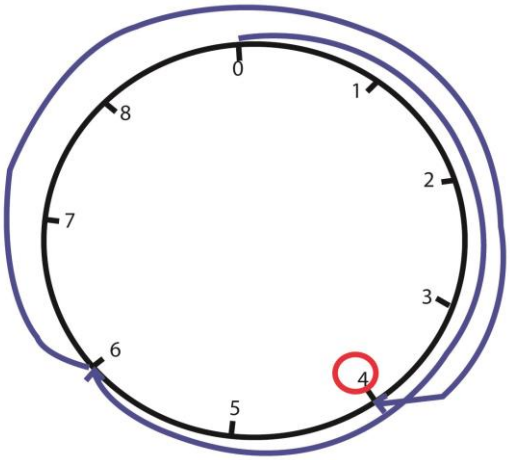
SUBTOPIC: Addition of numbers in finite system

Examples:

(i) Add: 6 + 7 = ___ (finite 9)

6 + 7 = ___(finite 9)
13 ÷ 9 = 1 rem 4 (finite 9)
∴ 6 + 7 = 4 (finite 9)

Using a dial / clockface



∴ 6+7 = 4 (finite 9)

(ii) Add: 8 + 6 + 3 = _____ (finite 13)

Mathematics is the Key

(8 + 6) + 3=___ (finite 13)
17 ÷ 13 = 1 rem 4(finite 13)
∴ 8 + 6 + 3 = 4 (finite 13)

(iii) Workout :3 + 4 + 5 = x (finite 7)
x = 3 + 4 + 5 (finite 7)
x = 12 ÷7 (finite 7)
x = 1 rem 5 (finite 7)
x = 5 (finite 7)

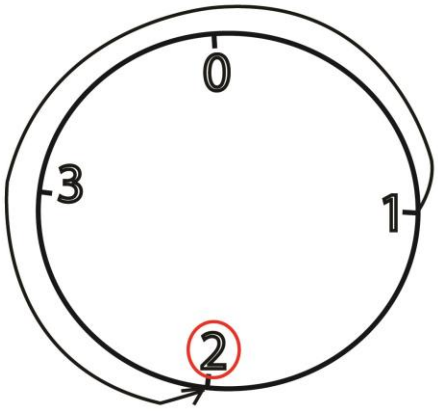
(iv) Workout the following

- $5 + 8 =$ ___$(mod\ 9)$
- $6 + 3 =$ ____$(finite\ 7)$
- $2 + 11 + 7 = k\ (mod\ 12)$

REFERENCE
A New MK Old Edition Pupils Bk 6 Pg 47

SUB TOPIC: SUBTRACTION IN THE FINITE SYSTEM

Workout the following
(i) 1 – 3 = ___ (finite 4)
(1 + 4) – 3___(finite 4)
5 – 3 = 2 (finite 4)
∴ 1 – 3 = 2 (finite 4)
Using a dial / clock face



∴ 1 – 3 = 2(finite 4)

(ii) $2^2 - 5 =$ ___ (finite 7)
(2 x 2) – 5 = ___ (finite 7)
4 – 5 = ___ (finite 7)
4 + 7 – 5 =___(finite 7)
11 – 5 = 6 (finite 7)
∴ 2^2 – 5 = 6 (finite 7)

(iii) $2 - 6 - 4 - 8 =$ ___ $(finite\ 9)$

Mathematics is the Key

(iv) $10 - 6 = ___(mod\ 12)$
(v) $3 - 6 = ____(mod\ 7)$
(vi) $2 - 49 = ____(finite\ 9)$

REFERENCE
A New MK Pupils Bk 7 Pg 48

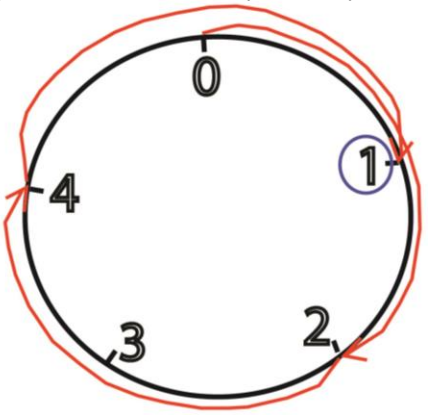
SUB TOPIC: MULTIPLICATION USING THE FINITE SYSTEM

Examples:
Workout the following

(i) *5 x 7 = _____ (finite 9)*
5 x7 =_____(finite 9)
35 ÷ 9 = 3 rem 8 (finite 9)
∴ 5 x 7 = 8 (finite 9)

(ii) 2^3 = ___(finite 7)
2^3= 2 x 2 x 2
= 4 x 2
= 8
2^3= 8÷3 =1 rem 1(finite 7)
2^3= 1 rem 1(finite 7)
∴ 2^3 = 1 (finite 7)

(iii) 3 x 2 = ____ (mod 5) using a dial



∴ 3 x 2 = 1 (mod 5)

(iv) $4 \times 6 = ____(mod\ 12)$
(v) $3 \times 5 = ____(mod\ 7)$
(vi) $8 \times 9 = ____(mod\ 4)$
(vii) $4 \times 6 = ____(mod\ 9)$

REFERENCE
A New MK Primary Maths Pupils Bk 7 Pg 50

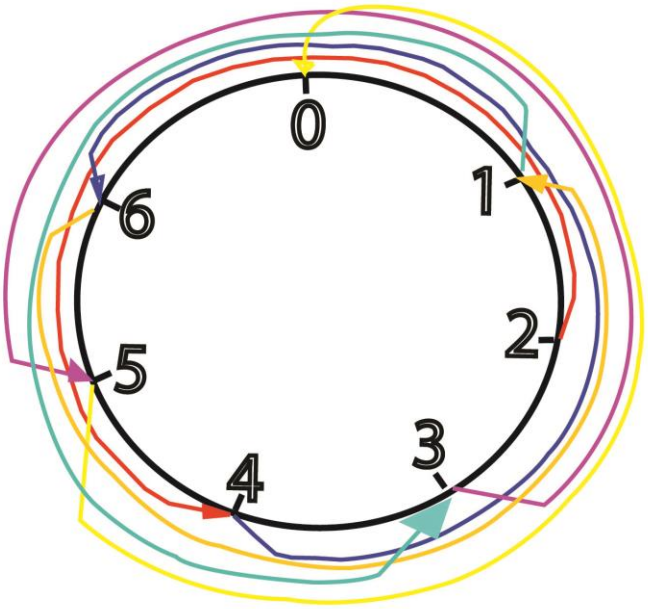
Mathematics is the Key

Example:

1. Divide 2 ÷ 5 = ___ (Mod 7)

$$2 \div 5 = __ \ (mod\ 7)$$
$$2 (mod\ 7) = \{2, 9, 16, 23, 30 \ldots\}$$
$$30 \div 5 = 6 \ (mod\ 7)$$
$$\therefore\ 2 \div 5 = 6 \ (mod\ 7)$$

Using a dial / clock face



2. Work out the following

(a) $\mathbf{2 \div 6 = ____ (mod\ 7)}$

(b) $\mathbf{4 \div 6 = ____ (mod\ 5)}$

(c) $\mathbf{8 \div 11 = ____ (mod\ 12)}$

REFERENCE

A New MK Primary Maths Pupils Bk 7

Maths Revision Hand Book 5, 6 & 7 Pg 35

SUB TOPIC: Application of finite 7 in days of the week.

(i) Today is Thursday, what day of the week will it be 82 days from today?

Thursday stands for 4

4 + 82 = ___ (finite 7)

86 = ___ (finite 7)

86 ÷ 7 = 12 rem 2 (finite 7)

2 stands for Tuesday

Mathematics is the Key

It will be Tuesday

(ii) Today is Tuesday what day of the week was it 85 days ago.

2 represents Tuesday
2 – 85 = ___ (finite 7)
85 ÷ 7 = 12 rem 1(finite 7)
85 = 1 (finite 7)
2 – 1 = 1 (finite 7)
1 stands for Monday
The day was Monday.

(iii) Today is Wednesday, what day of the week was it 30 days ago?

(iv) Today is Saturday, what day of the week will it be after 58 days?

REFERENCE

A New MK Primary Maths Pupils Bk 7 Pg 53

SUB TOPIC: Application of finite 12 in months of the year

Digits representing specific months in the year.

JAN	FEB	MAR	APRIL	MAY	JUN	JULY	AUG	SEPT	OCT	NOV	DEC
1	2	3	4	5	6	7	8	9	10	11	0

Example:

(i) It is July now, which month of the year will it be after 2132 months?

7 represents July
7 + 2132 = __(finite 2)
2139 = __ (finite 12)
2139 ÷12 = 178 rem 3 (finite 12)
3 stands for March
The month will be March.

(ii) It is April now, which month of the year was it 346 months ago?

4 stands for April
4 – 346 = ___ (finite 12)
346÷ 12 = 28 rem 10 (finite 12)
346 = 10 (finite 12)
4 – 10 = (fin 12)
(4 + 12) – 10 =____ (finite 12)
16 – 10 = 6 (finite 12)
6 stands for June

$$\begin{array}{r} 28 \\ 12\overline{)\,346} \\ -24\downarrow \\ \hline 106 \\ -96 \\ \hline 10 \end{array}$$

Mathematics is the Key

The month was June

(iii) It is March now, which month of the year was it 206 months ago?

(iv) It is July now, which month of the year will it be after 2890 months?

REFERENCE

A New MK Primary Maths Pupils Bk 7 Pg 54 – 55

SUB TOPIC: Applications of finite 12 in 12 hour clock

NOTE:

When the quotient is odd, the units will change (pm to am, am to pm)

When the quotient is even, the units will not change.

Example:

(i) It is 7:00 am. What time will it be after nine hours from now?

7 + 9 = __ (finite 12)
16 = __ (finite 12)
16 ÷ 12 = 1 rem 4(finite 12)
It will be 4:00pm
(It will change to pm if the quotient is an odd number)

(ii) It is 11:00 pm what time will it be nineteen hours from now?

11 + 19 = __ (finite 12)
30 = __ (finite 12)
30 ÷ 12 = 2 rem 6
11+19 = 6 (finite 12)
It will be 6:00pm
(it will remain in pm since the quotient is an even number.)

(iii) Given that time now is 4:00am. What time of the day was it be 95 hours ago?

(iv) Anitah travelled for 81 hour after leaving her home at 2:30pm. At what time did she arrive the final destination?

(v) It is 7:00 am. What time will it be after 9 hours from now?

REFERENCE

A New MK Primary Maths Pupils Bk 7 Pg 55- 56

Mathematics is the Key

SUB TOPIC: Applying more than one finite at ago.

Example 1

Find the least number of oranges when divided by 6 or 8, there is always a remainder of 5.

4(mod 8) = {4, 12, 20, 28, 36 …..}

4(mod 6) = {4, 10, 16, 22, 28, 34 …..}

28 oranges

Example: 2

A Headmaster bought some pens. Teachers grouped them in groups of nines but seven pens were left and when they grouped them in groups of 8, 4 pens were left. When they grouped them in 3's only 1 pen was left. How many pens were bought by the headmaster?

7 (finite 9) = {7, 16, 25, 34, 43, 52, 61……}

4 (finite 8) = {4, 12, 20, 28, 36, 44, 52, 60….}

1 (finite 3) = {1, 4, 7, 10, 13, 16, 19, 22, 25, 28, 31,34, 37, 40, 43, 46, 49, 52, 55….}

The headmaster bought 52 pens.

Try these

- π A P.7 class teacher 2018 arranged his candidates in groups of 8, 6 remained when he grouped them in 11, only 2 remained and when he grouped them in 5, 1 pupil remained. How many candidates are in P.7 2018?

- π Find the least number of fruits when shared by 15 pupils or 18 pupils there is always a remainder of 3 fruits

REFERENCE

A New MK Primary Maths Pupils Bk 7 Pg 57

SUB TOPIC: SOLVING EQUATIONS USING THE FINITE SYSTEM

Examples:

(i) x – 4 = 3 (mod 7)

x – 4 + 4 = 3 + 4)mod 7)

x + 0 = 7 (mod 7)

x = 7 ÷ 7 (mod 7)

x = 1 rem 0 (mod 7)

x = 0 (mod 7)

(ii) m + 4 = 3 (mod 5)

m + 4 – 4 = 3 – 4 (mod 5)

m + 0 = (3 + 5) – 4 (mod 5)

m = 8 – 4 (mod 5)

m = 4 (mod 5)

Mathematics is the Key

(iii) 2x – 3 = 3 (finite 4)

2x – 3 + 3 = 3 + 3 (finite 4)

2x + 0 = 6 (finite 4)

$\frac{2x}{2} = \frac{6}{2}$ ***(finite 4)***

x = 3 (finite 4)

(iv) 2(2x – 1) = 4 (finite 7)

2 x 2x – 1 x 2 = 4 (finite) 7)

4x – 2 = 4 (finite 7)

4x – 2 + 2 = 4 + 2 (finite 7)

4x = 6 (finite 7)

4x = 6 + 7 (finite 7)

4x = 13 + 7 (fin 7)

$\frac{4x}{4} = \frac{20^5}{4_1}$

X = 5

Try these

Solve the following

(a) $p + 2 = 4\ (finite\ 5)$

(b) $3\ (m - 2) = 1\ (finite\ 5)$

(c) $\frac{3y + 6}{5} = 2\ (finite\ 5)$

(d) $2(2k - 1) = 4\ (mod\ 7)$

(e) $3y = 4\ (finite\ 7)$

REFERENCE

A New MK Primary Maths Pupils Bk 7 Pg 49 - 50

TOPICAL TEST

ii. Find the additive inverse of the following
   a) -5
   b) 4
   c) -12

iii. Work out the following without a number line
   a) -6 +- 2
   b) +5- ¯6
   c) -3 x -5

iv. Workout the following using a number line
   a) -4 + ⁺5
   b) 6 - ¯3
   c) +3 x ¯ 4

Mathematics is the Key

v. Evaluate 33 = ___ (mode 7)
vi. Write the equivalent numbers of 3(finite 5)
vii. Simplify: 2 – 4 = ___ (finite 5)
viii. Simplify : 5 x 6 = ___(finite 7)
ix. Solve (i) y – 5 = 4 (finite 5)
(ii) 2(x – 2) = 3 (finite 6)
x. Divide 1÷ 5 = __ (finite 6)
xi. Today is Tuesday. What day of the week will it be after 46 days?
xii. Today is Friday. What day of the week was it 37 days ago?
xiii. A Plane left Entebbe airport at 1100 hours and arrived at New Park after 27 hours. At what time did it arrive?. (Give your answer in 24 hour clock).
xiv. Find the least number when divided by 12 or 15 leaves 6 as a remainder.

DATA HANDLING

SUB TOPIC: PICTO GRAPHS(review)

Definition:

A picot graph is where we use pictures to represent quantities of actual items.

Example:

The graph below shows the number of books that were given to different schools.

Kyengera P/s	🕮 🕮
Nakasero P/S	🕮 🕮 🕮
Mengo P/s	🕮 🕮 🕮 🕮
Old Kampala P/s	🕮 🕮
Winston P/s	🕮 🕮 🕮 🕮

Given that 🕮 stands for 100 books and for 50 books.

(a) How many more books did Mengo pupils get than Kyengera?
4 X100
400 boooks

(b) Which school had the maximum number of books?
Winston p/s

Mathematics is the Key

(c) Find the total number of books that were given out to the five schools.
15 x 100
1500 books

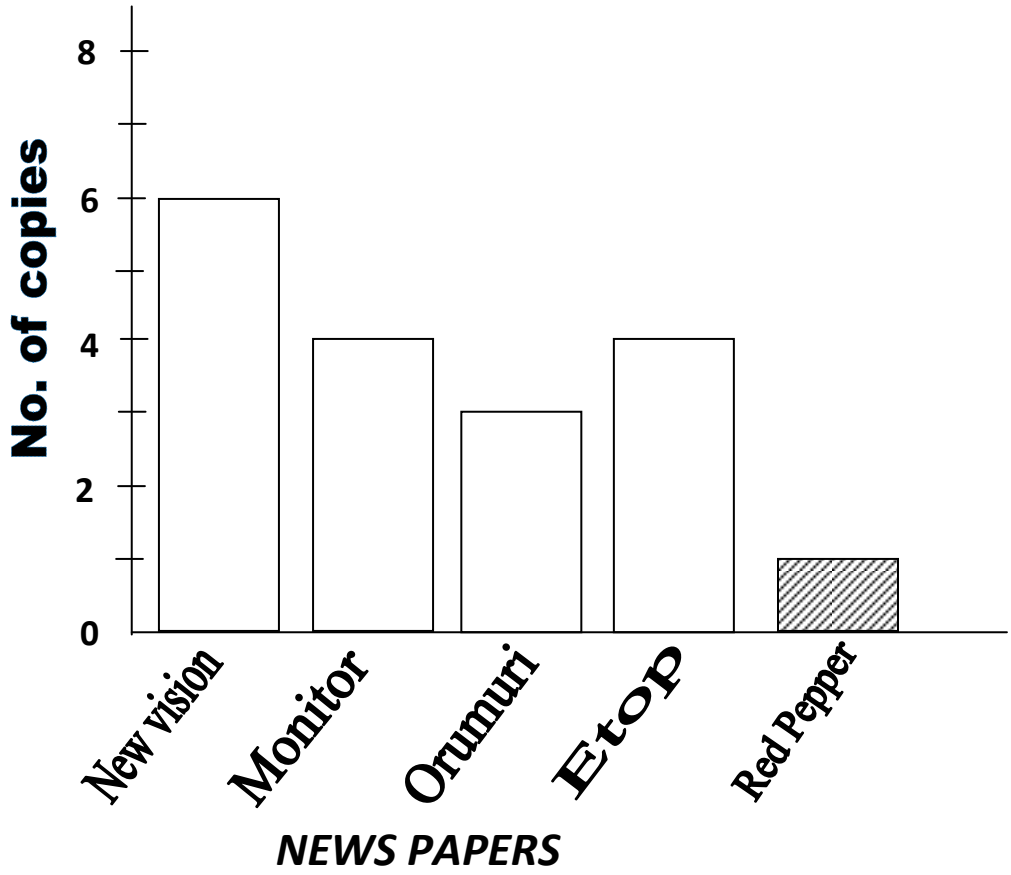
(d) Calculate the average number of books that were distributed to the five schools.
Average = $\frac{sum\ of\ items}{number\ of\ items}$
$= \frac{1500}{5}$
= 300 books

REFERENCE
A New MK Primary Mathematics Bk 7

SUB TOPIC: BAR GRAPHS(review)

Example:

The bar graph represents the copies of Newspapers which were sold to the Education Manager's office on a certain day. Use it to answer the questions that follow:



(a) Which Newspaper was sold in the biggest number?
New vision

(b) How many copies were sold altogether?
6 + 4 + 3 + 4 + 1
18 copies

Mathematics is the Key

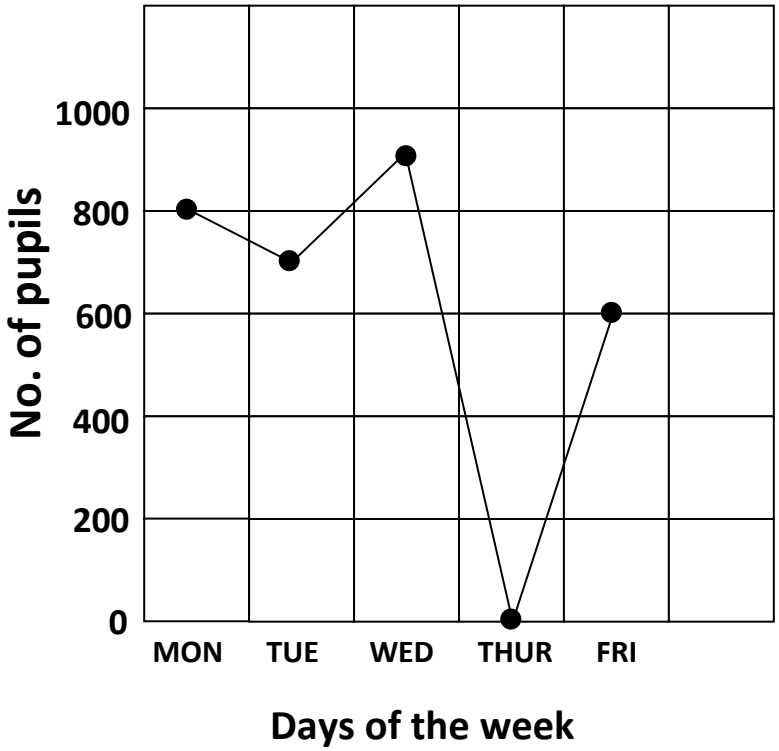
(c) Which newspaper was sold in the least number ?
Red pepper

(d) How many more copies of New Vision were sold than the Red Pepper?
6 – 1 = 5 more copies

REFERENCE
A New MK Primary Mathematics Bk 7

SUB TOPIC: LINE GRAPHS(review)

Example 1:
The graph represents the schools' daily attendance for a week. Use the information on the graph to make a table showing the daily attendance.



Questions
(i) On which day was the attendance high?
On Wednesday
(ii) On which day was the attendance 600?
On Friday
(iii) How many pupils attended on Tuesday?
700 pupils
(iv) What was the average attendance that week?

$$\textbf{Average} = \frac{sum\ of\ items}{number\ of\ items}$$

$$= \frac{800+700+900+0+600}{5}$$

Mathematics is the Key

$= \frac{3000}{5}$

$= 600$ *pupils*

(v) How many more pupils attended on Wednesday than Tuesday?
900 – 700 = 200 more pupils

REFERENCE

A New MK Primary Mathematics Bk 7 exercise 10:4 Pg 150

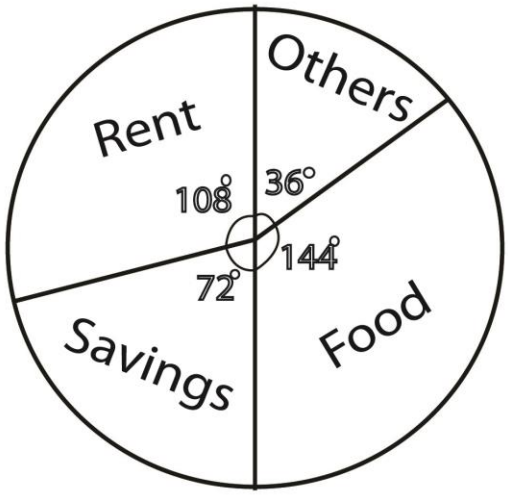
SUB TOPIC: PIE CHARTS INVOLVING DEGREES

REMEMBER:

Angles in all sectors of a pie chart add up to $360°$

Example:

1. The pie chart below shows the monthly expenditure and savings of Mr. Mugisha who earns sh.72,000



(a) How much does he spend on each item?

Savings

$\frac{72°}{360°} \times sh.72,000$

$72 \times sh.200$

Sh.14,400

Rent

$\frac{108°}{360°} \times sh.72,000$

$108 \times sh.200$

Sh.21600

Food

$\frac{144°}{360°} \times sh.72,000$

$144 \times sh.200$

Sh.28,800

Others

$\frac{36°}{360°} \times sh.72,000$

Sh.7,200

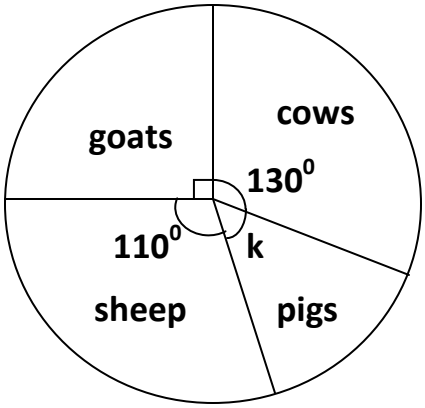
(b) Change the sector angle for others and percentages.

$\frac{36°}{360°} \times 100\%$

10%

Mathematics is the Key

2. The pie chart below shows how 72 animals are distributed on Mr. Kato's farm. Use it to answer the questions that follow.



(a) Find the value of k

$$\mathbf{k + 110° + 130° + 90° = 360°}$$
$$\mathbf{k + 330° = 360°}$$
$$\mathbf{k + 330° - 330° = 360° - 330°}$$
$$\underline{\underline{\mathbf{k = 30°}}}$$

(b) How many cows are on the farm?

$$\frac{\mathbf{130°}}{\mathbf{360°}} \times \mathbf{72}$$
$$\frac{\mathbf{13}}{\mathbf{36}} \times \mathbf{72}$$
$$\mathbf{13 \times 2}$$
$$\mathbf{26\ cows}$$

(c) How many more sheep than goats are on the farm?

$$\mathbf{110° - 90° = 20°}$$
$$\frac{\mathbf{20°}}{\mathbf{360°}} \times \mathbf{72}$$
$$\frac{\mathbf{2}}{\mathbf{36}} \times \mathbf{72}$$
$$\mathbf{2 \times 2}$$
$$\mathbf{4}\ \boldsymbol{more\ sheep}$$

(d) Express the sector angle for goats as a percentage.

$$\frac{\mathbf{90°}}{\mathbf{360°}} \times \mathbf{100\%}$$
$$\frac{\mathbf{1}}{\mathbf{4}} \times \mathbf{100\%}$$
$$\mathbf{25\%}$$

Mathematics is the Key

(e) What is the ratio of cows to pigs?

$$\frac{130^\circ}{30^\circ} = \frac{13}{3}$$

$$\underline{13:3}$$

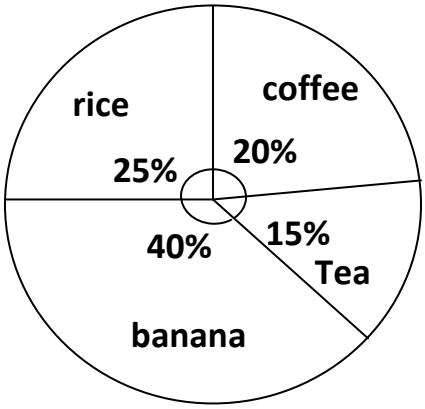
SUB TOPIC: PIE CHARTS INVOLVING PERCENTAGES

REMEMBER:

Percentages in all sectors of the pie chart add up to 100%

Examples

4. Study the pie chart below which shows how 60 acres of land were cultivated



a. What area of the land was used for Tea planting?

$$\frac{15}{100} \times 60\ acres$$

$$\frac{3}{2} \times 6$$

$$3 \times 3$$

$$\underline{9\ acres}$$

b. What area of the land was used for coffee planting?

$$\frac{20}{100} \times 60\ acres$$

$$2 \times 6$$

$$\underline{12\ acres}$$

c. What area of the land was used for rice planting?

$$\frac{25}{100} \times 60\ acres$$

$$\frac{5}{2} \times 6$$

$$5 \times 3$$

$$\underline{15\ acres}$$

Mathematics is the Key

d. Express the area of land for banana planting as a fraction

$\frac{40}{100}$

$\frac{4}{10}$

$\frac{2}{5}$

e. How many more acres of land were used for banana planting than tea planting?

$40\% - 15\% = 25\%$

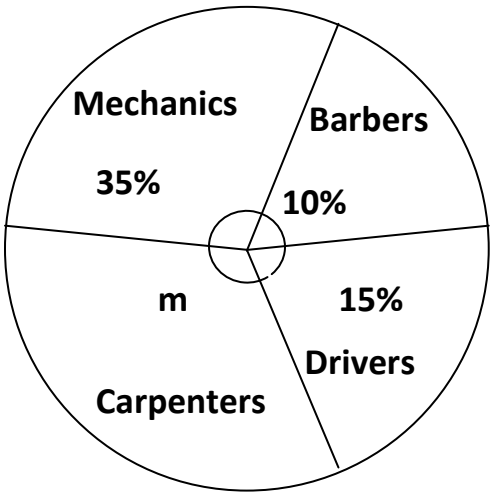
$\frac{25}{100} \times 60\ acres$

$\frac{5}{2} \times 6$

5×3

$15\ more\ acres$

5. The pie chart below shows how the COVID-19 task force of a certain district shared 40,000kg of posho flour to different groups of people who were stopped from working. Use it to answer the questions that follow.



a. Find the value of m

$$m + 10\% + 35\% + 15\% = 100\%$$
$$m + 60\% = 100\%$$
$$m + 60\% - 60\% = 100\% - 60\%$$
$$m = 40\%$$

b. How many kilograms of posho were given to drivers?

$\frac{15}{100} \times 40,000kg$

$15 \times 400kg$

$60,00kg$

Mathematics is the Key

c. How many more kilograms of posho were given to carpenters than barbers?

$40\% - 10\%$=30%

$\frac{30}{100} \times 40,000kg$

30×400

$12,000kg$

d. What is the ratio of the mechanics' share to the total share?

$\frac{35}{100}$

$\frac{7}{20}$

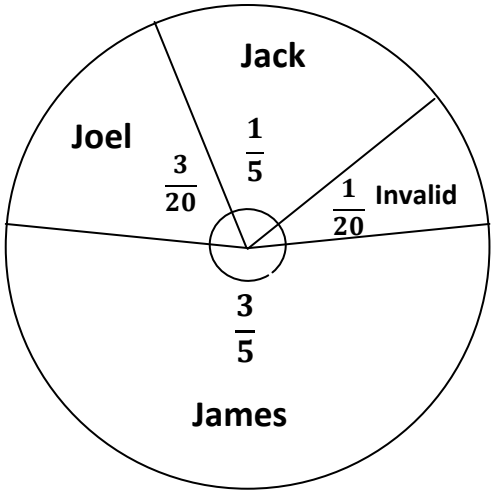
$7:20$

SUB TOPIC: PIE CHARTS INVOLVING FRACTIONS

REMEMBER:

Fractions in all the sectors add up to 1 whole.

1. The pie chart below shows how three boys got their votes in Boona fm p/s given that 720 votes were cast altogether. Use it to answer the questions that follow.



(a) How many votes did James get?

$\frac{3}{5} \times 720$

3×144

$432\ votes$

(b) How many votes did Jack get?

$\frac{1}{5} \times 720$

1×144

$144\ votes$

(c) How many votes were invalid?

Mathematics is the Key

$$\frac{1}{20} \times 720$$
$$1 \times 36$$
$$36\ votes$$

(d) How many more votes did James get than Joel?

$$\underline{Joel}$$
$$\frac{3}{20} \times 720$$
$$3 \times 36$$
$$108\ votes$$

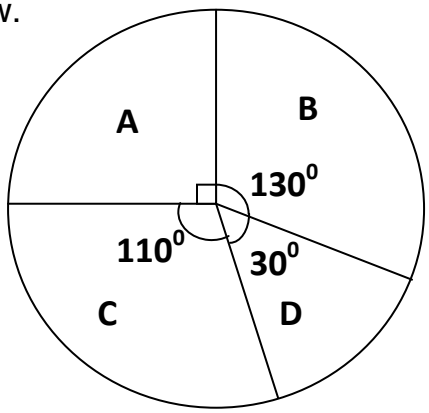
$$\underline{432\ votes - 108\ votes = 324\ more\ votes}$$

(e) Who won the election?

James

SUB TOPIC: SOLVING PROBLEMS INVOLVING PIE-CHARTS

1. Study the pie-chart below which shows the number of COVID-19 testing kits that were distributed in different countries in 2020 and use it to answer the questions that follow.



(a) How many kits were distribute altogether if country D got 15 million kits?

$$let\ the\ total\ number\ of\ kits\ be\ P$$
$$\frac{30°}{360°} \times P = 15,000,000$$
$$\frac{36}{3} \times \frac{3P}{36} = 15,000,000 \times \frac{36}{3}$$
$$P = 15,000,000 \times 12$$
$$\underline{P = 180,000,000\ kits}$$

(b) How many kits were distributed to country B?

$$\frac{130°}{360°} \times 180,000,000\ kits$$
$$130 \times 500000$$

Mathematics is the Key

$\underline{65,000,000\ kits}$

(c) How many more kits were distributed to country C than country A?

$110° - 90° = 20°$

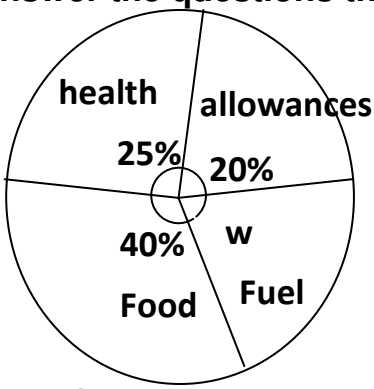
$\frac{20°}{360°} \times 180,000,000\ kits$

20×500000

$\underline{10,000,000\ more\ kits}$

Your turn

The pie chart below shows how the District COVID-19 task force distributed money. Use it to answer the questions that follow.



(a) Find the value of w.

(b) Find the total amount of money distributed if sh.60m was given the health sector.

(c) Find the amount of money for food?

(d) How much money was paid to the workers as allowances?

(e) Express the amount of money for fuel as a fraction.

SUB TOPIC: CONSTRUCTION OF PIE-CHARTS

The table below shows how Allen spent her money on the first day of the term

Item	Money
Books	sh.8,000
Pens	Sh.4,000
Pads	Sh.6,000
Pocket money	Sh.12,000

Construct a pie chart using a radius of 3.5cm showing the above information

$Total$

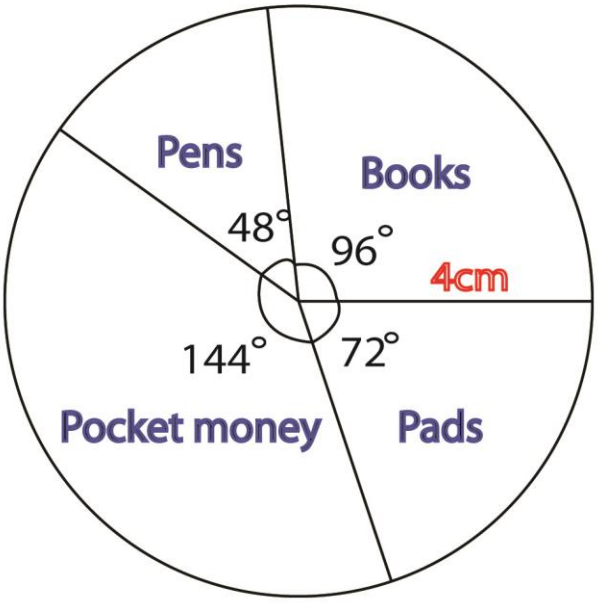
$sh.8,000 + sh.4,000 + sh.6,000 + 12,000 = sh.30,000$

Books	Pens	Pads	Pocket money
$\frac{sh.8,000}{sh.30,000} \times 360°$ $8 \times 12°$ $96°$	$\frac{sh.4000}{sh.30,000} \times 360°$ $4 \times 12°$ $48°$	$\frac{sh.6000}{sh.30,000} \times 360°$ $6 \times 12°$ $72°$	$\frac{sh.12000}{sh.30,000} \times 360°$ $12 \times 12°$ $144°$

Mathematics is the Key

check

$96° + 48° + 72° + 144° = 360°$



2. Waswa spent $^1/_3$ of his money on books and $^1/_6$ of the remainder on transport and the rest as pocket money.

(i) What fraction of his money was left for pocket money?

Fraction spent on books = $^1/_3$

Remaining fraction: $1 - \frac{1}{3} = \frac{3}{3} - \frac{1}{3} = \frac{2}{3}$

Fraction spent on transport: $\frac{1}{6}$ *of* $\frac{2}{3} = \frac{1}{6} \times \frac{2}{3}$

$= \frac{1}{9}$

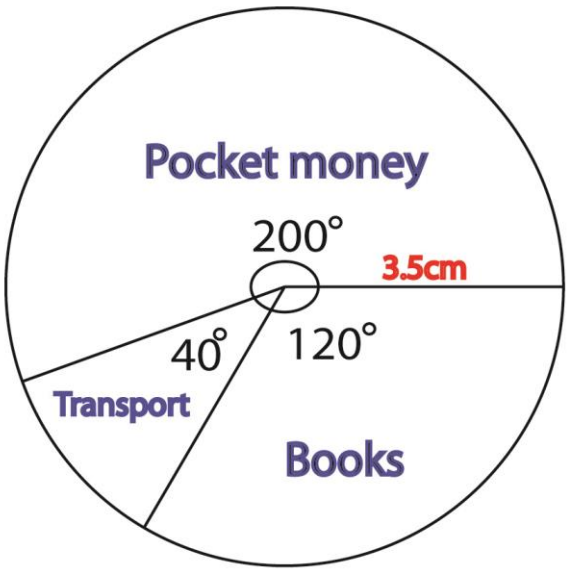
transport and books: $\frac{1}{3} + \frac{1}{9}$

$\frac{1}{3} \times \frac{3}{3} + \frac{1}{9} = \frac{3}{9} + \frac{1}{9} = \frac{4}{9}$

Remained fraction = $1 - \frac{4}{9} = \frac{9}{9} - \frac{4}{9} = \frac{5}{9}$

(ii) Using a radius of 4cm, construct a pie chart showing the information

Books	Transport	Pocket money
$\frac{1}{3} \times 360°$ $120°$	$\frac{1}{9} \times 360°$ $40°$	$\frac{5}{9} \times 360°$ $5 \times 40°$ $200°$



Mathematics is the key

1. In a certain town, 40% of the population are Baganda, 10% are Basoga, 30% are Bagisu and the rest are Acholi. Draw an accurate pie-chart for the above information.
2. Nambooze spends her monthly salary as follows ;
   sh. 12,000 on school fees
   sh. 6000 on transport and
   sh. 18,000 on food
   Draw an accurate pie chart for this information
3. On Adam's farm there are 9 goats, 6 cows, 3 pigs and 7 sheep. Using a radius of 4 cm, construct an accurate pie chart.
4. Father shared his land as follows
   $\frac{1}{3}$ *to the first born*
   $\frac{2}{9}$ *to the second born*
   $\frac{1}{9}$ *to the last born*
   The rest to the wife
   Use the information to construct a pie chart
5. In a certain town, 40% of the population are Baganda, 10% are Basoga, 30% are Bagisu and the rest are Acholi. Draw an accurate pie-chart for the above information
6. Nambooze spends her monthly salary as follows ;
   sh. 12,000 on school fees
   sh. 6000 on transport and
   sh. 18,000 on food
   Draw an accurate pie chart for this information

REFERENCES

Fountain primary maths Book 7 pages 177 to 198

MK Book 7 pages 164 to 188

SUB TOPIC: Measures of central tendency and range (STATISTICS)

NOTE THESE:

- **Mode**
  The most frequent value in an observation.
- **Model frequency**
  The number of times the mode appear.
- **Median**
  This is the middle number got after arranging in either ascending or descending order
  .

Mathematics is the Key

❖ **Mean / Average**

The measure of central tendency of a set of values computed by dividing the sum of the values by their number.

❖ **Range**

The difference between the smallest and the largest observation in a sample

❖ **Frequency**

The number of times an event appears in an experiment.

Example:

1. Amuza scored the following marks in MID term exams

$$SST - 60$$
$$MTC - 85$$
$$ENG - 82$$
$$SCI - 60$$
$$RE - 53$$

(a) Calculate his mode

Marks	Freq
85	1
82	1
60	2
53	1

$\boldsymbol{Mode = 60}$

(b) Find his range

$$\boldsymbol{Range = H - L}$$
$$\boldsymbol{= 85 - 53}$$
$$\boldsymbol{= 32}$$

(c) What is his median mark?

53, 60, 60, 82, 85

$Median = 60$

(d) Find his mean mark

$$\boldsymbol{Mean = \frac{sum\ of\ items}{no.\ of\ items}}$$
$$\boldsymbol{= \frac{53 + 60 + 60 + 82 + 85}{5}}$$
$$\boldsymbol{= \frac{340}{5}}$$
$$\boldsymbol{= 68}$$

Mathematics is the Key

2. The table below represents the goals scored by different teams.

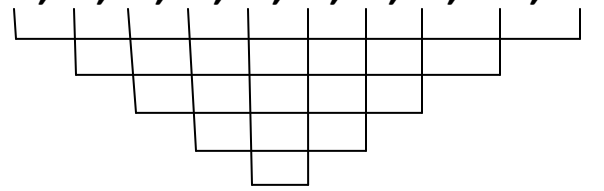
Goals scored	2	3	6	7	10
Number of teams	4	1	2	1	2

(a) Find the mode.
2 goals

(b) What was the modal frequency?
4

(c) Calculate the median

2 , 2 , 2 , 2 , 3 , 6 , 6 , 7 , 10 , 10



Median = $\frac{3+6}{2}$

$= \frac{9}{2}$

= 4.5

(d) Calculate the mean

$Mean = \frac{SI}{NI}$

$= \frac{2\times4+3+6\times2+7+10+10}{4+1+2+1+2}$

$= \frac{50}{10}$

$= 5$

3. Find the medium of the following scores 3, 1, 2, 0, 6, 1, 4

4. The table below shows the performance of pupils in a P.7 class in mathematics exam.

Marks	100	90	80	70	60	50	40	30
Freq	0	2	1	1	6	4	4	2

(a).How many pupils are in P.7 class?
(b).What was the highest mark obtained in this exam?
(c).Workout the range
(d)Calculate the average mark.

Mathematics is the key

REFERENCE
MK Bk 7 Pg 156

SUB TOPIC:COMPLEX AVERAGE/INVERSE OF AVERAGE

Examples

1. The average of 4 boys in a group is 12 years. A young boy of 7 years joined the group. Find the average age of the 5 boys.

$$Mean = \frac{Total}{Number\ of\ boys}$$

$$Total\ age = Mean\ age \times number\ of\ boys$$
$$= 12 \times 4$$
$$= \underline{48\ years}$$

$$Mean\ age\ of\ 5\ boys = \frac{Sum\ of\ ages}{Number\ of\ boys}$$
$$= \frac{48 + 7}{5}$$
$$= 55$$
$$= 11\ years$$

2. The average of weight of 6 pupils is 30kg. when the teacher joins them, their average becomes 36kg. Find the weight of the teacher.

$$\underline{total\ weight\ of\ 6\ pupils}$$
$$Total\ weight = Mean \times number$$
$$= 30 \times 6$$
$$= \underline{180\ kg}$$

$$\underline{Total\ weight\ of\ 6\ pupils\ and\ the\ teacher}$$
$$Total\ weight = Mean \times number$$
$$= 36 \times 7$$
$$= \underline{252\ kg}$$

$$\underline{weight\ of\ the\ teacher}$$
$$252kg - 180kg = 72kg$$

Try these

1. The average mark of 36 pupils in a class is 5. Two pupils whose marks are 20 and 24 leave the group. Find the average mark of the remaining pupils.
2. The mean age of 5 children is 12years, if a sixth child joins them, the mean age becomes 11years, find the age of the 6th child.

Mathematics is the Key

3. The average weight of 6pupils is 40kg; the average weight of other 4 pupils is 30kg. Find the average weight of all the pupils

SUB TOPIC: FINDING MISSING NUMBERS WHEN GIVEN AVERAGE

3. The table below shows the marks obtained by some pupils in a test. Use the information to answer the questions that follow.

Marks	40	m	60	70
Number of pupils	2	6	3	3

If the mean mark is 55, find the value of m

$$\boldsymbol{Mean = \frac{sum\ of\ items}{number\ of\ items}}$$

$$\frac{40 \times 2 + m \times 6 + 60 \times 3 + 70 \times 3}{2 + 6 + 3 + 3} = 55$$

$$\frac{80 + 6m + 180 + 210}{14} = 55$$

$$14 \times \frac{6m + 470}{14} = 55 \times 14$$

$$6m + 470 = 770$$

$$6m + 470 - 470 = 770 - 470$$

$$6m = 300$$

$$\frac{6m}{6} = \frac{300}{6}$$

$$\underline{m = 50}$$

Example 3

The mean of y + 1, 5 and y is 6. Find the value of y.

$$\frac{(y + 1) + 5 + y}{3} = 6$$

$$\frac{y + y + 5}{3} = 6$$

$$3 \times \frac{2y + 6}{3} = 6 \times 3$$

$$2y + 6 = 6 \times 3$$

$$2y + 6 - 6 = 18 - 6$$

$$\frac{2y}{2} = \frac{12}{2}$$

$$\underline{y = 6}$$

Try these

1. The table below represents the goals scored by different teams.

Goals scored	2	3	k	7	10
No. of teams	4	1	2	1	2

Mathematics is the Key

(a) Find the value of k if thee mean number of goals is 5
(b) Find the modal number of goals.
(c) What was the modal frequency?
(d) Calculate the median

2. The average of a, a-7, 3 and 2a is 8.Find the value of a.

EVALUATION ACTIVITY:

Macmillan Primary Maths Bk 7 Pg 148

SUB TOPIC: PROBABILITY

Probability is a measure of the likelihood of an event happening. Probability ranges from 0 to 1

REMEMBER

Probability of zero (0) means that there is no chance at all.
Probability that is less than a half means that it is a bad chance.
Probability that is a half means that the chances are 50 50.
Probability that is greater than a half means that it is a good chance.
Probability of one (1) means that you have all chances

$$\textbf{Probability} = \frac{number\ of\ events}{sample\ space}$$

Example: A basket has 2 ripe mangoes and 6 row mangoes. What is the probability of Twaha picking a ripe mango at random?

: $\boldsymbol{Probability} = \frac{number\ of\ events}{sample\ space}$

$\boldsymbol{n(E) = 2}$

$\boldsymbol{Total\ chances\ (SS) = 2 + 6 = 8}$

$\boldsymbol{Probability} = \frac{2}{8}$

Try these

1. What is the probability that a baby will be produced by a pregnant mother?
2. The probability that peter will pass his examinations is $\frac{2}{7}$. What is the probability that he will not pass his examinations?
3. In a tin there are 30 blue and red pens. If the probability of picking a red pen is $\frac{3}{5}$, how many red pens are in the tin?
4. In a football match a team will either win, draw or lose a game.

(a) What is the probability that a team wins the game?
(b) Find the probability that a team draws the match.
(c) What is the probability of a team losing a match?

Mathematics is the Key

SUB TOPIC: TOSSING A COIN OR A DICE

Example 1:

If a coin is tossed once, what is the probability of getting a head on the top?

$$\boldsymbol{Total\ chances} = \{\boldsymbol{H}, \boldsymbol{T}\}$$

$$\boldsymbol{Number\ of\ possible\ outcomes(SS)} = \boldsymbol{2}$$

$$\boldsymbol{Expected\ out\ comes} = \{\boldsymbol{H}\}$$

$$\boldsymbol{n(E)} = \boldsymbol{1}$$

$$\boldsymbol{Probability} = \frac{\boldsymbol{n(E)}}{\boldsymbol{SS}}$$

$$= \underline{\underline{\frac{1}{2}}}$$

Example 2:

When a die is rolled once, what is the probability of getting an even number on top?

$$Probability\ space = \{all\ expected\ out\ comes\}$$

$$\{1, 2, 3, 4, 5, 6\}$$

$$(s.s) = 6$$

$$Expected\ outcomes = \{all\ desired\ chances\}$$

$$(E) = \{2, 4, 6\}$$

$$n(E) = 3$$

$$\boldsymbol{Probability} = \frac{\boldsymbol{n(E)}}{\boldsymbol{SS}} = \frac{\boldsymbol{3}}{\boldsymbol{6}}$$

Try these

1. A coin is tossed once. What is the probability of getting ;
   (a) A head on top
   (b) A tail on top
   (c) A head or a tail on top
2. A dice is tossed once. What is the probability of getting;
   (a). an even number on top.
   (b). a prime number on top.
   (c). a number less than five on top

REFERENCE

A New MK Primary Bk 7 Page 189

SUB TOPIC: COORDINATE GRAPHS

1. Plot the following points on a grid

$\boldsymbol{A}(\boldsymbol{-1}, \boldsymbol{4})$ $\boldsymbol{B}(\boldsymbol{5}, \boldsymbol{4})$ $\boldsymbol{C}(\boldsymbol{5}, \boldsymbol{0})$ $\boldsymbol{D}(\boldsymbol{-1}, \boldsymbol{0})$

Join the points name the figure formed and find its area.

Rectangle

Mathematics is the Key

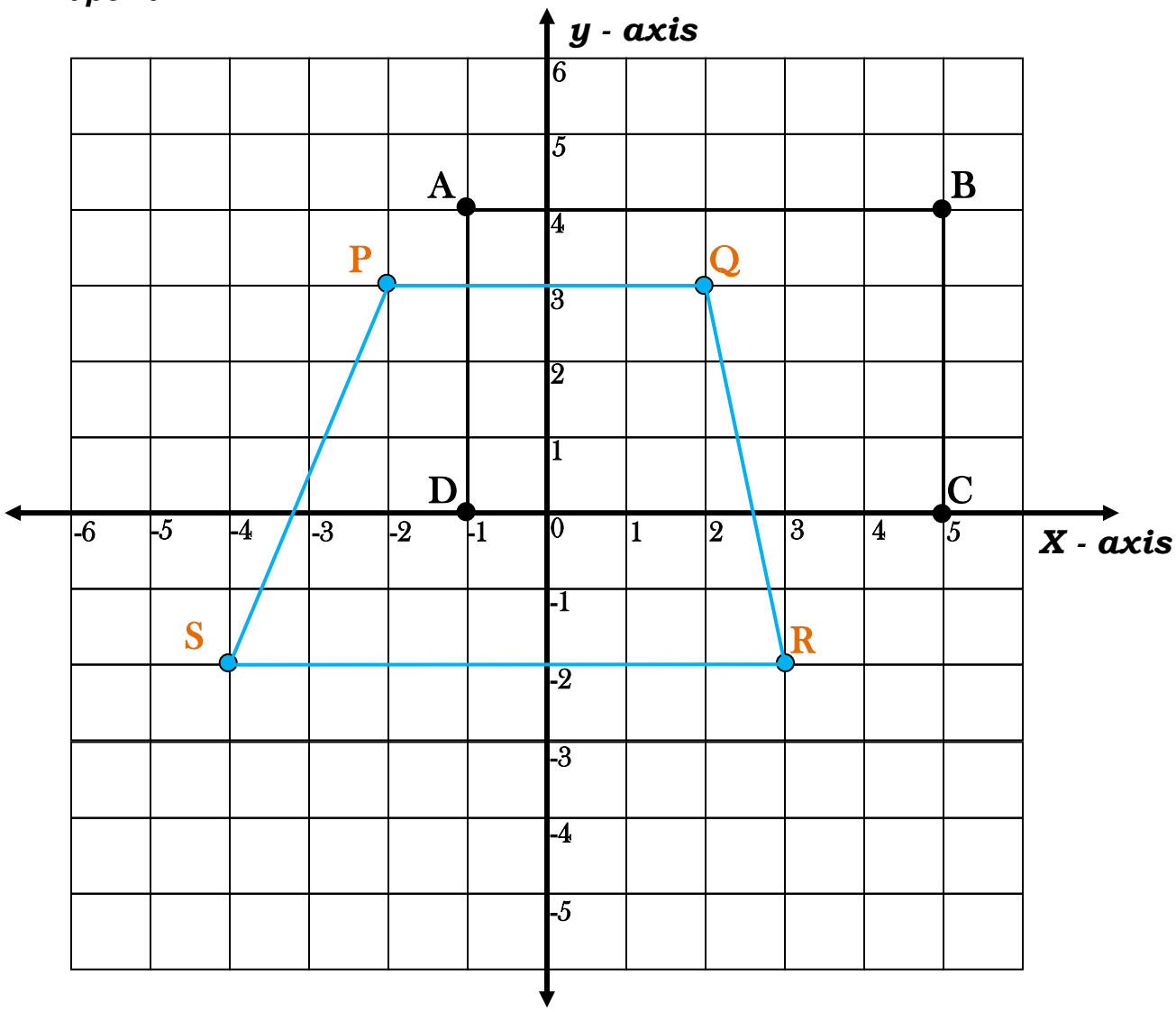
Area = 6 x 4

= 24 square units

2. Plot the following ***P (-2, 3) Q(2, 3) R(3, -2) S(-4, -2)***

Join the points and name the figure formed.

Trapezium



REFERENCE

A New MK Primary Mathematics Bk 7

SUB TOPIC: GRAPHS OF EQUATIONS

Completing tables using equations of lines

Example:

1. Given that x = y. Complete the table.

X	***-2***	***-1***	***0***	***1***	***2***	***3***	***4***	***5***
Y	***-2***	***-1***	***0***	***1***	***2***	***3***	***4***	***5***

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2. Given that 2x = y .Complete the table below

X	***- 4***	***- 2***	***0***	***2***	***4***
Y	***- 2***	***- 1***	***0***	***1***	***2***

3. Given that Y = 2x – 1 Complete the table.

Y =2x – 1
Y = 2 x -2 - 1
Y = - 4 -1
Y = -5

Y= 2x -1
Y = 2 x 0 -1
Y = 0 -1
Y = -1

Y = 2x -1
Y = 2 x 2 – 1
Y= 4 -1
Y= 3

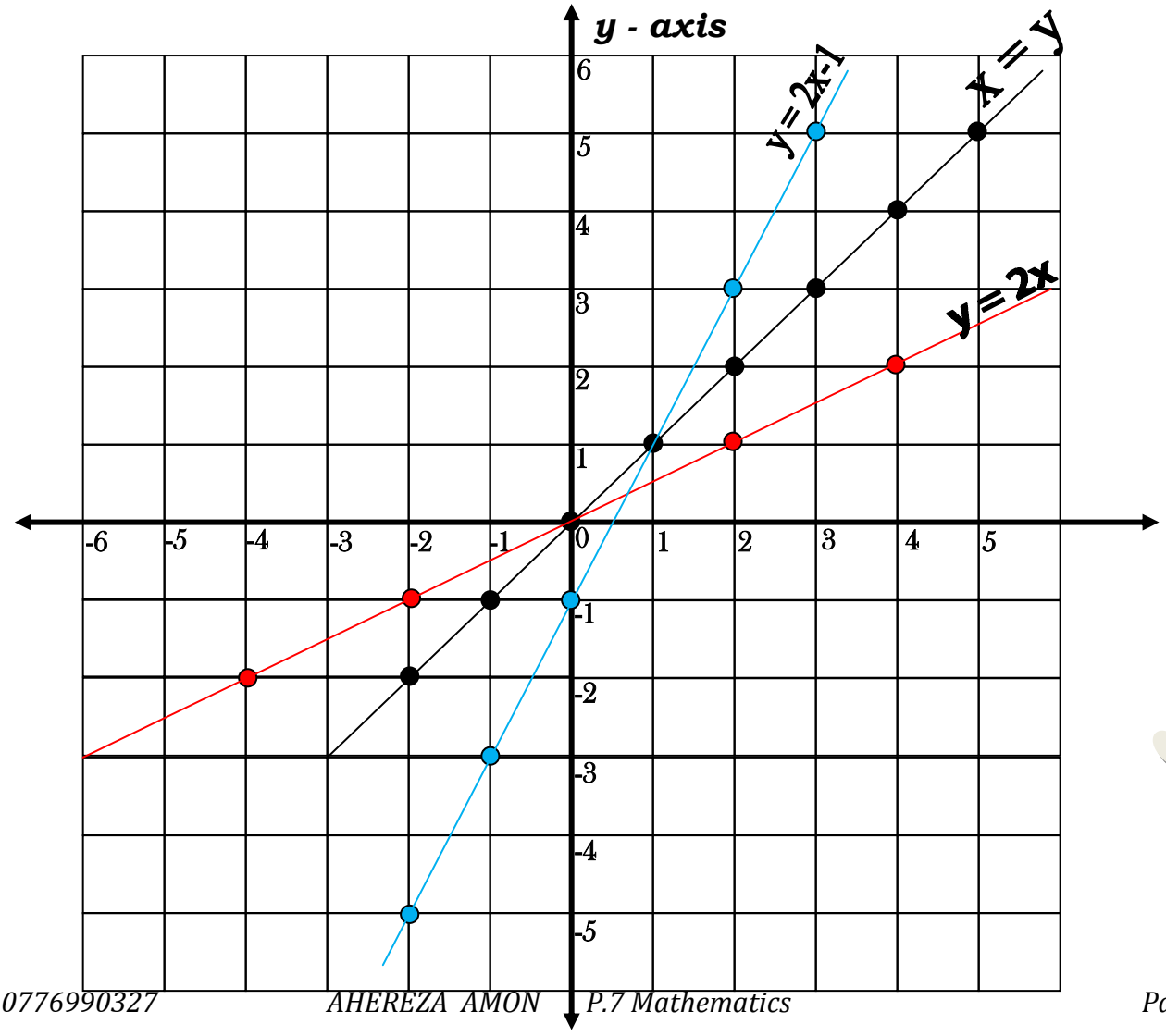
Y = 2x-1
Y = 2 x -1 -1
Y = -2 -1
Y = -3

Y = 2x-1
Y = 2 x 1 – 1
Y = 2 – 1
Y = 1

Y = 2x -1
Y = 2 x 3 -1
Y = 6 -1
Y = 5

X	**-2**	**-1**	**0**	**1**	**2**	**3**
Y	**- 5**	**- 3**	**-1**	**1**	**3**	**5**

(a) Plot lines for the equation above .



Mathematics is the Key

4. Complete the table y = 3x – 5

X	4	___	$^1/_3$	___	3
Y	_____	-2	___	-8	___

5. 3x + y = 5 Complete the table

X	0	1	2	___	6	___
Y	5	___	___	7	___	3

REFERENCE

A New MK Primary Mathematics Bk 7

SUB TOPIC: FORMING EQUATIONS OF LINES FROM ORDERED PAIRS

Example:

1. Line A in the graph passes through (-3,-3), (-2, -2) (-1, -1), (0, 0), (1, 1), (2, 2), (3, 3)

The table shows the x and y coordinates from line A.

X	***-3***	***-2***	***-1***	***0***	***1***	***2***	***3***
Y	***-3***	***-2***	***-1***	***0***	***1***	***2***	***3***

In comparison x co - ordinates are equal to the y coordinates

y = x

The equation of line A is y = x

2. Line B passes through (-3, -2), (-2, -1), (-1, 0), (0, 1), (1, 2), (2, 3), (3, 4), etc

X	***-3***	***-2***	***-1***	***0***	***1***	***2***	***3***
Y	***-2***	***-2***	***0***	***1***	***2***	***3***	***4***

Y = x + 1

-2 = -3 + 1

-1 = - 2 + 1

0 = -1 + 1

1 = 0 + 1

2 = 1 + 1

3 = 2 + 1

The equation for line B is y = x + 1

REFERENCE

MK Bk 7 Pg 185

Mathematics is the Key

TOPICAL EXERCISE ON GRAPHS

1. Hamisa kept the following daily record of the number of people who visited their home in a week: 3, 5, 3, 2, 0, 3, 5. Find the mean.
2. A die is rolled once. What is the probability that a composite number will show on top?
3. The average height of Peter, James and John is 51cm. If the height of Peter is 53cm and that of James is 46cm Find the height of John.
4. Mary kept the following record of rainfall in centimeters 4, 3, 6, 5, 3, 0. Find the mode.
5. a FOOT BALL TEAM CAN WIN, DRAW OR LOSE A Match. What is the probability that it will win a March?
6. The mean of the scores: 8, 7, 6, 5, (a – 5) is 6
   (a) Find the value of a.
   (b) Find the range of the scores.
7. Sumaya scored the following marks in her homework exercises: 2, 5, 7, 3, 10, 4, 7, 11, 8, 3
   (a) Find her median mark
   (b) Find the mean mark
   (c) Find the probability that Sumaya scored a mark above her mean mark
8. The equation of a line is 2x + 1 = y. Make a table for the coordinates of x and y with the coordinates of x between -2 and +3. Show the line on a graph.
9. Given that x = 2y + 1 Complete the table below.

X	1	___	5	___	9
Y	____	1	____	3	____

10. (a) Draw a grid and plot the following points:
    (i) A (-4, 3)
    (ii) B (0, 3)
    (iii) C (2, -3)
    (iv) D (-4, -1)
    (b) Join the points A to B, B to C, C to D, D to A
    (c) Name the quadrilateral formed.
    (d) Find the area of the quadrilateral formed above.
11. Find the mean of x, 4, 2x, 6 and 2x.
12. What number is mid way of ½ and 1/3?
13. A cyclist traveled from town P to R as follows. For 2 hours, he cycled from P to town Q a distance of 30km and then rested for 1 hour from Q. He continued for another 1 hour to town R at a speed of 40km/hr.
    (a) Draw a travel graph to show his journey

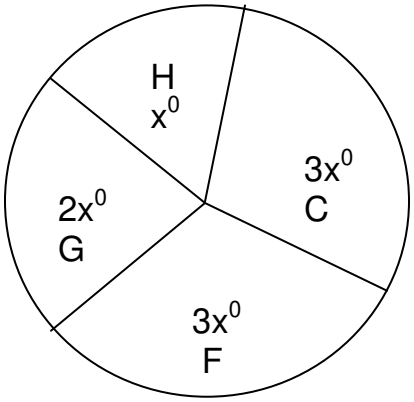
14. Given that Y = 2x – 1
    (a) Complete the table below.

X	0	1	2	3	4	5
Y	-1	1	___	___	___	___

    (b) Plot the points given in the table above on a graph.

Mathematics is the Key

15. The average of 3, 5, 4, 7, 9, 5 and y is 5. Find:
    (a) the value of y
    (b) the median
    (c) the mode
16. The average speed of a car is 60km/hr for 30 minutes. What distance is covered?
17. The pie chart below shows how a farmer has divided his land. C is for cash crops, G is for grazing, F is for food crops and for other purposes . The land available is 720 hectares.



    (a) How many hectares are left for grazing?
    (b) If he pays rent of shs 200 per hectare per year, how much will he pay for land reserved for cash crops?

18. In a Mathematics test given to a class, the marks scored frequency and total marks scored are shown in the table below.

Marks scored	Frequency	Total marks
4	4	16
_____	9	45
6	____	84
7	8	_____
9	5	45

    (a) Complete the table
    (b) What was the mode?
    (c) How many pupils were in the class?
    (d) What was the average mark scored?

19. Study the frequency table and answer the questions that follow:

Marks scored	20	40	70	50
No. of children	2	3	1	1

    (a) How many pupils did the test?
    (b) Find their mean mark.
    (c) Calculate their median mark.
    (d) What was the modal mark.
    (e) Workout the range

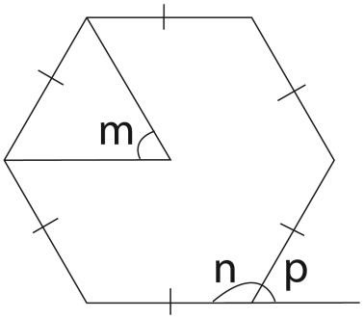
Mathematics is the Key

LINES, ANGLES AND GEOMETRICAL FIGURES

SUB TOPIC: Names of polygons

NAME	SIDES
triangles	3
quadrilateral	4
pentagon	5
hexagon	6
heptagon	7
octagon	8
nonagon	9
decagon	10
hendecagon	11
duo decagon	12

SUBTOPIC: interior and exterior angles of a polygon



[redacted]

Examples

1. The exterior angle of a regular polygon is 36°. Find the size of the interior angle?

$$\boldsymbol{Let\ the\ interior\ angle\ be\ m}$$
$$\boldsymbol{m + 36° = 180°}$$
$$\boldsymbol{m + 36° - 36° = 180° - 36°}$$
$$\underline{\boldsymbol{m = 144°}}$$

2. The interior angle of a regular polygon is 115°.find the size of its exterior angle.

$$\boldsymbol{Let\ the\ exterior\ angle\ be\ m}$$
$$\boldsymbol{m + 115° = 180°}$$
$$\boldsymbol{m + 115° - 115° = 180° - 115°}$$
$$\underline{\boldsymbol{m = 65°}}$$

3. Find the size of the exterior angle of a polygon whose interior angle is;
   (a) 120°

Mathematics is the key

(b) 80°

4. Find the size of an interior angle of a polygon whose exterior angle is 45°.

SUB TOPIC: Calculating the number of sides of a polygon

Examples:

1. Calculate the number of sides of a regular polygon whose exterior angle is 30°.

Number of sides = $\frac{360°}{each\ ext\ angle}$

$= \frac{360°}{30°}$

No of sides = 12 sides.

2. The interior angle of a regular polygon is 144.Name the polygon.

Let the ext angle be x.

$X + 144^0 = 180^0$

$X + 144^0 - 144^0 = 180 - 144$

$X = 36^0$

Exterior angle = 36^0

No of side = $\frac{360°}{36°}$

= 10 sides

The polygon is a decagon

3. The interior angle of a regular polygon is 90^0 more than the exterior angle.

(a) Calculate the exterior angle

Let the ext. angle be x

Int. angle = $x + 90^0$

Ext. angle x

$x + 90^0 + x = 180^0$

$2x + 90^0 - 90^0 = 180^0 - 90^0$

$\frac{2x}{2} = \frac{90}{2}$

$x = 45^0$

ext. angle = 45^0

(b) How many sides has the polygon?

No of sides = $\frac{360^o}{45^o}$

= 8 sides

Mathematics is the Key

Calculate the number of sides of a polygon whose exterior angle is;

(a) $36°$

(b) $45°$

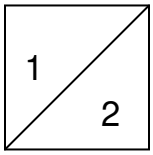
(c) $60°$

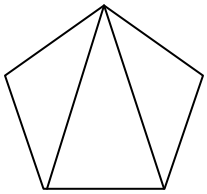
REFERENCE

A New MK Primary Mathematics 2000 Bk 7 Pg 246 - 249(New Edition)

SUB TOPIC: Triangulation

Triangulation is forming triangles in a polygon.





Quadrilateral Pentagon

Number of triangles = n – 2

Each triangle contains two right angles.

Number of right angles = 2 (n - 2)

= 2n - 4

Polygon	*Number of sides*	*Number of triangles*	*Number of right angles*
Quadrilateral	4	4 – 2 = 2 triangles	2 x 2 = 4 right angles
Pentagon	5	5 – 2 = 3 triangles	3 x 2 = 6 right angles
Hexagon	6	6 – 2 = 4 triangles	4 x 2 = 8 right angles
Heptagon	7	7 – 2 = 5 triangles	5 x 2 = 10 right angles

Examples:

1. How many triangles and right angles can be formed in a polygon with 8 sides?

$$No\ of\ triangles = n - 2$$
$$= 8 - 2$$
$$= 6\ triangles$$

$$No.of\ right\ angles = 6 \times 2$$
$$= 12\ right\ angles$$

2. Calculate the number of triangles and the number right angles of;

(a) A 6 six sided polygon

(b) A duo decagon

(c) A 20 sided polygon

Mathematics is the Key

REFERENCE

A New MK Primary Mathematics 2000 Bk 7 Pg 237-250 (New Edition)

SUB TOPIC: Finding number of sides of a polygon when given number of triangles or right angles

1. If 10 triangles can be formed in regular polygon, find the number of sides of the polygon.

$$No.of\ triangles = n - 2$$
$$n - 2 = 10$$
$$n - 2 + 2 = 10 + 2$$
$$\underline{n = 12\ sides}$$

2. Find the number of sides of a polygon with 16 triangles

$$2(n-2) = no.of\ right\ angles$$
$$2n - 4 = 16$$
$$2n - 4 + 4 = 16 + 4$$
$$2n = 20$$
$$\frac{2n}{2} = \frac{20}{2}$$
$$\underline{n = 10 sides}$$

3. Find the number of sides of a polygon with;
   (a) 10 right triangles
   (b) 4 triangles
4. Name the polygon with;
   (a) 8 triangles
   (b) 18 right angles

SUB TOPIC: THE SUM OF INTERIOR ANGLES OF A REGULAR POLYGON (interior angle sum)

Interior angle sum = $180^o(n - 2)$ or $90^o(2n - 4)$

Examples:

1. The interior angle of a regular pentagon is 108^o. Calculate the sum of all interior angles of the polygon.

A pentagon has 5 sides.

Each int. angle = 108^o

The sum of interior angles = 108^o x 5

$\underline{= 540^o}$

Mathematics is the Key

2. Calculate the interior angle sum of a regular polygon with 7 sides.

Int. angle sum = 180^o (n-2)

180^o (7 – 2)

180^0 x 5

900^0

3. Each exterior angle of a polygon is 30°. Calculate the sum of the interior angles of a polygon.

No. of sides

$\frac{360°}{30°}$

12 sides

The sum of int. angles

180^0 (n – 2)

180^0 (12 - 2)

180 x 10

1800^0

4. Find the sum of interior angles of ;
   (a) A polygon with 8sides
   (b) A polygon with 18sides
   (c) A heptagon
   (d) A polygon with 15 sides

REFERENCE

A New MK Primary Mathematics 2000 Bk 7 Pg 252 - 257 (New Edition)

SUB TOPIC: Finding number of sides when given interior angle sum

1. The sum of interior angles of a regular polygon is 1440°.
   (a) How many sides has the polygon?

180^o(n - 2) = int. angle sum

180^o(n - 2) = 1440^o

$$\frac{\cancel{180°}(n-2)}{\cancel{180°}} = \frac{1440°}{180°}$$

$$n - 2 = 8$$

$$n - 2 + 2 = 8 + 2$$

$$n = 10 \text{ sides}$$

   (b) What is the size of each exterior angle of the polygon?

$360^o \div 10 = 36^0$

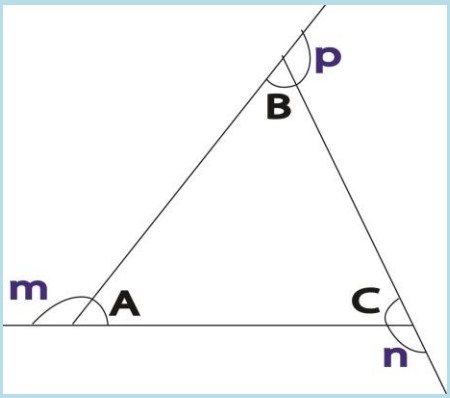
Mathematics is the Key

2. Calculate the number of sides of a polygon whose interior angle sum is;
   (a) $1800°$
   (b) $540°$
   (c) $720°$

REFERENCE

A New MK Primary Mathematics 2000 Bk 7 Pg 252 - 257 (New Edition)

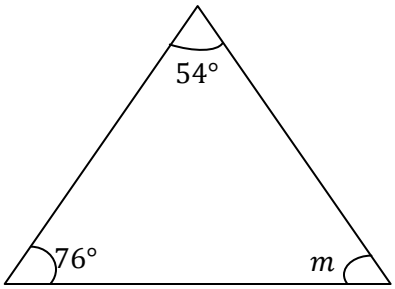
SUB TOPIC: ANGLES OF TRIANGLES



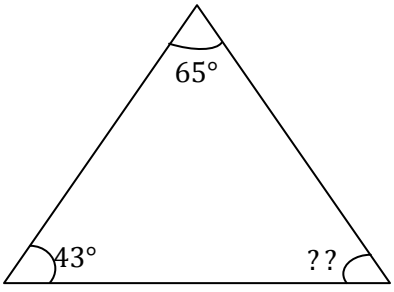
$$A + B + C = 180°$$

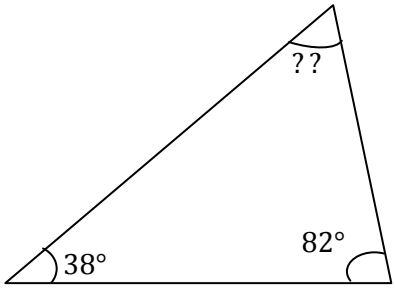
Examples

1. Find the missing angle



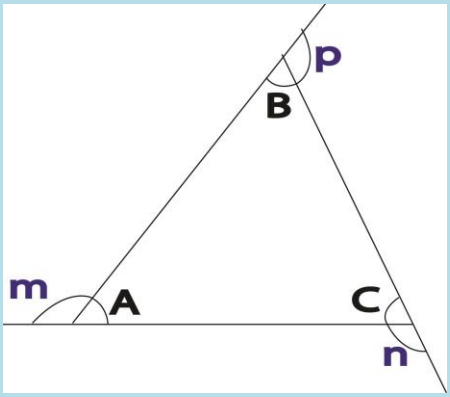
$$m + 76° + 54° = 180°$$
$$m + 130° = 180°$$
$$m + 130° - 130° = 180° - 130°$$
$$m = 50°$$





Mathematics is the Key

Angle properties of triangles



Two interior angles of a triangle add up to one opposite exterior angle

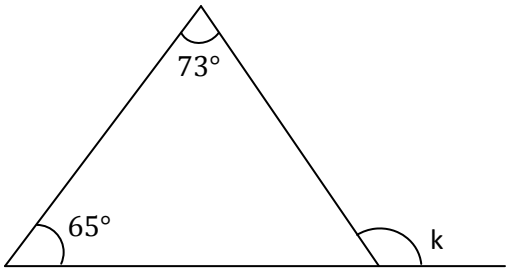
A + B = n

B + C = m

A + C = p

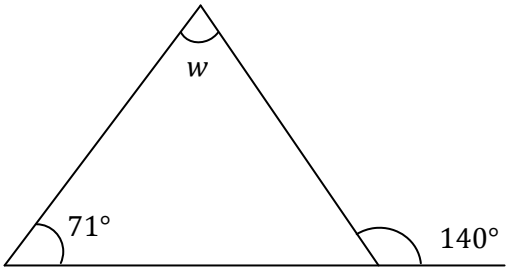
Examples

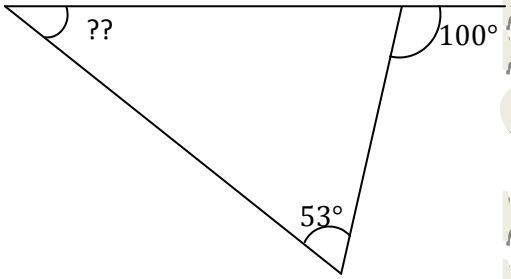
1. ***Find the missing angle in the figures below***

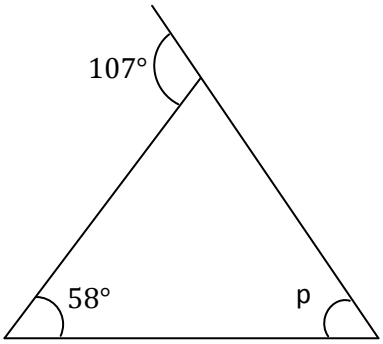


$$k = 65° + 73°$$

$$\underline{k = 138°}$$

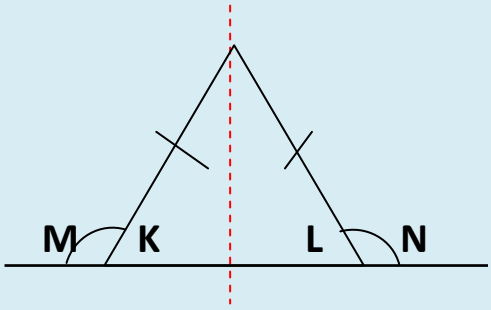






Mathematics is the Key

Angle properties of triangles



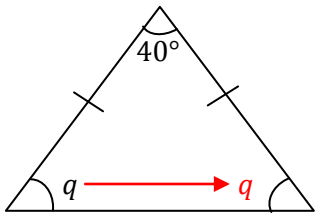
- *Two sides are equal*
- *It has one line of symmetry*
- *Base angles are equal*

$\angle K = \angle L$

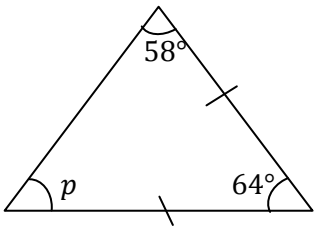
$\angle M = \angle N$

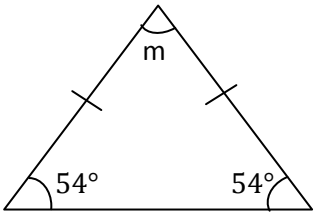
Examples

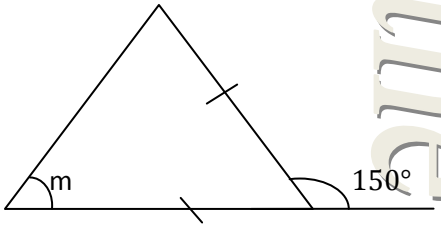
1. Find the value of the unknown in degrees.

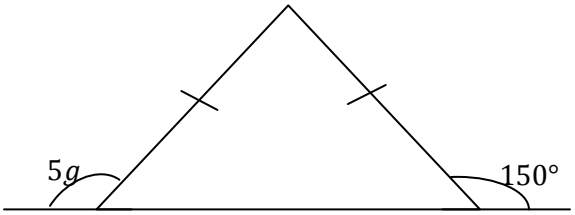


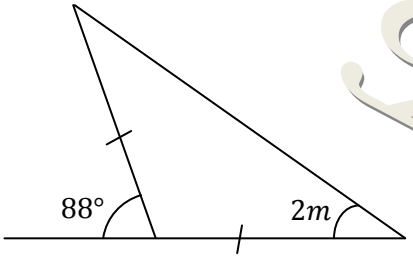
$$q + q + 40° = 180°$$
$$2q + 40° = 180°$$
$$2q + 40° - 40° = 180° - 40°$$
$$2q = 140°$$
$$\frac{2q}{2} = \frac{140°}{2}$$
$$q = 70°$$











Mathematics is the key

REFERENCE

A New MK Primary Mathematics 2000 Bk 7 Pg 229-235 (New Edition)

SUB TOPIC: PROPERTIES OF REGULAR POLYGONS

- ***The number of centre, exterior or interior angles is equal to the number of sides.***
- ***The centre angle is equal to the exterior angle in a regular polygon.***
- ***Interior angle plus exterior angle is equal to 180°.***
- ***All exterior angles of a regular polygon add up to 360°.***

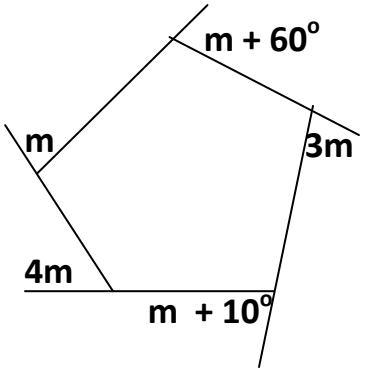
Exterior angles of polygons

Examples:

1. The exterior angles of a quadrilateral are 2x, x, 3x and x +10°.find the value of x.

$$2x + x + 10^0 + 3x + x = 360^0$$
$$7x + 10^0 = 360^0$$
$$7x + 10^0 = 10^0 = 360^0 - 10^0$$
$$\frac{7x}{7} = \frac{350^0}{7}$$
$$x = 50^0$$

2. Use the figure below to find the value of the unknown.



$$m + 4m + m + 10^0 + m + 60^0 + 3m = 360^0$$
$$10m + 70^0 = 360^0$$
$$10m + 70^0 - 70^0 = 360^0 - 70^0$$
$$\frac{10m}{10} = \frac{290^0}{10}$$
$$m = 30^0$$

REFERENCE

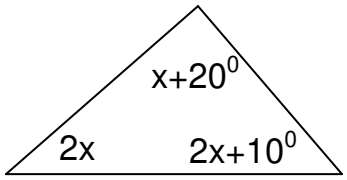
A New MK Primary Mathematics 2000 Bk 7 Pg 242 – 244 (New Edition)

Mathematics is the Key

SUB TOPIC: MORE ABOUT INTERIOR ANGLE SUM OF POLYGONS

Examples

1. Find the value of x in the figure.



Sum of int. angles of triangle = 180^0

$x + 20^0 + 2x + 2x + 10 = 180^0$

$5x + 30^0 = 180^0$

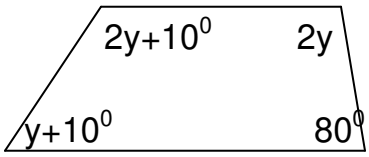
$5x + 30^0 - 30^0 = 180^0 - 30^0$

$5x = 150^0$

$\frac{5x}{5} = \frac{150^0}{5}$

$x = 30^0$

2. Find the value of y.



Int. angle sum = 360^o

$2y + y + 10 + 2y + 10 + 80^0 = 360^0$

$2y + y + 2y + 10 + 10 + 80^0 = 360^0$

$5y + 100^o = 360^0$

$5y + 100^o - 100^o = 360^0 - 100^0$

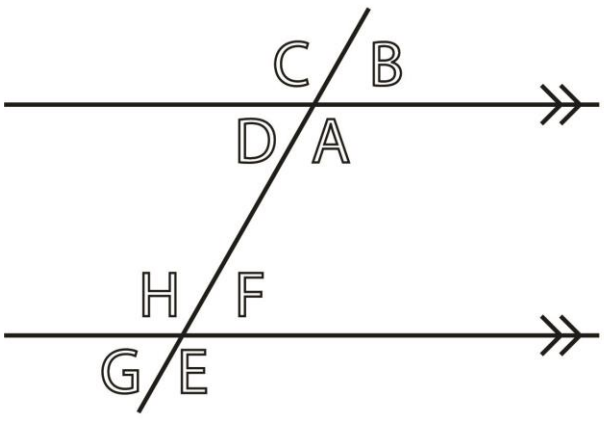
$\frac{5y}{5} = \frac{260^0}{5}$

$y = 52^0$

3. Interior angles of an octagon are 2x, x, 3x, 4x, x, 2x, 3x and x. find the value of x

SUB TOPIC: ANGLES ON PARALLEL LINES

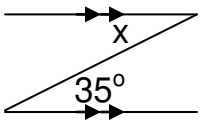
Properties of angles on parallel lines



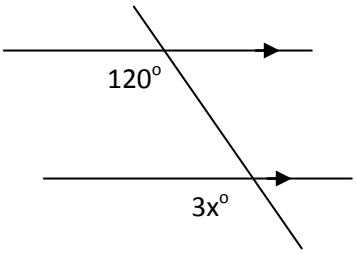
A + B = 180^o (supp. ∠S)
A = C (vertically opp ∠S)
A = E (corresp ∠S)
D = G (corresp ∠s)
B = F (corresp ∠s)
C = H(corresp ∠s)
A = H & D = f (alt. Int ∠S)
G = B & C = E (Alt. ext. ∠S)
A + F = 180^0 (co.int. ∠S)
D + H = 180^0(co.int. ∠S)
C + G= 180^0 (co.ext ∠S)
B + E = 180^0 (co.ext ∠S)
H = E (vertically opp. ∠s)
A + B + C + D = 360^0 (∠S at a point)

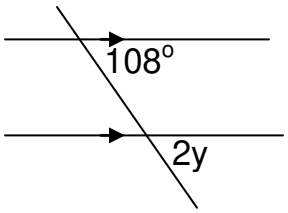
Mathematics is the Key

1. Solve for the unknowns



$\underline{X = 350\ (Alt, int \angle S)}$

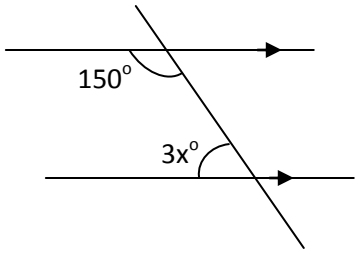


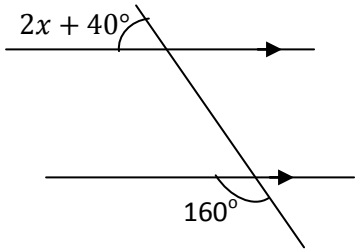


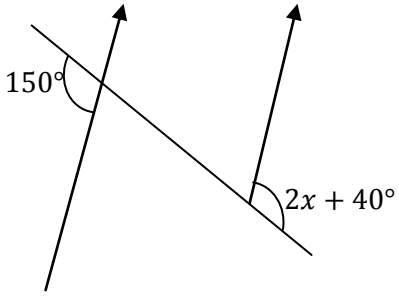
$2y = 108°\ (corr. \angle s)$

$\frac{2y}{2} = \frac{108°}{2}$

$\underline{y = 54°}$



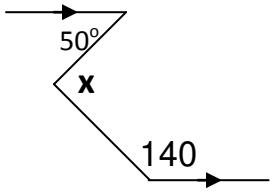


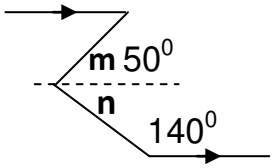


SUB TOPIC: More about angles on parallel lines

Examples:

1. Find the value of x.





Imaginary lines

Draw imaginary lines

$\underline{m = 50°\ (Alt. int \angle S)}$

$n + 140° = 180°\ (Co. int. \angle S)$

$n + 140° - 140° = 180° - 140°$

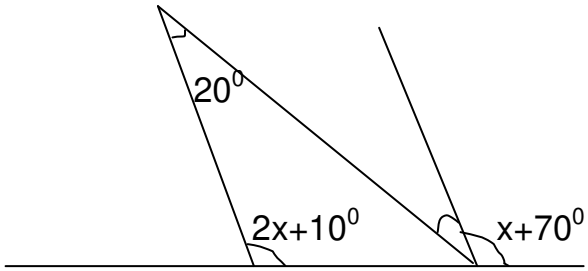
$\underline{n = 40°}$

$x = 40° + 50°$

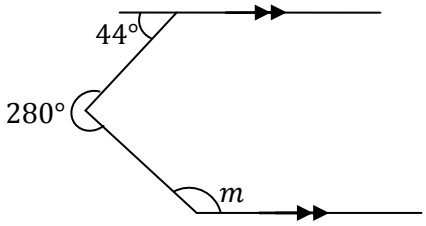
Mathematics is the Key

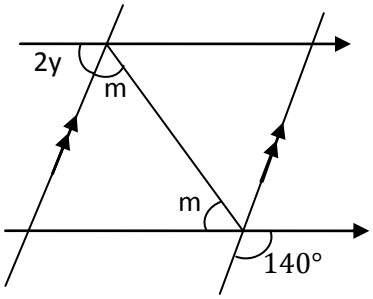
$\underline{x = 90°}$

2. Find the value of x and k



3. Find the value of the unknowns in degrees





REFERENCE

A New MK Primary Mathematics 2000 Bk 7 Pg 213 (New Edition)

SUB TOPIC: ***Angle properties of quadrilaterals***

A quadrilateral is a figure with 4 sides

Examples of quadrilaterals

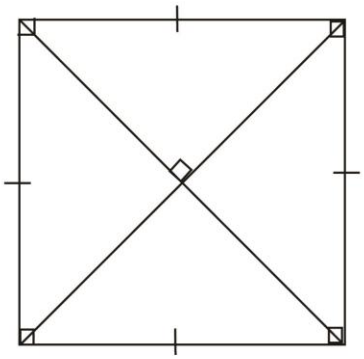
- ***Square***
- ***Kite***
- ***Parallelogram***
- ***Rectangle***
- ***Rhombus***
- ***Trapezium***

Remember :

A square is s regular quadrilateral.

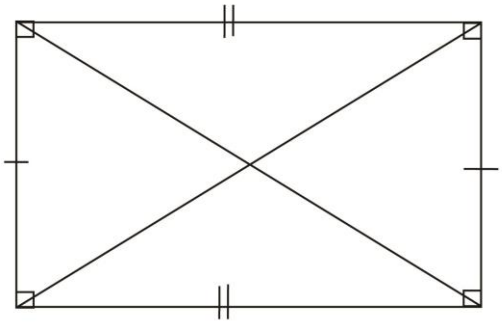
Mathematics is the Key

SQUARE



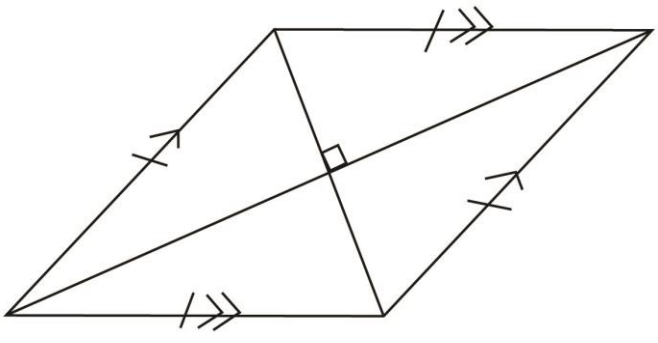
- *All sides are equal.*
- *It has 4 right angles.*
- *Opposite sides are parallel.*
- *Diagonals are equal and they bisect each other at a right angle.*
- *It has 4 lines of folding symmetry.*
- *Diagonals bisect each angle at every vertex.*
- *Opposite angles are equal.*

RECTANGLE



- *Opposite sides are equal and parallel.*
- *It has 4 right angles.*
- *Diagonals are equal and they bisect each other.*
- *Diagonals do not meet at right angle.*
- *It has 2 lines of folding symmetry.*
- *Opposite angles are equal.*

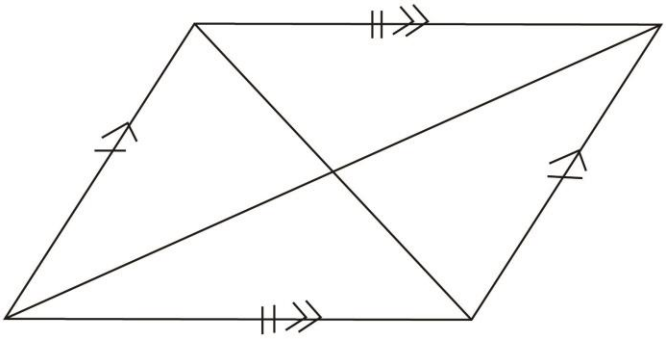
RHOMBUS



- *All sides are equal*
- *Opposite sides are parallel.*
- *Diagonals are not equal and they bisect each other at a right angle.*
- *Diagonals bisect each angle at every vertex.*
- *It has 2 lines of folding symmetry.*
- *Opposite angles are equal.*

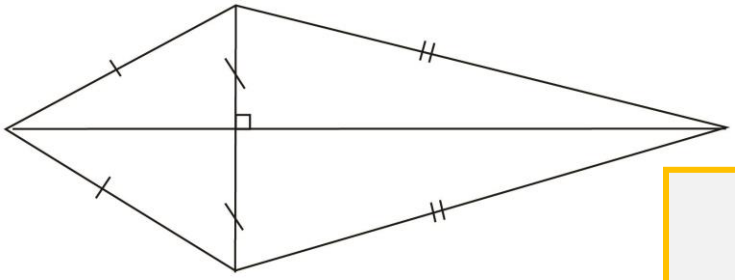
Mathematics Made Easy

PARALLELOGRAM



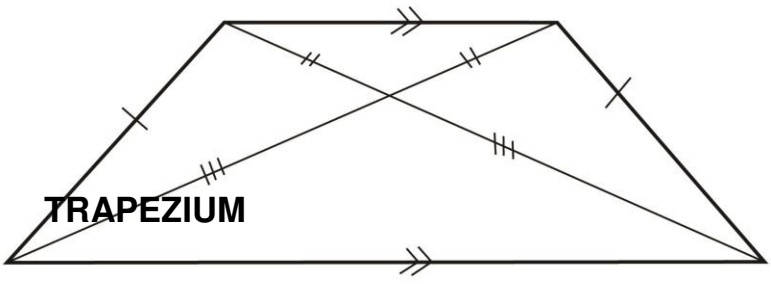
- ***Opposite sides are equal and parallel.***
- ***Diagonals are not equal and they bisect each other.***
- ***Diagonals do not bisect each angle at every vertex.***
- ***It has no lines of folding symmetry***
- ***Opposite angles are equal.***

KITE

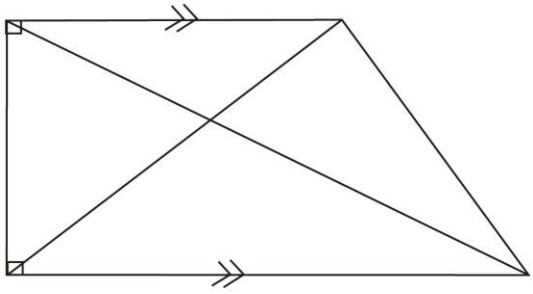


- ***Adjacent sides are equal.***
- ***Diagonals are not equal and they meet each other at a right angle.***
- ***The longer diagonal bisects the shorter diagonal and the angles at the vertices.***
- ***It has 1 line of folding symmetry.***
- ***Opposite angles are equal.***

TRAPEZIUM



Isosceles trapezium



Right angled trapezium

Mathematics is the key

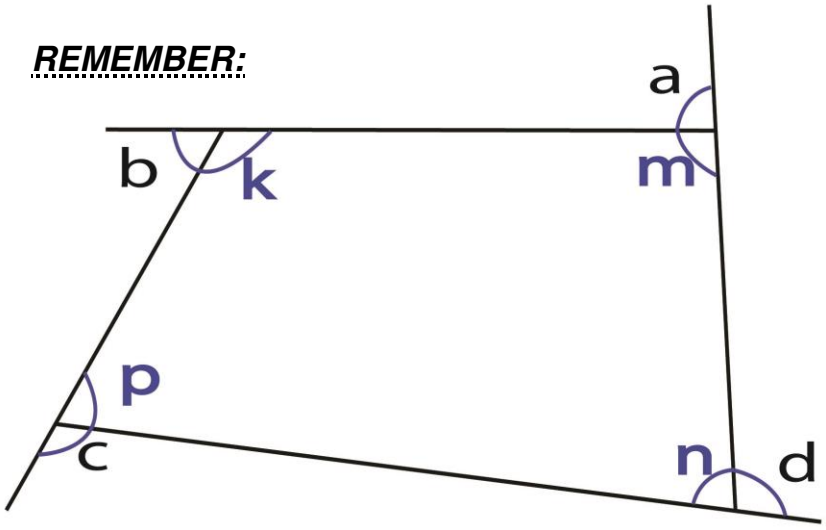
ISOSCELES TRAPEZIUM

- ***Two of the sides are parallel.***
- ***Diagonals are equal but they do not bisect each other.***
- ***Diagonals do not bisect angles in the vertices.***
- ***Opposite angles are not equal.***
- ***It has 1 line of folding symmetry.***
- ***Opposite angles are not equal.***

RIGHT ANGLED TRAPEZIUM

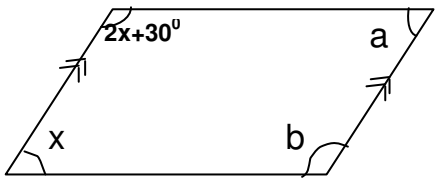
- ***Two of the sides are parallel.***
- ***Diagonals are not equal and they do not bisect each other.***
- ***Diagonals do not bisect angles in the vertices.***
- ***Opposite angles are not equal.***
- ***It has no lines of folding symmetry.***
- ***Opposite angles are equal.***

REMEMBER:



- ***Interior angle sum of a quadrilateral is 360°***
  k + m + n + p =360°
- ***Exterior angle sum of every polygon is 360°***
  a + b + c + d =360°

1. Calculate the size of angles x, b, a



REFERENCE

A New MK Primary Mathematics 2000 Bk 7 Pg 237-241 (New Edition)

Mathematics Made Key

SUB TOPIC: Complementary angles

An angle with 90^0 is called a right angle.

Any two angles that add up to 90^0 are complementary angles.

Examples:

xv. What is the complement of 30^0?

Let the complement be x

$X + 30^0 = 90^0$

$X + 30 - 30 = 90 - 30$

$x = 60$

xvi. Find the complement of $(x + 40)^0$

$90^0 - (x + 40)^0$

$90^0 - x^\circ - 40^0$

$90^0 - 40^0 - x^\circ$

$(50 - x)^0$

xvii. What angle is ½ of its complement?

Let the angle be k

ANGLE	COMPL.	TL
k	2k	90^0

$2k + k = 90^0$

$3k = 90^0$

$\frac{3k}{3} = \frac{90^\circ}{3}$

$K = 30^\circ$

xviii. Find the complement of ;

(a) 30°

(b) 63°

(c) $m - 15^\circ$

(d) p°

xix. What angle is 5 times its complement

REFERENCE

A New MK Primary Mathematics 2000 Bk 7 Pg 202-203 (New Edition)

SUB TOPIC: Supplementary angles

Supplementary angles are two angles that add up to 180^0.

Examples:

$X + Y = 180^0$ (supp. angles)

1. In the above figure, if $x = 48^0$, find y.

$x + y = 180^0$

$y + 48^0 = 180^0$

$y + 48^0 - 48^0 = 180^0 - 48^0$

$y = 132^0$

Mathematics is the Key

2. What angle is ¼ of its supplement?

Let the angle be m

ANGLE	SUPPL.	TL
K	4k	180^0

4k + k = 180^0

5k = 180^0

$\frac{5k}{5} = \frac{180°}{5}$

K = 36°

3. Find the supplement of;
   a. $135°$
   b. $2k - 20°$

4.What angle is 5 times its supplement?

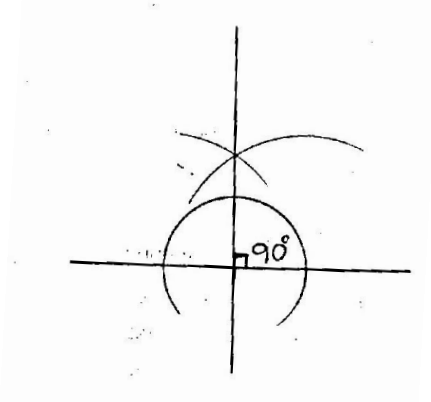
REFERENCE

A New MK Primary Mathematics 2000 Bk 7 exercise 11:56 Pg 204 (New Edition)

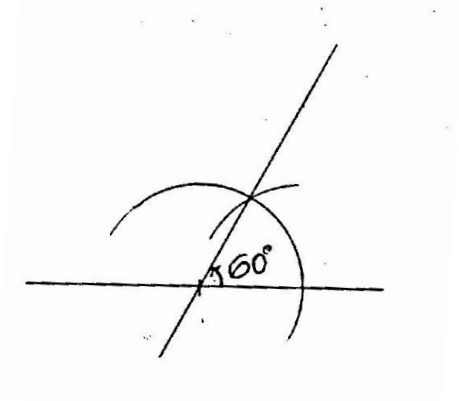
CONSTRUCTION

SUB TOPIC: Constructing special angles

1. **Construct an angle of $90°$**

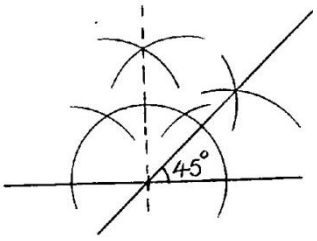


2. **Construct an angle of $60°$**

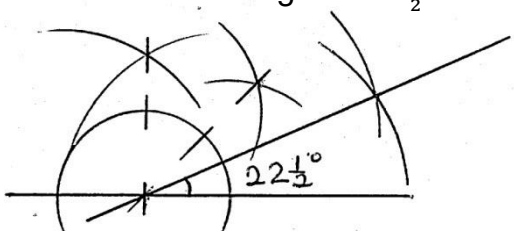


SUB TOPIC: Constructing other angles

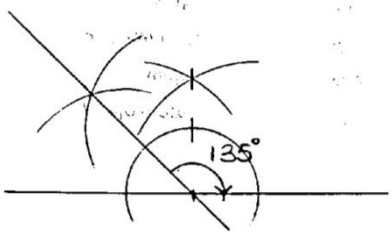
1. Construct an angle of $45°$



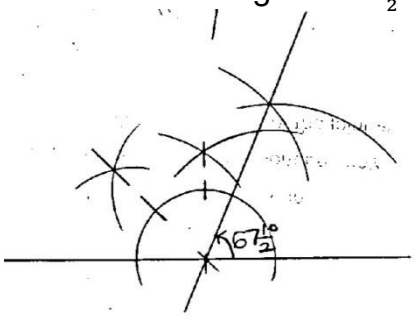
2. Construct an angle of $22\frac{1}{2}°$



3. Construct an angle of $135°$

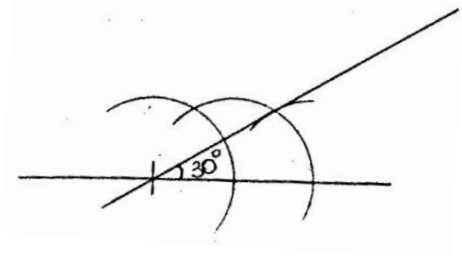


4. Construct an angle of $67\frac{1}{2}°$

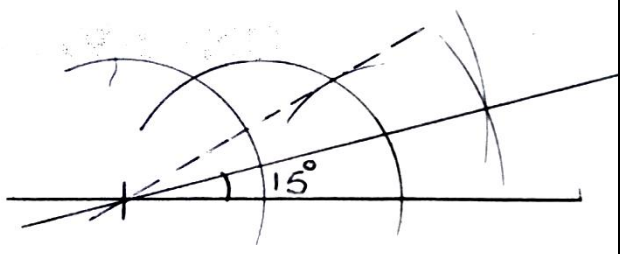


Mathematics is the Key

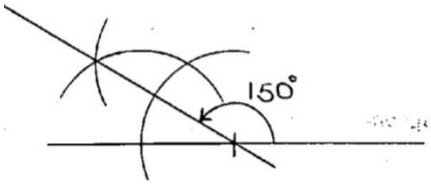
5. Construct an angle of 30°



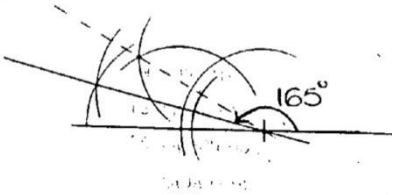
6. Construct an angle of 15°



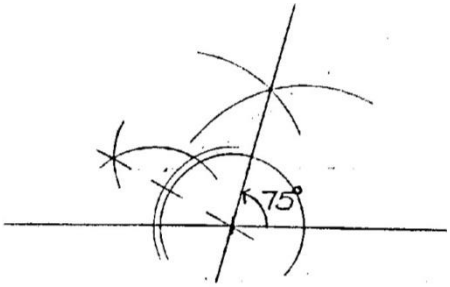
7. Construct an angle of 150°

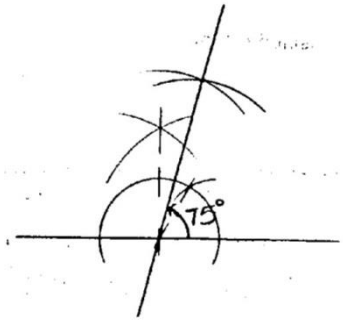


8. Construct an angle of 165°

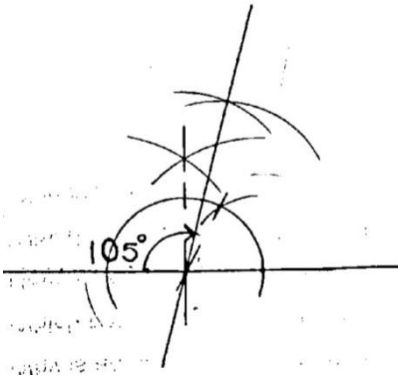


9. Construct an angle of 75°





10. Construct an angle of 105°



REFERENCE

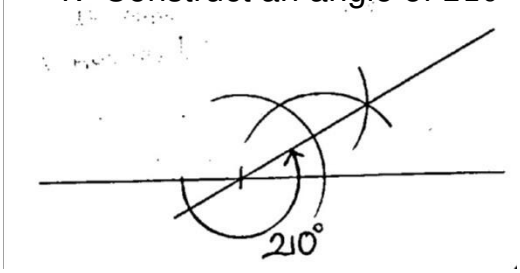
A New MK Primary Mathematics 2000 Bk 7 Pg 277 - 279 (New Edition)

Mathematics is the Key

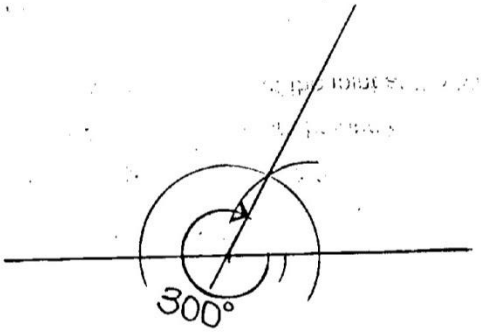
SUB TOPIC: Constructing reflex angles

A reflex angle is constructed by adding 180° to other angles

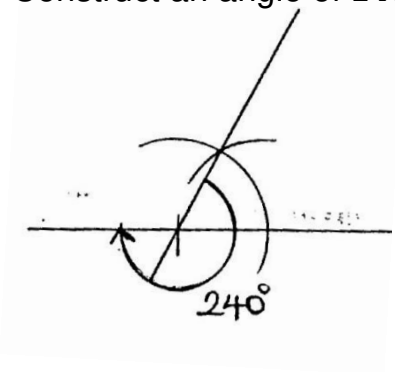
1. Construct an angle of 210°



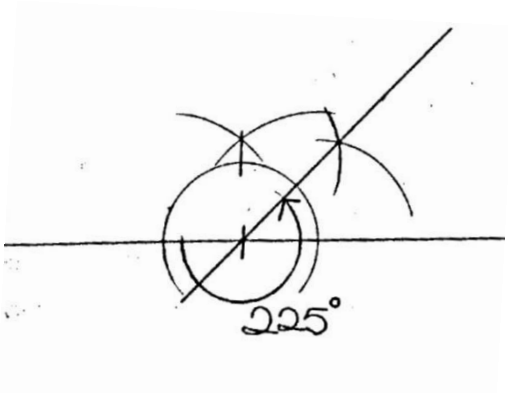
2. Construct an angle of 300°



3. Construct an angle of 240°

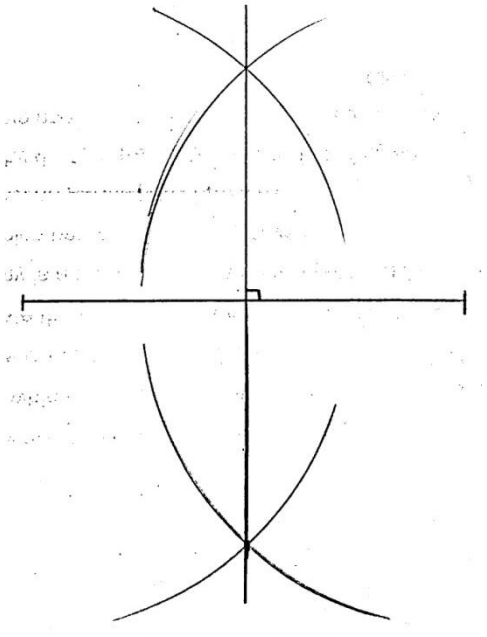


4. Construct an angle of 225°



SUB TOPIC: Constructing perpendicular bisectors

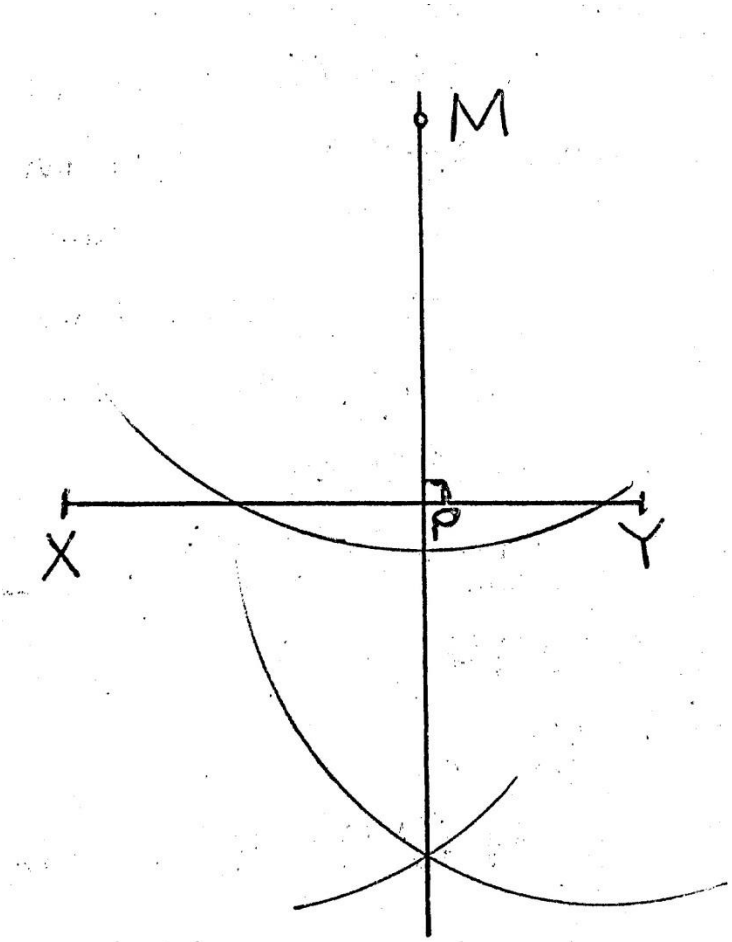
1. Bisect the line below



Mathematics is the Key

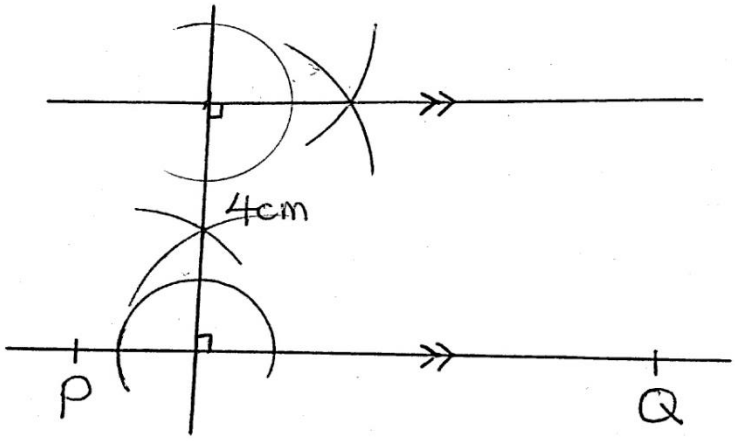
SUB TOPIC: Constructing perpendicular from a point

1. Using a ruler, a pencil and a pair of compasses, drop a perpendicular from M to meet line XY at p.



SUB TOPIC: Constructing parallel lines

1. Construct a line parallel to line PQ below such that the lines are 4 cm apart.



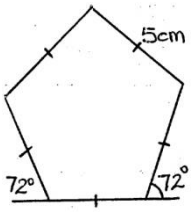
Mathematics is the Key

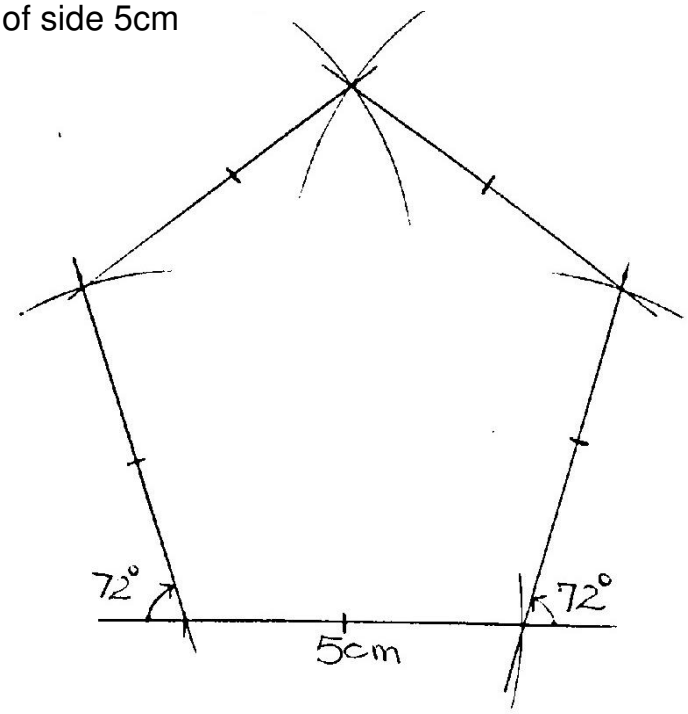
SUB TOPIC: Constructing a pentagon when given a side

1. Construct a pentagon of side 5cm

$$\boldsymbol{Ext.angle} = \frac{\mathbf{360°}}{\mathbf{5}}$$

$$= \underline{\underline{\mathbf{72°}}}$$



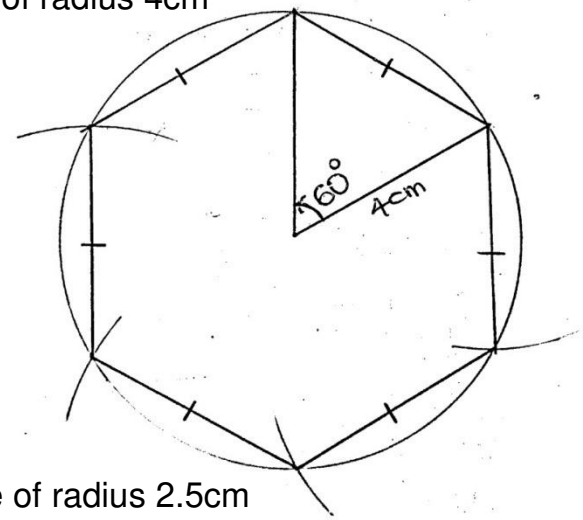


SUB TOPIC: Constructing polygons using a centre angle

1. Construct a hexagon in a circle of radius 4cm

$$\boldsymbol{Centre\ angle} = \frac{\mathbf{360°}}{\mathbf{6}}$$

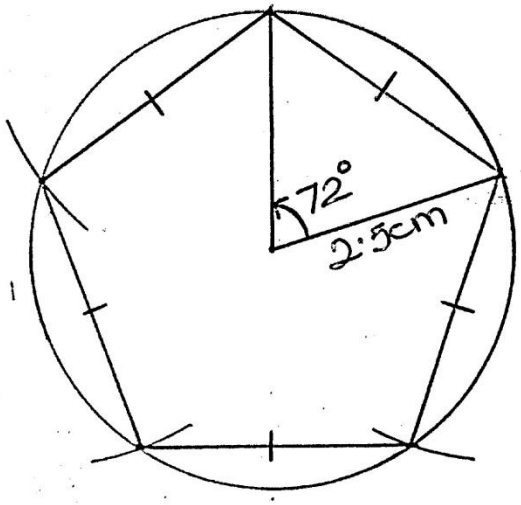
$$= \underline{\underline{\mathbf{60°}}}$$



2. Construct a pentagon in a circle of radius 2.5cm

$$\boldsymbol{Centre\ angle} = \frac{\mathbf{360°}}{\mathbf{5}}$$

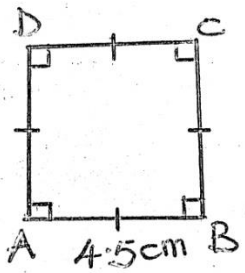
$$= \underline{\underline{\mathbf{72°}}}$$

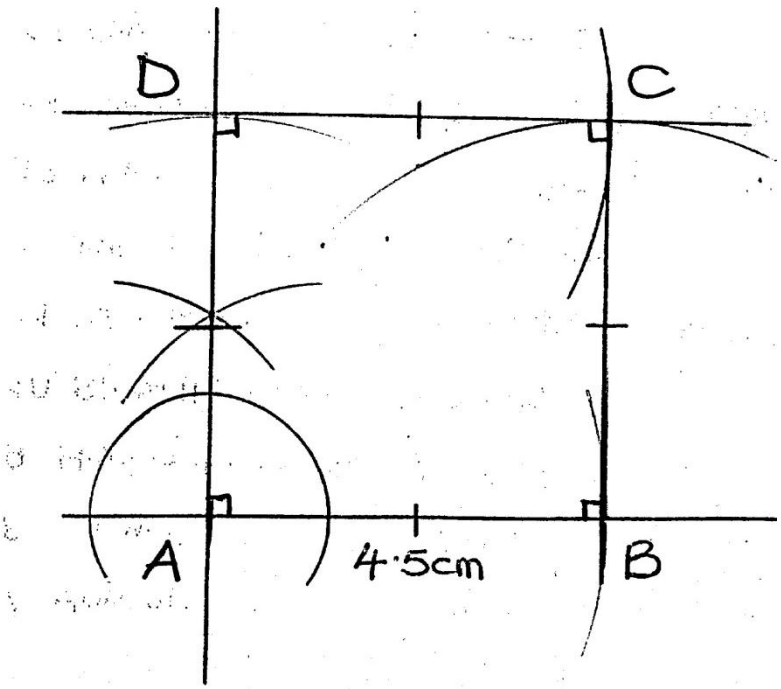


Mathematics is the Key

SUB TOPIC: Constructing a square when given side

1. Construct square ABCD of side 4.5cm

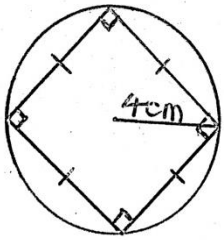


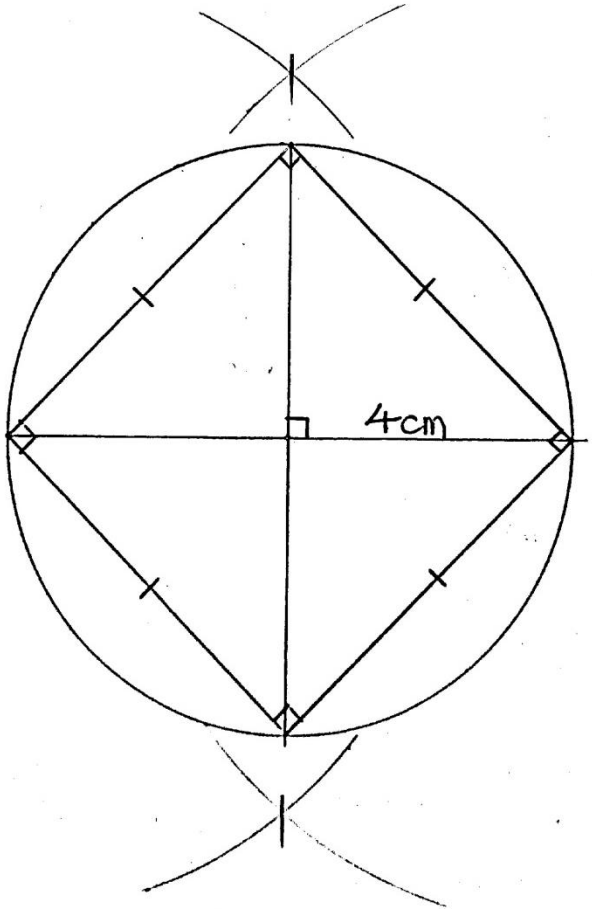


2. Construct a square of side 5.3 cm
3. Construct square MNOP where MN=4cm

SUB TOPIC: Constructing a square in a circle

1. Construct a square in a circle of radius 4cm





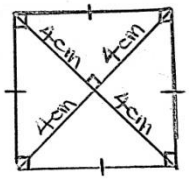
Mathematics is the Key

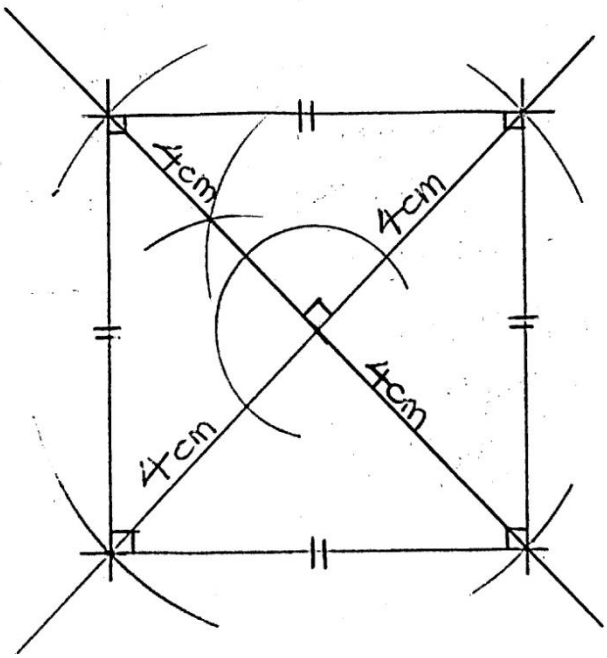
♠ ***Measure the length of one side***

2. Construct a square in a circle of radius 6cm
3. Construct a square in a circle of radius 3.5cm

SUB TOPIC: Constructing a square using diagonals

1. Construct a square whose diagonal is 8cm



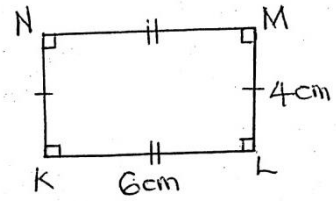


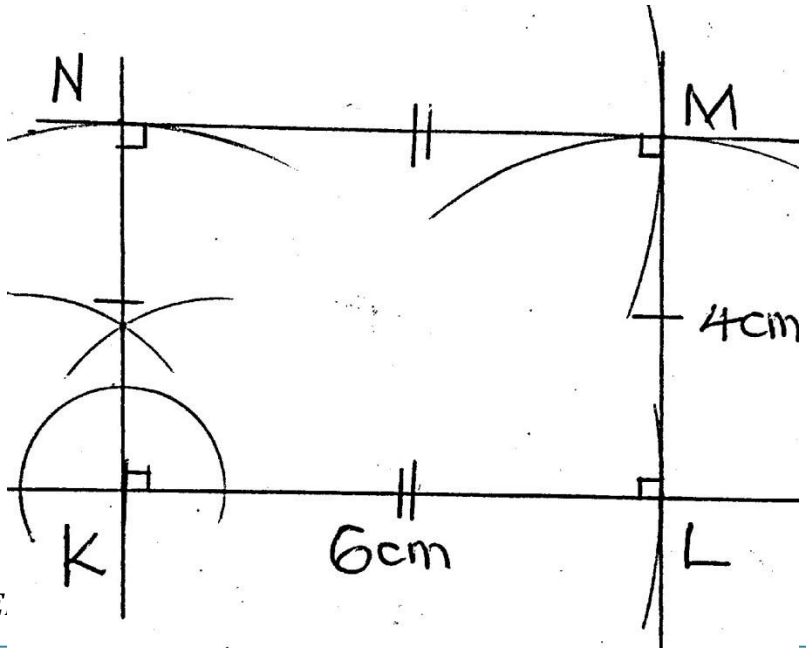
♠ ***Measure the length of one side***

2. Construct a square whose diagonal is 9cm
3. Construct square PQRS whose diagonal is 8cm

SUB TOPIC: Constructing a rectangle when given sides

1. Construct rectangle KLMN where KL=6cm and LM = 4cm.





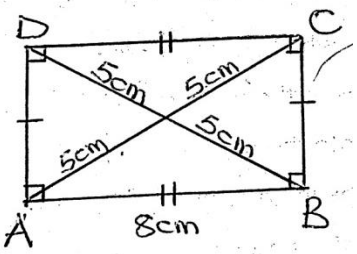
Mathematics is the Key

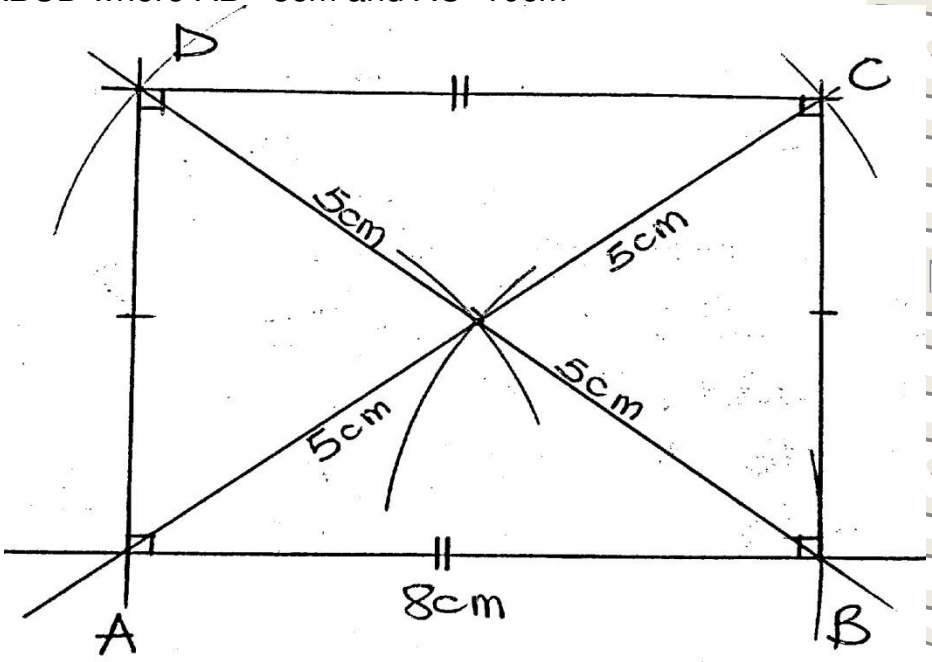
- ♠ ***Measure diagonal KM***
- ♠ ***Measure angle MKL***

2. Construct a rectangle whose length is 7cm and width is 4.3cm.

SUB TOPIC: Constructing a rectangle when one side and diagonals

1. Construct rectangle ABCD where AB= 8cm and AC=10cm

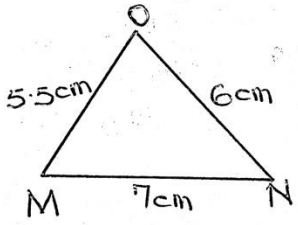


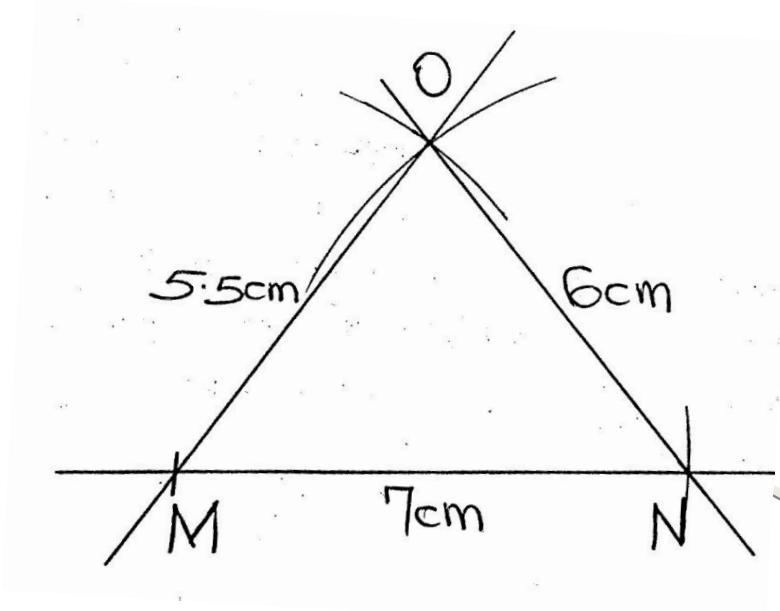


- ♠ ***Measure the width of the rectangle.***
- ♠ ***Measure angle DBA***

SUB TOPIC: Constructing a triangle when given sides(SSS)

1. Construct triangle MNO where MN= 7cm, NO=6cm and MO=5.5cm





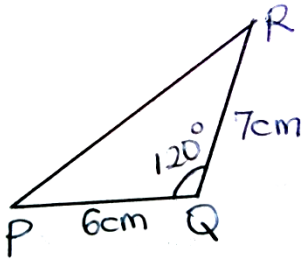
- ♠ ***Measure angle OMN.***

2. Construct triangle KLM in which KL = 7.3cm KM = LM = 8cm

Mathematics is the Key

SUB TOPIC: Constructing a triangle when given two sides and one angle(SAS)

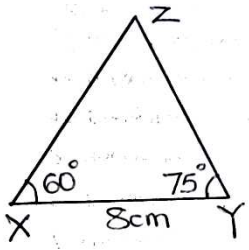
1. Construct triangle PQR where line PQ = 6cm, angle PQR = 120^0 and QR=7cm.Drop a perpendicular from R to meet PQ at m.

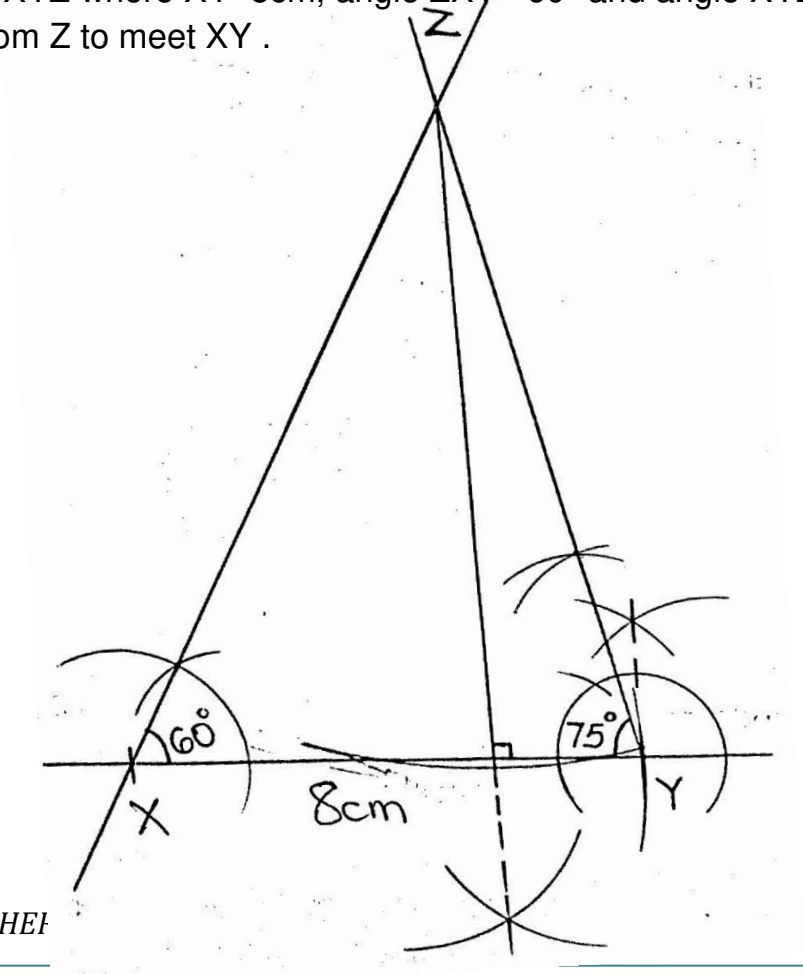


- ***Measure line RM***
- ***Measure angle RPQ***

SUB TOPIC: Constructing a triangle when given two angles and one side(ASA)

1. Construct triangle XYZ where XY=8cm, angle ZXY =60^0 and angle XYZ=75^0.drop a perpendicular from Z to meet XY .





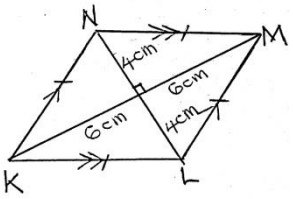
Mathematics is the Key

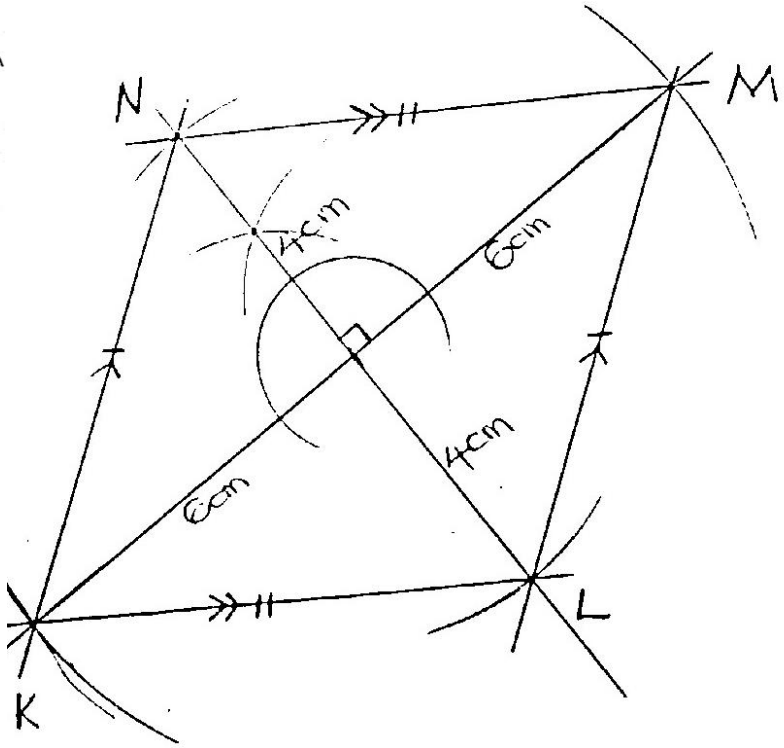
- ***Measure line XZ***
- ***Measure line YZ***
- ***Measure the height of the triangle***
- ***Find its area***

2. Construct a triangle RST where angle R = 60^0 angle S = 45^0 and RS = 5cm
   Measure the length of ST and angle T.

SUB TOPIC: Constructing a rhombus when given diagonals

1. Construct rhombus KLMN where KM=12cm and LN=8cm.





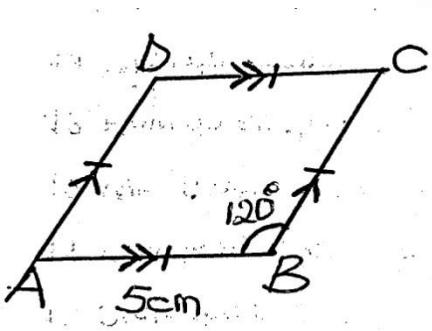
- ***Measure line LM***
- ***Measure angle NKL***
- ***Measure angle MKN***
- ***Measure angle KNL***

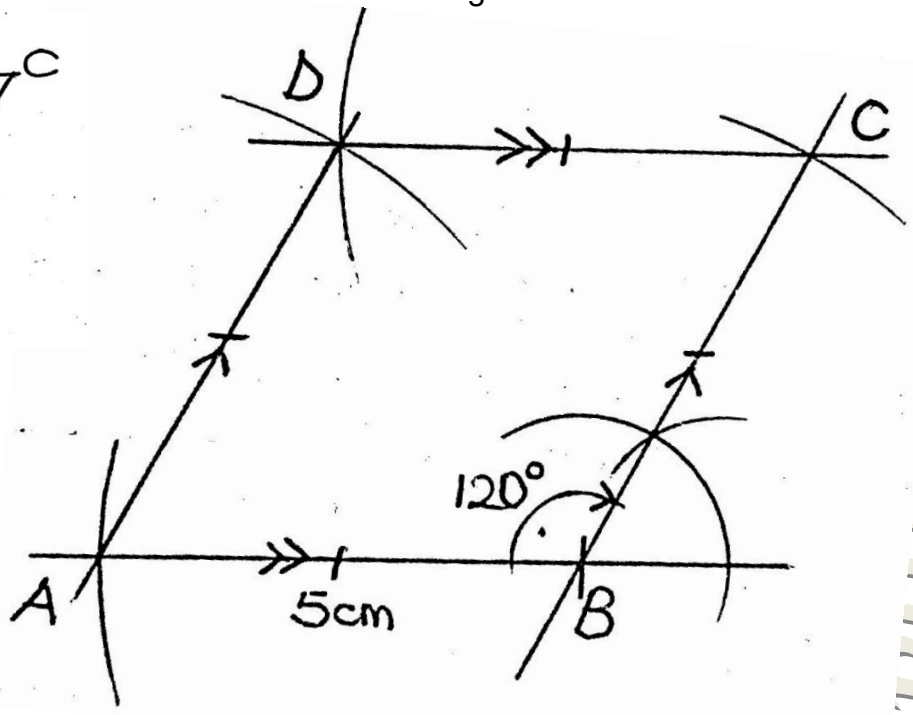
2. Construct a rhombus whose diagonals are 16cm and 12cm respectively.

Mathematics is the Key

SUB TOPIC: Constructing a rhombus when given an angle and a side

1. Construct rhombus ABCD where AB = 5cm and angle ABC=120^0

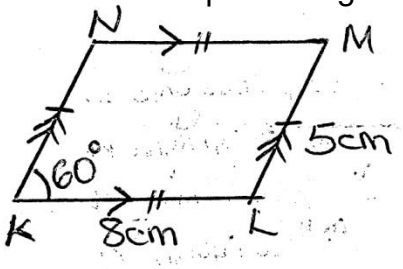


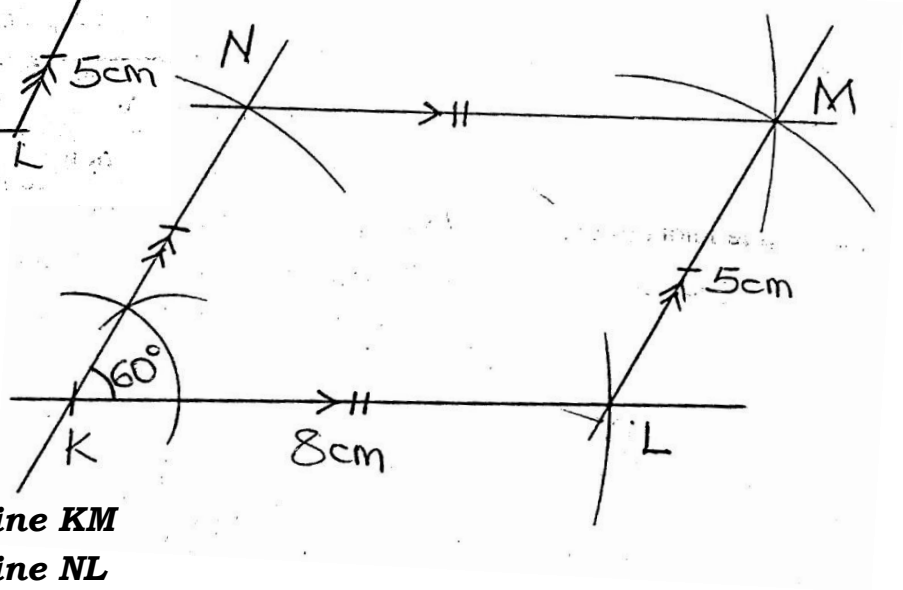


- ***Measure line AC***
- ***Measure line BD***
- ***Measure angle DAB***
- ***Measure angle CAB***

SUB TOPIC: Constructing a parallelogram when given side and angle

1. Construct parallelogram KLMN where KL=8cm,LM=5cm and LKN=60^0



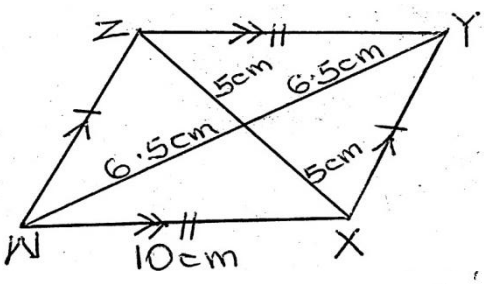


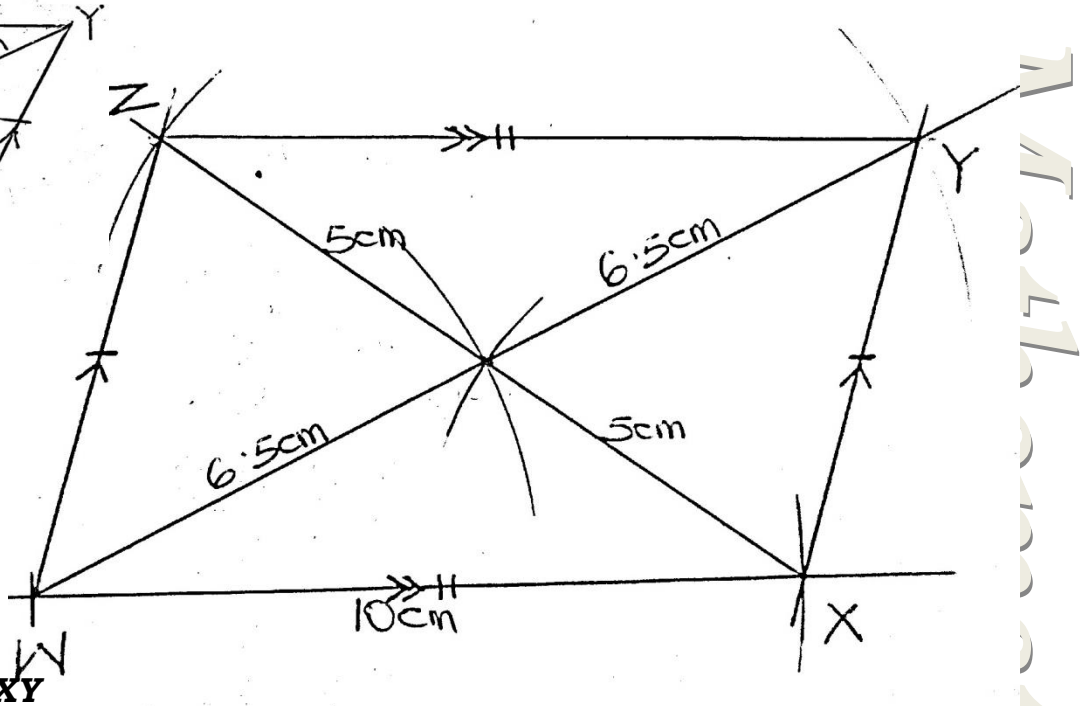
- ***Measure line KM***
- ***Measure line NL***
- ***Measure angle MKL***
- ***Measure angle KLM***

Mathematics is the Key

SUB TOPIC: Constructing a parallelogram when given one side and diagonals

1. Construct parallelogram WXYZ where WX =10cm, WY=13cm and XZ =10cm.

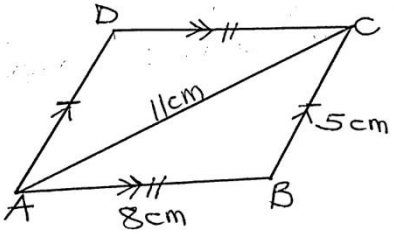


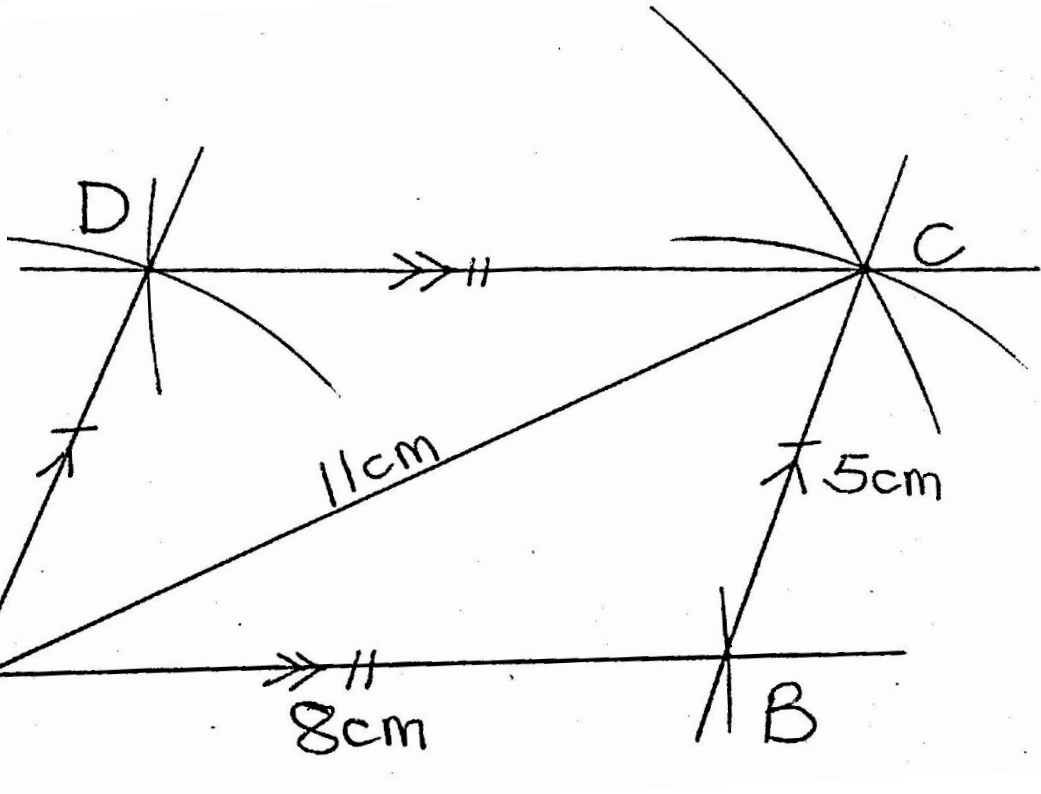


- ***Measure line XY***
- ***Measure angle YWX***
- ***Measure angle WXY***
- ***Measure angle WZX***

SUB TOPIC: Constructing a parallelogram when given sides and one diagonal

1. **Construct parallelogram ABCD where AB=8cm, BC=5cm and AC =11cm**



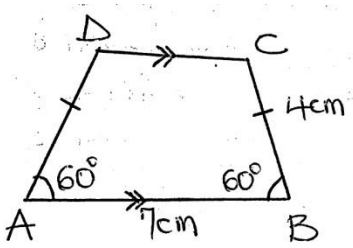


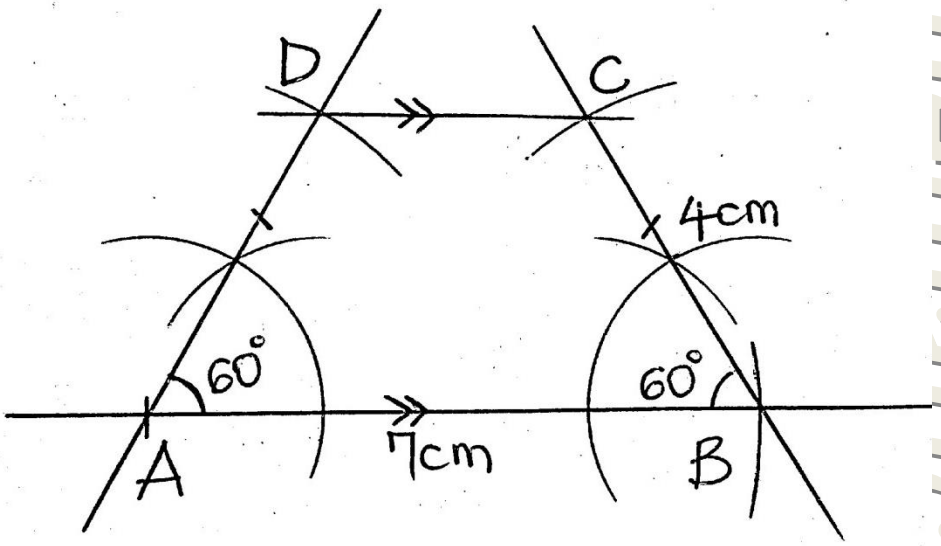
Mathematics

- ***Measure line BD***
- ***Measure angle ABC***
- ***Measure angle ABD***
- ***Measure angle ACD***

SUB TOPIC: Constructing a trapezium

Construct quadrilateral ABCD where AB = 7cm, angle BAD =ABC=60^0. Line AD=BC=4cm.





- ***Measure line AC***
- ***Measure line DC***
- ***Measure angle ADC***
- ***Measure angle BDA***

BEARING AND SCALE DRAWING

SUB TOPIC: Rotations/Revolutions/Complete turns

This is the act of turning around a centre or an axis

$$1\ complete\ turn/1\ rotation/1\ revolution\ =\ 360°$$

Examples

1. How many degrees are in two complete turns?

$$1\ turn = 360°$$

$$2\ complete\ turns = 360° \times 2$$

$$= 720°$$

Mathematics is the Key

2. How many revolutions make up 1080^0?

$360° = 1\ revolution$

$1080° = \frac{1080°}{360°}$

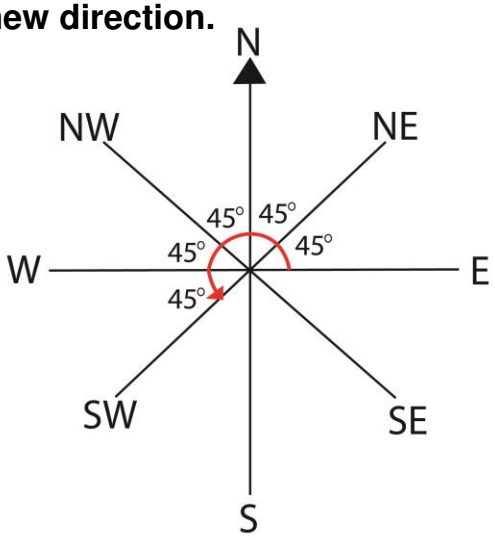
$= \frac{108}{36}$

$= 3\ revolutions$

3. **How many degrees are in $\frac{1}{2}$ turn?**
4. **A boy made 4 complete turns. Through what angle did he turn?**

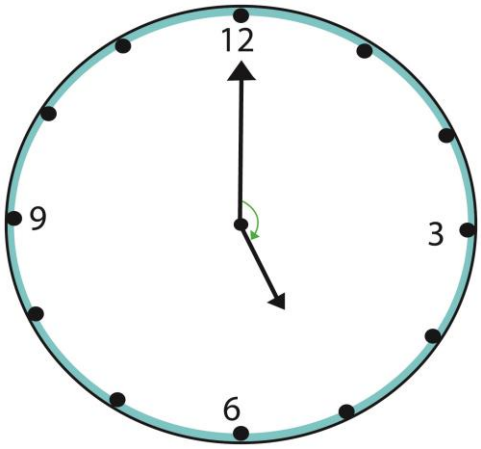
SUB TOPIC: Angles on a compass and a clock face

1. **Kakuru was facing in East and turned anticlockwise through an angle of 225^0. Find his new direction.**



His new direction became South West

2. **Calculate the smaller angle between the hands on the clock face below.**



$\frac{25}{60} \times 360°$

$25 \times 6°$

$150°$

3. **What angle can one turn after turning from South East to North in a clock wise direction?**
4. **What smaller angle is between West and North East?**
5. **Find the smaller angle between the North West and South West**

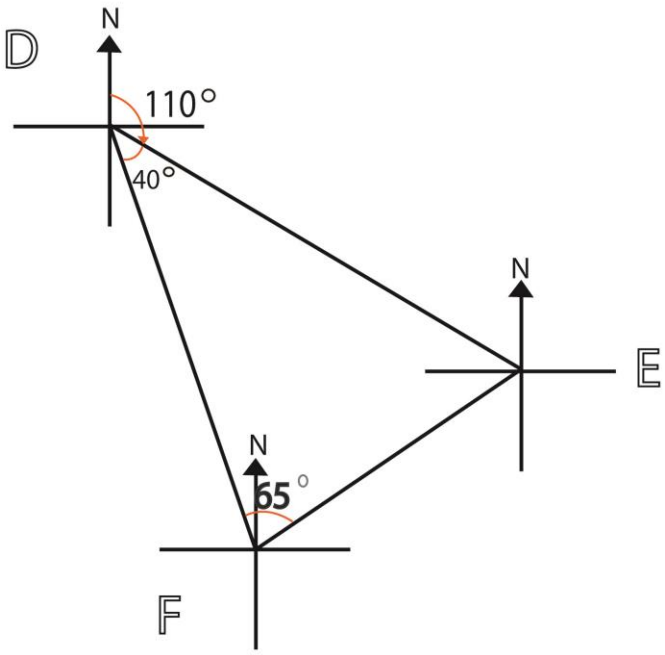
Mathematics is the Key

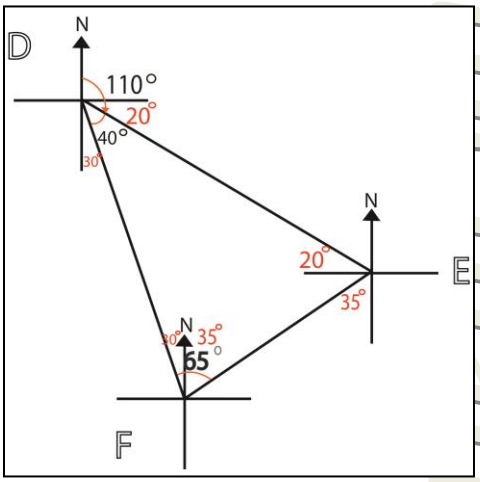
SUB TOPIC: Ordinary bearing (directions)

NOTE

- *Ordinary bearing (direction) is measured from either North or South but never from East or West*
- *The direction of P from Q is at point Q*

1. Study the diagram below and use it to answer the questions that follow





What is the direction of;

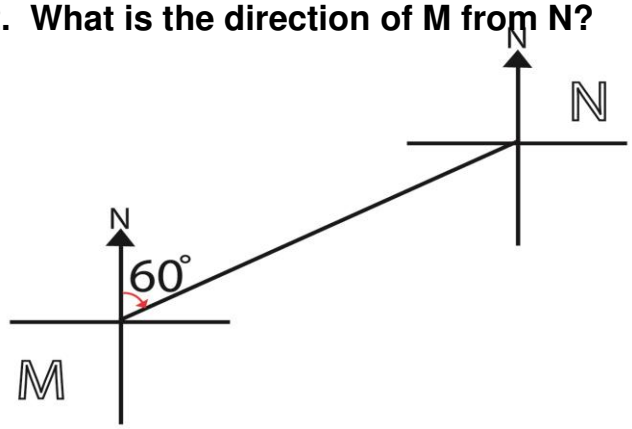
a) F from E
S35°W

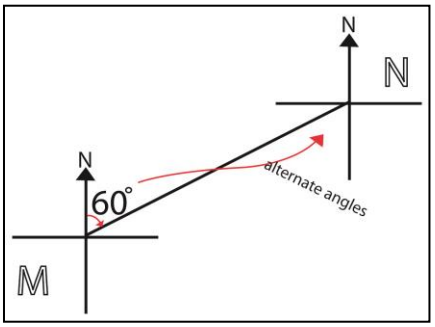
b) E from D
S70°E

c) D from F
N30°W

d) E from F
N35°E

2. What is the direction of M from N?

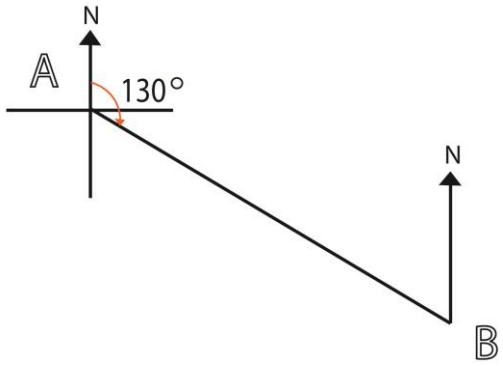




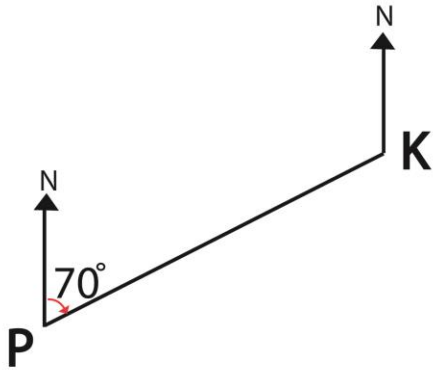
S60°W

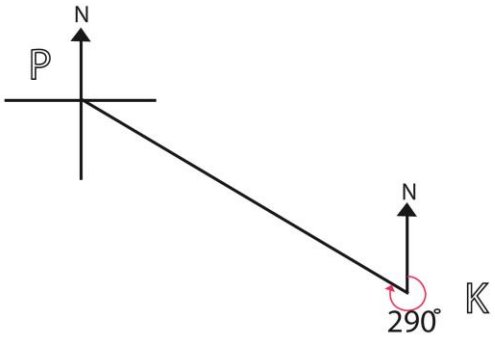
Mathematics is the Key

3. **What is the direction of B from A?**



4. **What is the direction of K from P?**



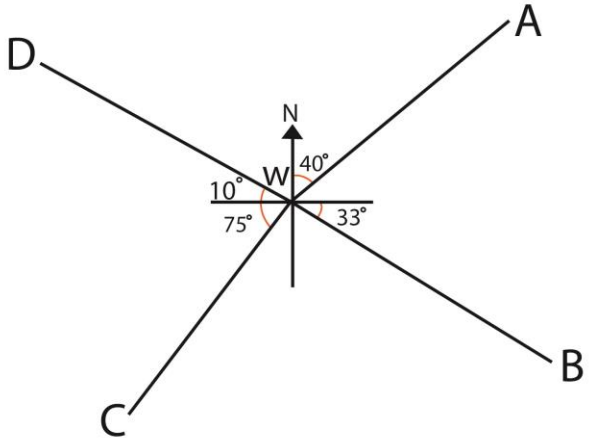


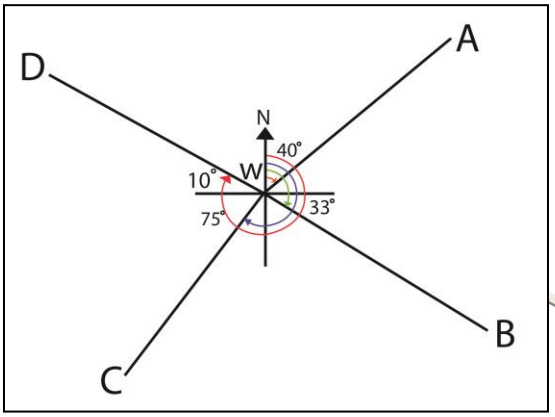
SUB TOPIC: True bearing

REMEMBER

- Bearing is measured from NORTH in a CLOCKWISE direction only.
- Bearing MUST be written in three digits i.e **030°, 000°, 126°** etc
- The bearing of NORTH is **000°, 360°**

1. Study the diagram below and use it to answer the questions that follow.





Mathematics is the Key

Find the bearing of;

a) **A from W**

$040°$

$\underline{\boldsymbol{The\ bearing\ of\ A\ from\ W\ is\ 040°}}$

b) **B from W**

$90° + 33° = 123°$

$\underline{\boldsymbol{The\ bearing\ of\ B\ from\ W\ is\ 123°}}$

c) **C from W**

$90° - 75° = 25°$

$180° + 25° = 205°$

$\underline{\boldsymbol{The\ bearing\ of\ C\ from\ W\ is\ 205°}}$

d) **D from w**

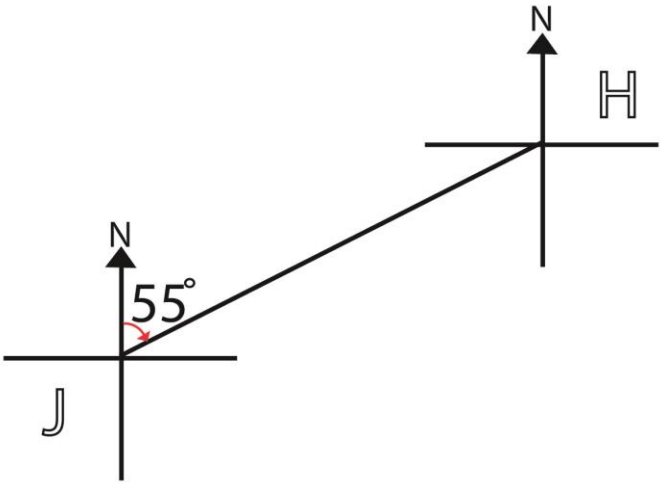
$90° + 90° + 90° + 10° = 280°$

$\underline{\boldsymbol{The\ bearing\ of\ D\ from\ W\ is\ 280°}}$

SUB TOPIC: More about true bearing

Examples

1. **Study the diagram below**

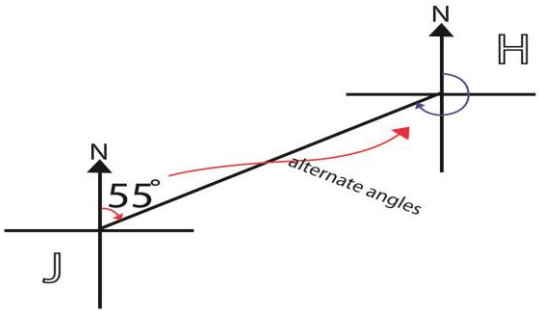


a) Find the bearing of H from J

$\underline{\boldsymbol{The\ bearing\ of\ H\ from\ J\ is\ 055°}}$

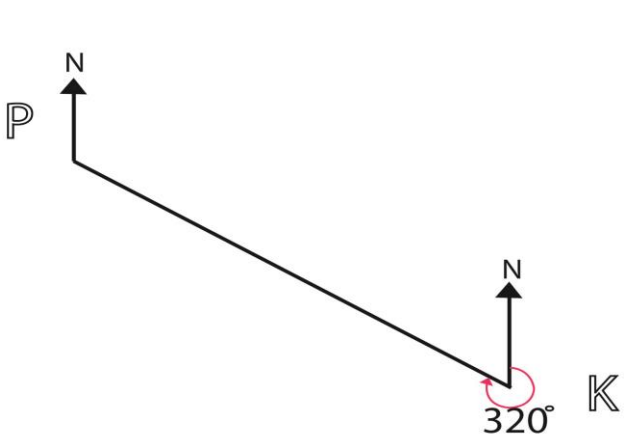
Mathematics is the Key

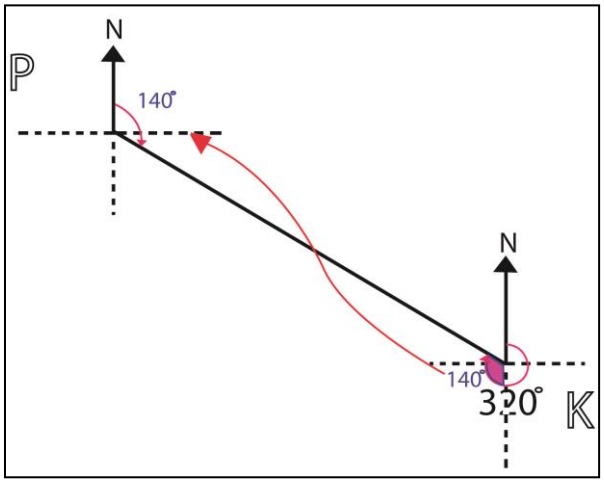
b) Find the bearing of J from H



$90° + 90° + 55°$
$180° + 55°$
$135°$
The bearing of J fro H is 235°

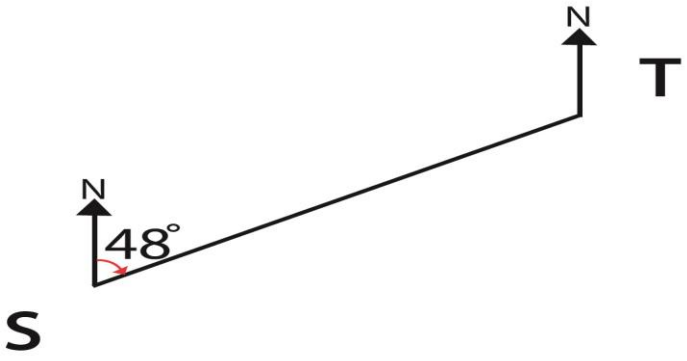
2. Use the diagram below to find the bearing of K from P





$320° - 180° = 140°$
The bearing of K from P is 140°

3. Use the diagram below to find the bearing of S from T



Mathematics is the Key

SUB TOPIC: Opposite bearing

NOTE

- When the given bearing is less than 180^{o}, to get its opposite bearing add 180^{o} to it.
- When the bearing is greater than 180^{o}, subtract 180^{o} from it.

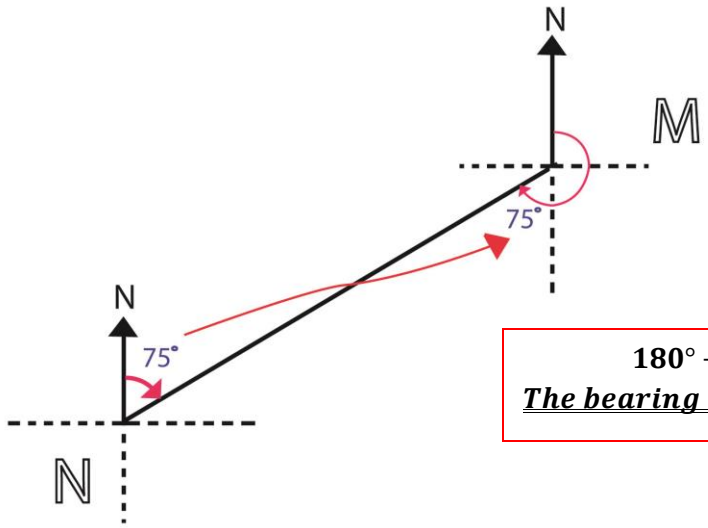
Try these

1. The bearing of A from B is 040^{0}. Find the bearing of B from A.

$$\mathbf{180° + 040° = 220°}$$

The bearing of B from A is 220

2. **The bearing of M from N is 075^{0}. Find the bearing of N from M. (use a diagram)**



$$\mathbf{180° + 75° = 255°}$$

The bearing of N from M is 255°

3. The bearing of X from Y is 300^{0}. Find the bearing of Y from X.

$$\mathbf{300° - 180° = 120°}$$

The bearing of Y from X is 120°

4. **The bearing of K from P is 050^{0}. Find the bearing of P from K.**
5. **The bearing of B from C is 250^{0}. Find the bearing of C from B**

Mathematics is the Key

SUB TOPIC: Expressing distance in a given scale

Examples

1. The distance between two towns on a map is 3.5cm. Find the actual distance on the ground in km if the scale is 1:100,000.

$1cm\ represents\ 100,000cm$

$3.5cm\ represent\ \ 3.5 \times 100,000cm$

$\underline{350,000cm}$

cm to km

$100,000cm = 1km$

$350,000cm = \frac{350,000}{100,000} km$

$\underline{= 3.5km}$

$\underline{The\ actual\ distance\ is\ 3.5km}$

2. **The actual distance between village A and B is 8.5 km. Find the distance between the two towns on a map if the scale is 1:1000,000.**

km to cm

$1km = 100,000cm$

$8.5km = 8.5\ \times 100,000cm$

$\underline{= 850,000cm}$

$1,000,000cm\ represent\ 1cm$

$850,00cm\ represent\ \frac{850,000}{1,000,000}$

$\underline{0.85cm}$

$\underline{The\ distance\ on\ the\ map\ \ is\ 0.85cm}$

3. The distance between two ports on a map is 6cm. Calculate the scale used on that map if the actual distance is 120km on the ground.

km to cm

$1km = 100,000cm$

$120km = 120 \times 100,000cm$

$\underline{= 12,000,000cm}$

$6cm: 12,000,000cm$

$\frac{6cm}{6cm} : \frac{12,000,000cm}{6cm}$

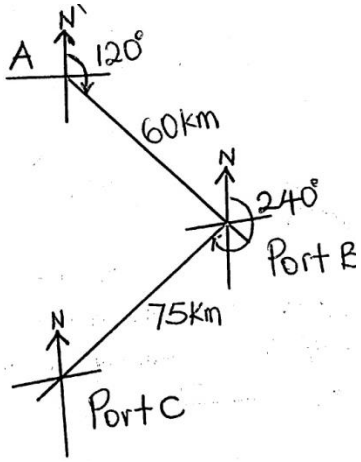
$\underline{1: 2,000,000}$

Mathematics is the Key

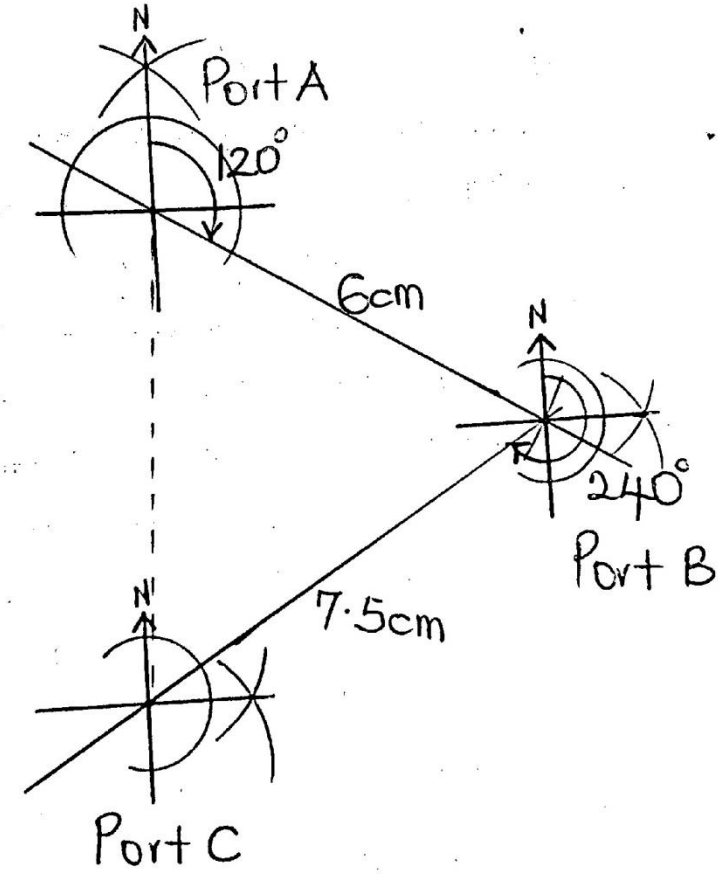
4. The distance between the church and the hospital on the map is 4.5cm. find the actual distance on the ground if 1cm represents 80m.

SUB TOPIC: Scale drawing

1. A ship left port A for port B on a bearing of120^0 a distance of 60km. it then continued to port C on a bearing of 240^0 a distance of 75km. Using a scale of 1cm:10km. Draw an accurate diagram to show the three ports.



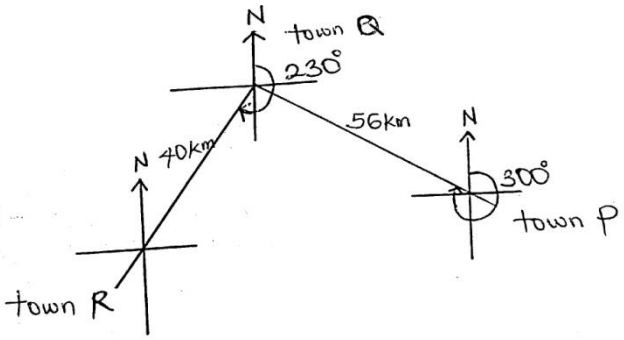
1cm represents 10km	
60km	$60km \div 10km = 6cm$
75km	$75km \div 10km = 7.5cm$



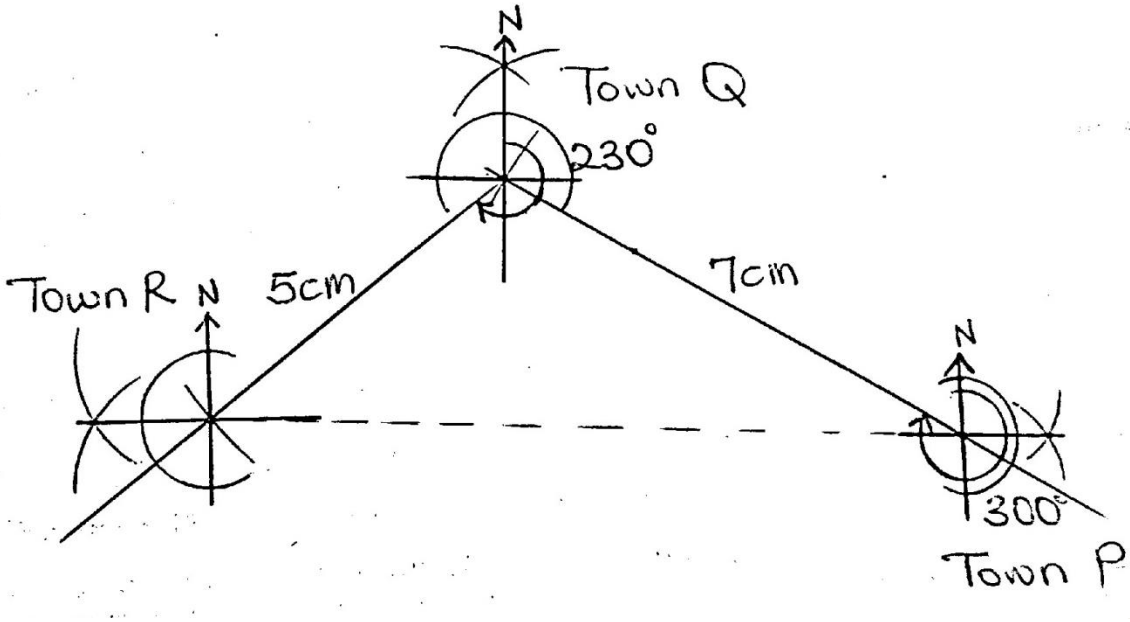
- ***Find the shortest distance from port A to port C.***
- ***Find the bearing of port A from port C***

Mathematics is the Key

2. A driver drove from town P on a bearing of 300^0 to town Q for a distance of 56km. the driver left town Q and drove on a bearing of 230^0 to town R for a distance of 40km.
Using a scale of 1cm to represent 8km, draw an accurate diagram to show the route of the driver.



1cm represents 8km	
56km	$56km \div 8km = 7cm$
40km	$40km \div 8km = 5cm$



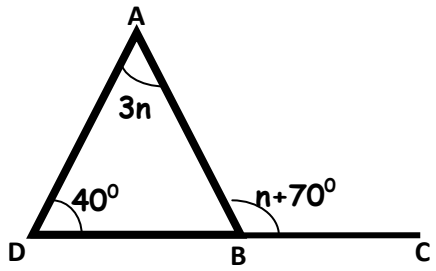
- **Find the shortest distance from town P to town R.**
- **Find the bearing of Town R from Town P.**

Mathematics is the Key

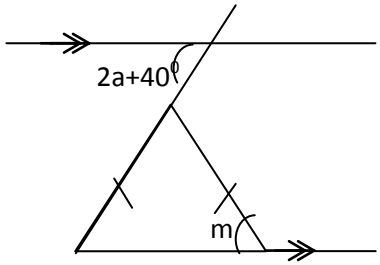
TOPICAL REVISION QUESTIONS:

1. With the help of a ruler and pair of compasses only, construct the following angles.
   (a) 30^0
   (b) 45^0
   (c) 75^0
   (d) 120^0

2. Construct using a ruler and pair of compasses only the triangles with the following measurement.
   (a) Triangle ABC where AB = 7cm, AC = 6cm and BC = 5cm
   (b) Triangle PQR where PQ = 8cm, $\angle Q = 120^0$ and QR = 5cm. Measure PR
3. What is the smaller angle between West and South West.
4. The bearing of a village P from town K is 049. What is the bearing of town K from village P.
5. Construct a square WXYZ whose sides are 4.5cm.
6. Each interior angle of a regular polygon is 120.
   (iii) Find the number of sides of the polygon.
   (iv) Calculate its interior angle sum.
7. How many degrees will Munduni turn through in 3 ¼ revolutions?
8. Town B is 60km South of town A and town C is 80km East of town B. Draw an accurate diagram for the 3 towns and measure the shortest distance between A and C
9. In the triangle ABC below, find the value of **n**

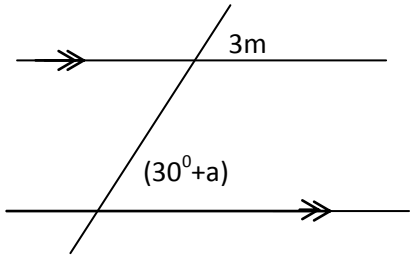


10. The supplement of $\mathbf{(a+30)^0}$ is $\mathbf{40^0}$, find the value of **a**
11. From the diagram below, angle m = 3a. Find the value of a

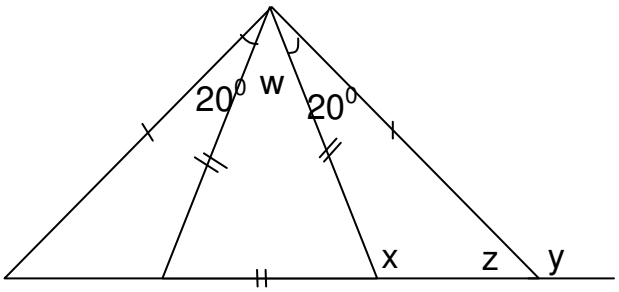


Mathematics is the Key

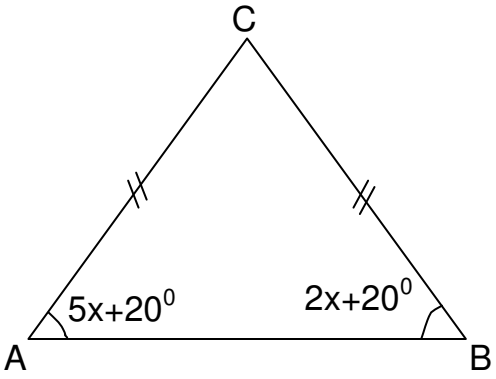
12. Given that m = 2a, find the value of a in degrees.



13. Calculate the size of angle w, x, y, z



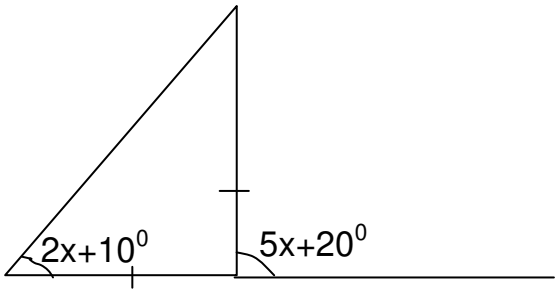
14. Use the figure below to answer the question the questions that follow.



(a) Find the value of x

(b) Find the size of angle ACB

15. find the value of x in degrees



Mathematics is the Key

TIME

SUB TOPIC: Conversion of 12 hour time to 24 hour time

Example

1. Change 2:00am to 24 hour clock

2:00am
+00:00
02 00 hrs

2. Change 8:30pm to 24 hour lock

8:30 pm
+12:00
20 30 hrs

NOTE:

12 noon and 12 mid night is special time which means that we just state the answer as shown below.

12:30 am = 00:30 hrs

12:30 pm = 12:30hrs

3. Change the following time to 24hour clock.

(a) 5:30am
(b) 4:18pm
(c) 12:12am
(d) 12:19pm
(e) 11:11pm

REFERENCE

A New MK Primary Mathematics 2000 Bk 7 Pg 412 (New Edition)

SUB TOPIC: Changing 24 hour clock to 12 hour clock

Example

1. Write 0436 hrs in the 12-hour clock

04 36 hrs
- 00 00
4:36 am

2. Write 2340 hrs in the 12-hour clock time

23 40hrs
-12 00
11:40 pm

3. Write 1245hrs in 12 hour clock

1245hrs = 12:45 pm

4. Write 0045hrs in 12 hour clock

0045hrs = 12:45hrs

Mathematics is the Key

5. Write the following time in 12 hour clock.

(a) $\mathbf{0319}\boldsymbol{hrs}$

(b) $\mathbf{1529}\boldsymbol{hrs}$

(c) $\mathbf{1256}\boldsymbol{hrs}$

(d) $\mathbf{0013}\boldsymbol{hrs}$

(e) $\mathbf{1943}\boldsymbol{hrs}$

REFERENCE

A New MK Primary Mathematics 2000 Bk 7 Pg 413 (New Edition)

SUB TOPIC: Finding duration

$$\boldsymbol{Duration = Ending\ time - Starting\ time}$$

$$\boldsymbol{Duration = ET - ST}$$

Example

1. A lesson started at 8:30 am and ended at 11:00 am. How long did the lesson take?

11:00 am
- 8:30 am
2:30

2hours 30minutes

$\mathbf{2\frac{30}{60}hours = 2\frac{1}{2}}\ \boldsymbol{hours}$

2. A bus left Nairobi at 1315 hours and arrived in Kampala at 1630 hrs. How long did the journey take?

1630 hrs
- 1315 hrs
3 15

3hours 15minutes

$\mathbf{3\frac{15}{60}\ hours = 3\frac{1}{4}}$ **hours**

3. A party started at 2000hrs and ended at 11:30pm. How long did the party last? (Express 11:30pm in 24 hr-clock)

11:30pm
+12:00hrs
2330hrs

200hrs
-2000hrs
3:30

The party lasted for 3 hours and 30 minutes.

Mathematics is the Key

4. A baby slept at 10:00pm and woke up at 3:30 am. How long did the baby sleep?

10:00pm to 12:00 mid night	***Total time***
12:00	***2:00***
+10:00	***+ 3:30***
2:00	***5:30***

The baby slept for 5 hours 30 minutes

5. A man started his journey at 6:35am and reached the destination at 10:00am.how long did the journey take?
6. A motorist left town A at 11:00am and reached town B at 3:00pm. How long did he take to move from tow A to town B?
7. Jamil started digging at 6:50am and ended at 1000hrs. How long did he take digging?
8. How many hours are their between 8:00pm to 3:00am?

SUB TOPIC: More problems on duration

REMEMBER

$$Duration = ET - ST$$
$$ET = ST + Duration$$
$$ST = ED - Duration$$

Examples

1. A 45 minute lesson ended at 5:20pm. At what time did the lesson start?

$$ST = ET - Duration$$
$$5{:}20pm$$
$$-00{:}45$$
$$4{:}35pm$$

2. Hope started the journey at 8:00am and took 1hr 30minutes. At what time did the journey end?

$$ED = ST + Duration$$
$$8{:}00am$$
$$+1{:}30$$
$$9{:}30am$$

3. A motorist moved for 3hours from town A to Town B. if he reached town B at 7:30 pm, at what time did he start the journey?
4. Mercy started revising at 5:45am and took $2\frac{1}{2}$ hours. At what time did he end the revisions?

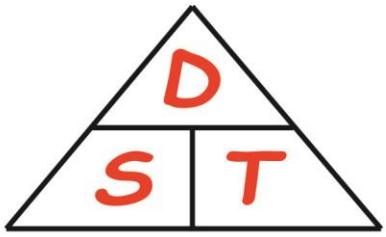
Mathematics is the Key

5. A truck moved for 5 hours and reached the destination at 2:00am. At what time did he start the journey?

REFERENCE

A New MK Primary Mathematics 2000 Bk 7 Pg 414 (New Edition)

SUB TOPIC: Finding Distance



$$\text{Distance} = S \times T$$

$$\text{Speed} = \frac{D}{T}$$

$$\text{Time} = \frac{D}{S}$$

Distance is measured in km or m

Examples

1. Alex moved from town A to town B at a speed of 40km/hr for 2hours. How far is town A from town B?

$$\begin{aligned} \boldsymbol{D} &= \boldsymbol{S} \times \boldsymbol{T} \\ &= \frac{\boldsymbol{40km}}{\boldsymbol{hr}} \times \boldsymbol{2hrs} \\ &= \boldsymbol{40km} \times \boldsymbol{2} \\ &= \boldsymbol{80km} \end{aligned}$$

2. A car travelled for $2\frac{1}{2} hours$ at a speed of 80km/hr. How far did he move?

$$\begin{aligned} \boldsymbol{D} &= \boldsymbol{S} \times \boldsymbol{T} \\ &= \frac{\boldsymbol{80km}}{\boldsymbol{hr}} \times \boldsymbol{2\frac{1}{2}hrs} \\ &= \boldsymbol{80km} \times \frac{\boldsymbol{5}}{\boldsymbol{2}} \\ &= \boldsymbol{40km} \times \boldsymbol{5} \\ &= \boldsymbol{200km} \end{aligned}$$

3. A bus travelled from town Q to town R for 6 hours at a speed of 65km/hr. What is the distance between town Q and R?
4. Allen moved from town Y at 4:30pm and reached town X at 5:00pm. If she was moving at a speed of 120km,
   (a) How long did he take travelling?
   (b) How far is town X from town Y?

Mathematics is the Key

SUB TOPIC: Finding Speed

The units for speed are km/hr or m/s

Examples

1. Kagoma takes 45 minutes to drive from home to town a distance of 30km. Calculate his speed in km/hr.

$$\boldsymbol{Speed = \frac{distance}{time}}$$
$$\boldsymbol{= 30km \div \frac{45}{60} hrs}$$
$$\boldsymbol{= 30km \times \frac{60}{45} hrs}$$
$$\boldsymbol{\underline{= 40km/hr}}$$

2. James covered a distance of 80km in just 2 hours. At what speed was he moving?
3. A bus moved for $2\frac{1}{2}$ hours from town A to town B. If the distance from town a to town b is 100km, find the speed at which the bus was moving.
4. Daniel covered 45km in only 45 minutes. Find his speed in km/hr.

SUB TOPIC: Finding Time

Examples

1. A driver covered 60km at a speed of 15km/hrs. How long did he take travelling?

$$\boldsymbol{Time = \frac{D}{S}}$$
$$\boldsymbol{Time = \frac{60km}{15km/hr}}$$
$$\boldsymbol{\underline{Time = 4\ hours}}$$

2. A boy moved a distance of 180m at a speed of 2m/s. How many seconds did he take to cover the distance?

$$\boldsymbol{Time = \frac{D}{S}}$$
$$\boldsymbol{Time = \frac{180m}{2m/s}}$$
$$\boldsymbol{\underline{Time = 90seconds}}$$

3. Calculate the time taken to cover 80km at a speed of 20km/hr
4. Amon travelled from home to school at a speed of 80km/hr which is a distance of 120km. How long did he take to reach school?
5. A truck moving at 150km/hour covered a distance of 450km. how long did the journey take?

Mathematics is the Key

SUB TOPIC: Changing km/hr to m/s and vice versa

Example

1. Change 10m/s to km /hr

10m/s = $\frac{10m}{1s}$

1 hour = 3600hrs

1 km = 1000m

10m/s = $\frac{10 \div 1000}{1 \div 3600}$

$= \frac{10}{1000} \div \frac{1}{3600}$

$= \frac{10}{1000} \times \frac{3600}{1}$

= 36 km/hr

2. Change 90km/hr to m/s

90km/hr = $\frac{90km}{1hr}$

$= \frac{90 \times 1000}{1 \times 3600}$

= 25 m/s

3. Change the following as instructed
   (a) $\mathbf{15\ m/s\ to\ km/hr}$
   (b) $\mathbf{72km/hr\ to\ m/s}$
   (c) $\mathbf{40m/s\ to\ km/hr}$
   (d) $\mathbf{108km/hr\ to\ m/s}$

REFERENCE

A New MK Primary Mathematics Bk 7 pg 331 (old edition)

SUB TOPIC: Finding the average speed

1. .Dungu travelled from town A to town B at a speed of 60km/hr for 3 ½ hours. Then he went to town C from B at a speed of 80km/hr in $1\frac{1}{2}hrs$. Calculate the average speed for the whole journey.

Average speed = $\frac{TDC}{TTT}$

Distance 1

$D = S \times T$

$= 60km/hr \times 3\frac{1}{2}hrs$

$= 60 \times \frac{7}{2}km$

$= 30 \times 7km$

$= 210km$

Distance 2

$D = S \times T$

$= 80km/hr \times 1\frac{1}{2}hrs$

$= 80 \times \frac{3}{2}km$

$= 40 \times 3km$

$= 120km$

$TDC = 210km + 120km = 330km$

$TTT = 1\frac{1}{2}hrs + 3\frac{1}{2}hrs = 5hrs$

Average speed = $\frac{330km}{5hrs}$

$=66\ km/hr$

Mathematics is the key

2. A bus driver left town **A** at 6:00am driving at an average speed of 30km/hr for 2 hours to town **B**. he stopped at **B** for 30minutes and then left for **C** driving at 60km/hr for $2\frac{1}{2}$hours. He stopped at C for $\frac{1}{2}$an hour and then drove back at 140km/hr.
   (a) Calculate his average speed.
   (b) At what time did he reach town C.
3. A bus driver left town **A** at 7:30am driving at an average speed of 70km/hr for 2 hours to town **B**. he stopped at **B** for an hour and then left driving at 35 km/hr back to town **A.** Calculate his average speed.

4. A bus driver left town **R** at 6:40am driving at an average speed of 25km/hr for 2 hours to town **S**. He stopped at **S** for an hour and then left for **T** driving at 30km/hr for 3hours. Calculate his average speed for the whole journey.

SUB TOPIC: School Time Table

Example:

1. Study the time table below for a P.6 class in Kyebando Primary School and answer the questions that follow.

From	8:30 am	9:10 am	9:50 Am	10:30 Am	11:10 Am	11:50 Am	12:30 pm	2:00 pm	2:40 pm
To	9:10 am	9:50 am	10:30 Am	11:10 Am	11:50 am	12:30 pm	2:00 pm	2:40 pm	3:20 pm
MON	***MTC***	***ENG***		***PAPE***	***PAPE***	***R.E***		***PAPE MDD***	***PAPE MDD***
TUE.	***SCI***	***MTC***		***R.E***	***R.E***	***ENG***		***SST***	***SST***
WED.	***SST***	***ENG***		***IPS***	***SCI***	***SCI***		***ENG***	***ENG***
THUR	***ENG***	***SCI***		***MTC***	***MTC***	***L.LAG***		***R.E***	***MTC***
FRI	***MTC***	***MTC***		***KISW***	***ENG***	***SCI***		***IPS***	***IPS***

(i) How long does each lesson last?

9:~~10~~^{70}am ***(60 + 10) = 70 minutes***

-8:30 am

40

Each lesson lasts for 40 minutes

(vi) At what time does break end?

10:30am

(iii) For how long do the pupils take studying Science the whole week?

5 lessons x 40 minutes = 200 minutes

Mathematics is the Key

SUB TOPIC: Taxi and bus time tables

Example

1. The table shows the departure and arrival time of a taxi at given stations. Study it and answer the questions that follow:

Station	Arrival	Depature
Tororo		6:00am
Iganga	7:30am	7:45am
Jinja	8:35am	8:50am
Kampala	10:50am	

(i) How long did the taxi take to move from Tororo to Iganda?

Time of arrival – Time of departure

7:30am

- 6:00am

1:30

It took 1 hour 30 minutes

(ii) How long was the taxis stopover in Jinja?

8:50am

- 8:35am **It was 15 minutes**

0:15

(ii) How long did the taxi take to move from Iganga to Kampala?

10 : 50 am

- 7 : 45 am

3 : 15

It took 3 hours and 15 minutes

SUB TOPIC: Train timetables

Example

1. The tables below shows the departure, the arrival time and the fares for a train from Mityana to Tororo. Study the table carefully:

Station	***Arrival***	***Departure***
Mityana		11:00pm
Bujjuko	11:45pm	12:00 Mid night
Kampala	12:30am	12:45am
Jinja	1:30am	1:40am
Iganga	2:10am	2:30am
Tororo	3:30am	

Table II:

Mathematics is the Key

Mty

500	***BJK***				
1000	***500***	***Kla***			
1600	***1100***	***1000***	***JNJ***		
2600	***2100***	***2000***	***1000***	***ING***	
3600	***3100***	***3000***	***2000***	***1000***	***TRR***

(a) How long does the train take to move from Mityana to Kampala?

12:30am
- 11:00pm
1:30

1 hour and 30 minutes

(e) Three tourists boarded the train from Kampala to Iganga. How much did they pay?

Solution: Kampala to Iganga costs shs 2,000

Sh.2000 X 3 = shs 6,000

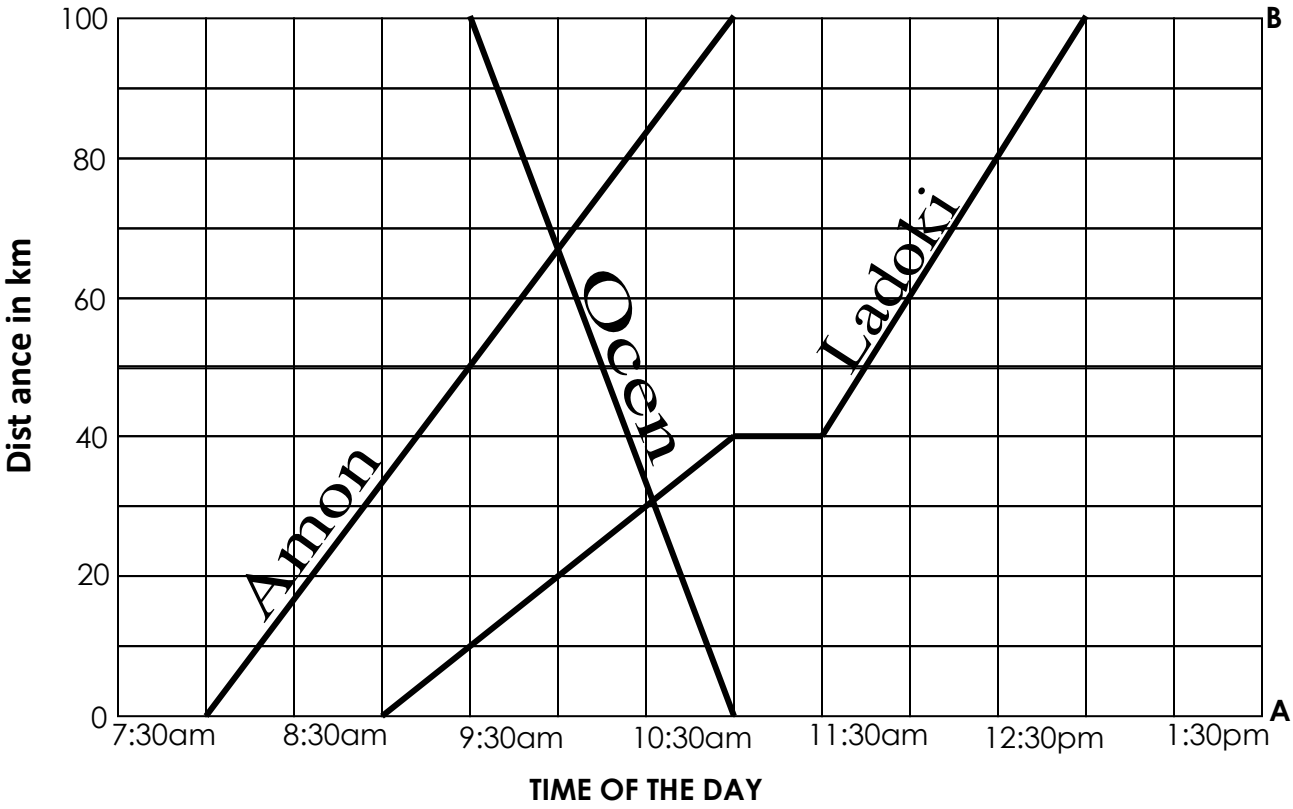
SUB TOPIC: INTERPRETING TRAVEL GRAPHS (Distance Time graph)

A travel graph is one which shows the distance travelled in a period of time
Time is shown on the horizontal axis and distance is shown on the vertical axis.

Example1

The graph below shows 3 people who moved between town A and town B. Amon started from town A at 8:00 am to town B, Ladoki started the journey at 9:00am to town B and Ocen started the journey fom B at 9:30am to town A .

Mathematics is the Key



Questions

ii. What is the scale on the horizontal axis.?
One small square represents 30 minutes

iii. What is the scale on the vertical axis?
One small square represents 10 km

iv. Find the average speed for Ladoki.

$$\textbf{Average speed} = \frac{TDC}{TTT}$$

$$TDC = 100\ km$$

$$TTT = 4\ hours$$

$$\textbf{Average speed} = \frac{100km}{4hrs}$$

$$= 25\ km/hr$$

v. How many hours did Amon take to complete her journey?
3hours

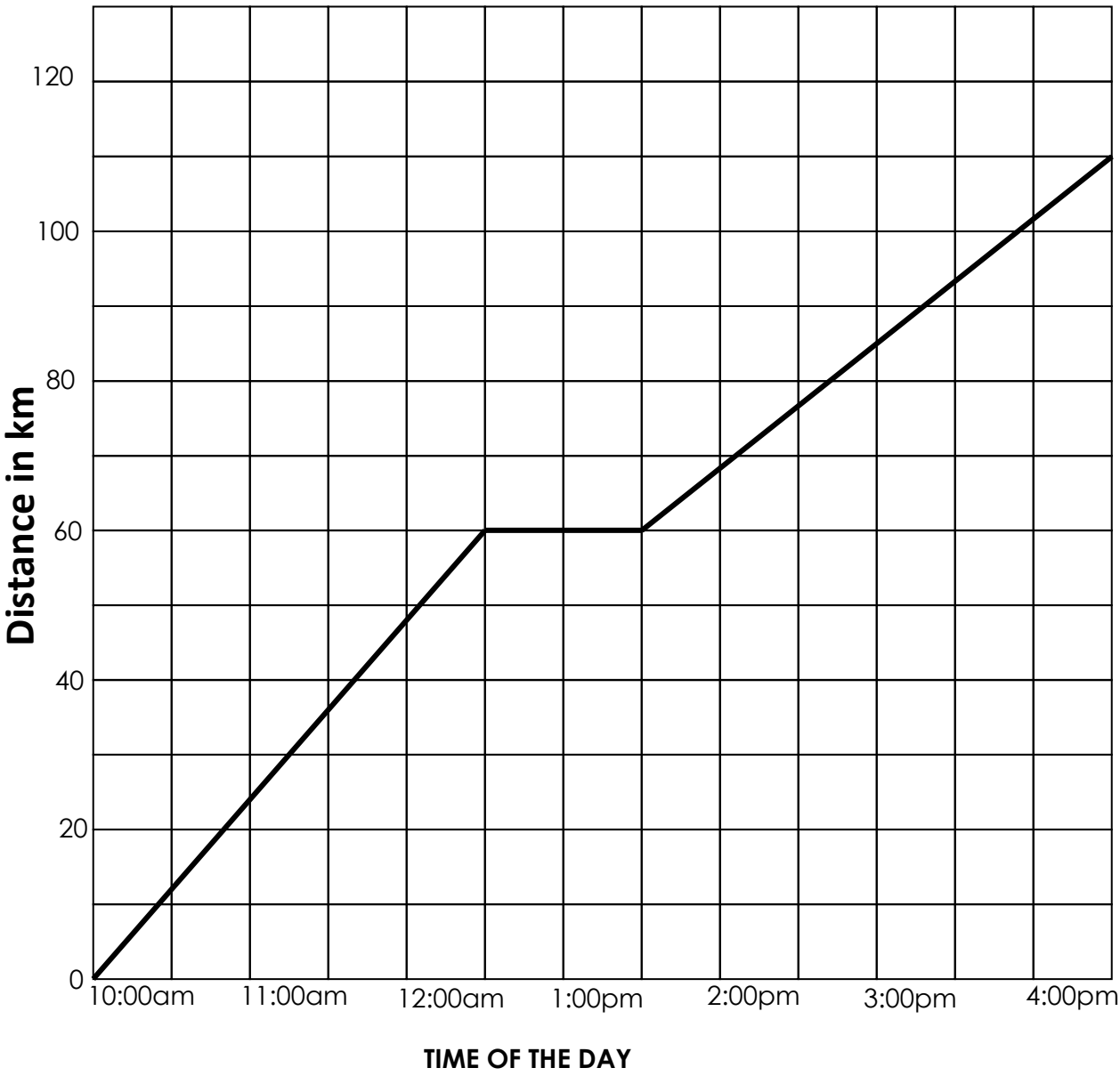
vi. At what time did Amon meet Ocen?
At 10:00am

vii. How many hours earlier did Amon arrive at town B before Ladoki?
2 hours

Mathematics is the Key

Example 2

The graph below shows how the driver moved from ASA town to OMU town via EKO town. Use it to answer the questions that follow.



Questions

a) What is the scale on the vertical axis?
1 small square represents 10km

b) What is the scale on the horizontal axis?
1 small square represents 30 minutes

c) At what time did he start the journey?
At 10:00am

d) At what time did he reach OMU?
At 4:30pm

e) How long did he take resting?
1 hour

f) How far is ASA from OMU?

Mathematics is the Key

110km

g) How long did he take to move from ASA to EKO?

2hours 30minutes

h) What is the distance from EKO to OMU?

i) At what speed was he moving from ASA to OMU?

j) Find his average speed for the whole journey.

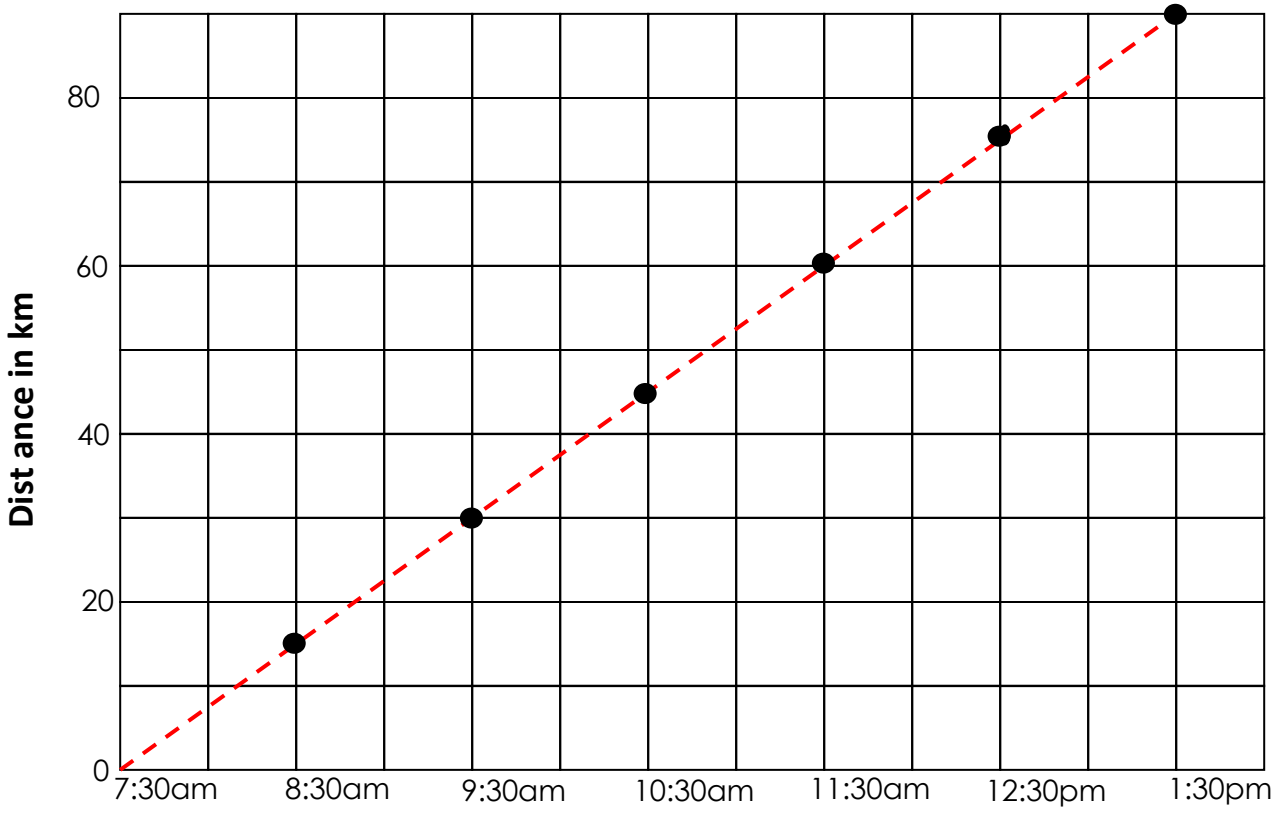
SUB TOPIC: DRAWING TRAVEL GRAPHS

Example1:

Mukasa covered a journey in 6 hours traveling at 15 K.P.H. Show the journey on the grid if he started the journey at 7:30am.

KM	0^{+15}	15km $^{+15}$	30km $^{+15}$	45km^{+15}	60km^{+15}	75km^{+15}	90km
Time	0^{+1}	1 hr $^{+1}$	2hrs $^{+1}$	3hrs^{+1}	4 hrs^{+1}	5hrs^{+1}	6hrs

A graph representing Mukasa's journey.



Example 2

Town M is 150km from town G. A motorcyclist started the journey from town M at 10:30am .He was travelling at a speed of 25km/hr for 2 hours. he rested for 30 minutes and then continued at a speed of 50km/hr for the rest of the journey to town G.

Mathematics is the Key

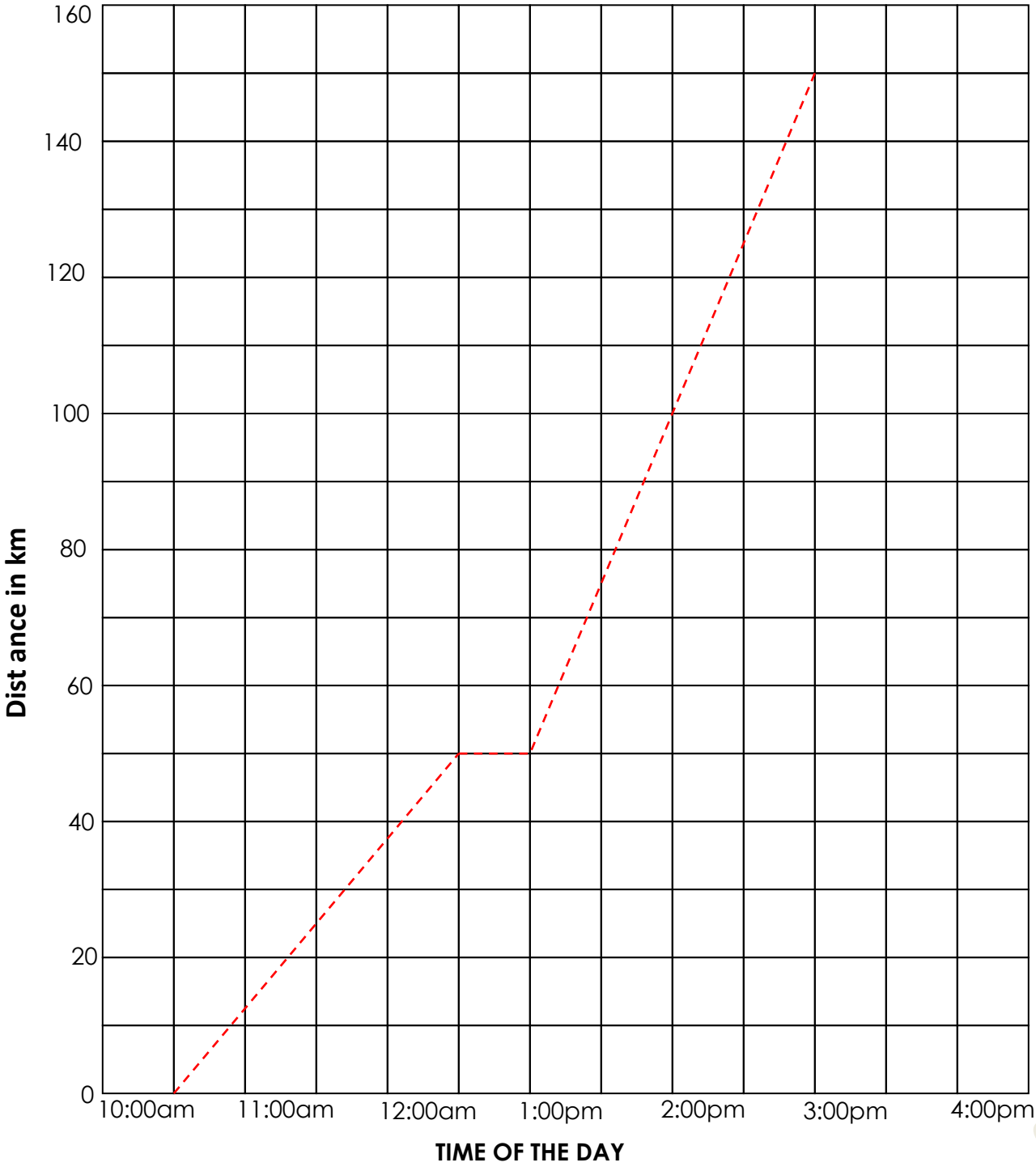
(a). ***Represent the motorcyclists journey on the graph below.***

Phase 1

Distance = S X T
= 25km/hr X 2hrs
=50 km

Phase 2

D = 150 km – 50 km =100 km
Time = 100km ÷ 50km/hr
= 2 hours



(b).At what time did he reach town G?

At 3:00 pm

Mathematics is the Key

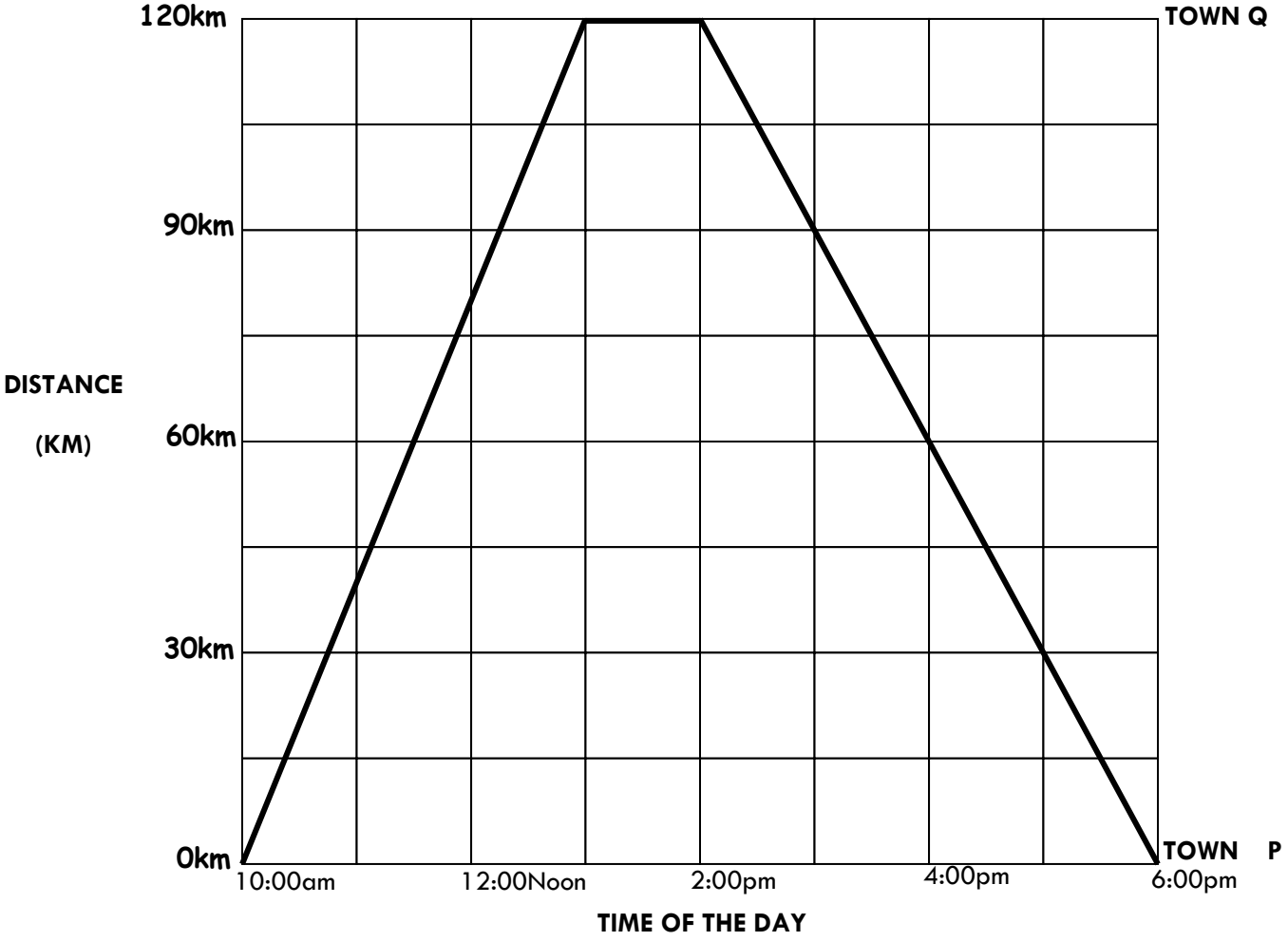
REFERENCE
A New MK Primary Mathematics 2000 Bk 7 Pg 418 - 419 (New Edition)

TOPICAL QUESTIONS ON TIME

1. Namayanja arrives at Kampala at 11:20pm and leaves at 2:00am to travel to Nairobi. She is due into Nairobi at 6:00am the following day. Unfortunately she is delayed and arrives at 9:30am.
   (a) How late is Namayanja in arriving at Nairobi?
   (b) For how long does Namayanja have to wait in Kampala?
   (c) At what time does Namayanja leave Kampala on the 24 – hour clock?
2. A lesson started at 10:30am and ended at 11:50 am. How long did the lesson last?
3. Convert 7200 seconds into hours.
4. Convert 1717 hours to a 12- hour clock.
5. Thieves escaped from the prisons at 12:15 am. Express this time in a 24-hour clock.
6. Convert 2 ½ hours to minutes.
7. It takes 4 hours for a bus traveling at 75 km/hr to move from town X to town y. Find the time taken by a bus traveling at 50km/hr to cover the same distance.
8. Express 90km/hr as m/sec.
9. Convert 10m/second to km/hour
10. A motorist covered 140km between 11:25 am and 2:55pm. Find his average speed.
11. It takes a car industry 1 hour 10 minutes 20 seconds to assemble a car. How long will it take to assemble 50 cars?
12. A bus driver left town **A** at 6:00am driving at an average speed of 50km/hr for 3 hours to town **B**. he stopped at **B** for 2hours and then left for **C** driving at 60km/hr for 1hour. Calculate the average speed for the whole journey

Mathematics is the Key

13. The travel graph below shows a motorists' journey from town P to town Q and back to P. Use it to answer the questions that follow



(a) At what time did the motorist arrive at town Q**?**
(b) How long did the return journey take**?**
(c) What was the total distance covered by the motorist**?**
(d) Find the total time taken by the motorist over the entire journey while travelling**?**
(d) Calculate the motorists' average speed over the whole journey while travelling

MONEY

SUB TOPIC: Shopping lists

Example

1. A mother had a twenty thousand shilling note and bought the following items.
   1 ½ kg of beans at shs.3,000 per kg.
   500g of salt at sh. 2,600 each kg.
   2 bars of soap at sh.8,000
   12 tomatoes at sh.800 for every 4 tomatoes
   (a) How much did she spend altogether?

Mathematics is the Key

Beans	Salt	Soap	Total exp.
$1\frac{1}{2}kg \times sh.3{,}000$ $\frac{3}{2} \times sh.3{,}000$ $3 \times sh.1{,}500$ $sh.4{,}500$	$1kg = 1000g$ $\frac{500}{1000} \times$ sh. 2,600 $50 \times sh.26$ $sh.1{,}300$	$sh.8{,}000$ **Tomatoes** $\frac{12}{4} \times sh.800$ $3 \times sh.800$ $sh.2{,}400$	$sh.4{,}500$ $sh.1{,}300$ $sh.8{,}000$ $+sh.2{,}400$ $sh.16{,}200$

(b) Find her change

$Change = Money\ at\ hand - Total\ expenditure$

$= \boldsymbol{sh.20{,}000 - sh.16{,}200}$

$= \boldsymbol{sh.3{,}800}$

Activity

1. During the COVID-19 pandemic, a lady bought the following items.

   $3\ bottles\ of\ sanitizers\ at\ sh.5{,}000@\ bottle$

   $6\ bars\ of\ soap\ at\ sh.4{,}000@bar$

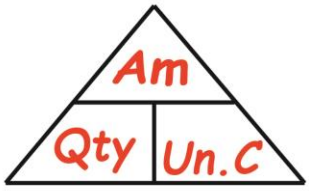
   $12\ face\ masks\ at\ sh.2{,}500\ each$

   $A\ box\ of\ gloves\ at\ sh.12{,}000$

   i. How much money was spent altogether?

   ii. If she went with 2-fifty shilling notes, calculate her change.

SUB TOPIC: Completing table bills



$Amount = Qty \times Un.C$

$Qty = \frac{Amount}{Un.C}$

$Un.C = \frac{Amount}{Qty}$

1. **Study the shopping table below which shows how Alvas bought items for the birthday party and use it to answer the questions**

Item	*Quantity*	*Unit cost*	*Amount*
Sugar	*2kg*	*Sh.3,600*	*Sh.7,200*
Rice	*4kg*	*Sh. 3,000*	*Sh.12,000*
Meat	$1\frac{1}{2}kg$	*Sh.12,000*	*Sh.18,000*
Cooking oil	*500ml*	*Sh.5,000@litre*	*Sh.2,500*
Total expenditure			*Sh.49,700*

Mathematics is the Key

(a) Complete the table

Sugar

$2 \times sh.3{,}600 = sh.7{,}200$

rice

$sh.12{,}000 \div 4$

$= sh.3{,}000$

meat

$sh.18{,}000 \div 1\frac{1}{2}$

$sh.18{,}000 \div \frac{3}{2}$

$sh.18{,}000 \times \frac{2}{3}$

$sh.6{,}000 \times 2$

$sh.12{,}000$

Cooking oil

$\frac{500}{1000} \times sh.sh.5{,}000$

$sh.500 \times 5$

$sh.2{,}500$

(b) Find the change given that he went with sh.50,000.

$\boldsymbol{sh.50{,}000 - sh.49{,}700 = sh.300}$

2. Complete the shopping table below

Item	*Quantity*	*Unit cost*	*Amount*
Books	*5*	*Sh.2,000*	*Sh._____*
Pens	_____	*Sh. 700*	*Sh.6,300*
pencils	*half dozen*	*Sh.4,500@doz*	*Sh._____*
Reams	*2*	*Sh._____*	*Sh.50,000*
Total expenditure			*Sh._____*

REFERENCE

A New MK Primary Mathematics 2000 Bk 7 Pg 214 - 216 (New Edition)

SUB TOPIC: CURRENCY (comparison of currencies)

Below are some of the countries with their currency

COUNTRY	***CURRENCY***
Burundi	*Burundi francs (BF)*
Zambia	*Kwacha (Kch)*
Zimbabwe	*Zimbabwe Dollar (Z$)*
German	*Deutsch mark (DM)*
Egypt	*Egyptian pound*
America	*US Dollar(US$)*
Britain	*GB pound(£)*
Kenya	*Kenya shillings (Ksh)*
Tanzania	*Tanzania shilling (TZ sh)*
Rwanda	*Rwanda francs (RF)*

Mathematics is the Key

Examples

1. Given that
   $1US\$ = Ugsh.3{,}700$
   $1\ TZ\ sh. = Ugsh.2.2$
   $1ksh = ugsh.$

   a) How much in Uganda shillings is equivalent to $20 plus Tzsh. 30,00?

   $$\mathbf{1US\$ = Ugsh.3{,}700}$$
   $$\mathbf{Ugsh\ 3{,}700 \times 20}$$
   $$\mathbf{Ugsh\ 74{,}000}$$

   $$\mathbf{1\ TZsh = Ugsh\ 2.2}$$
   $$\mathbf{TZ\ shs\ 30{,}000 = Ush.\frac{22}{10} \times 30{,}000}$$
   $$\mathbf{= Ush.66{,}000}$$

   Total Uganda currency
   $$\mathbf{Ugsh\ 74{,}000}$$
   $$\mathbf{+\ Ugsh\ 66{,}000}$$
   $$\mathbf{Ush.140{,}000}$$

   b) Kizito works with the Tanzania high commission and his monthly salary is Ugsh.33,000. What is his salary in Tanzania currency?

   $$\mathbf{Ugsh.2.2 = TZsh1}$$
   $$\mathbf{33{,}000 \div 2.2}$$
   $$\mathbf{33000 \div \frac{22}{10}}$$
   $$\mathbf{33000 \times \frac{10}{22}}$$
   $$\mathbf{3000 \times 5}$$
   $$\mathbf{TZsh.15{,}000}$$

   c) A trader sold maize to Kenya for K sh. 150,000. How much money did he get in Uganda shillings given that 1 ksh. = Ugsh.20

   $$\mathbf{Ksh\ 1\ equivalent\ to\ U\ sh\ 20}$$
   $$\mathbf{Ugsh.20 \times 150{,}000}$$
   $$\mathbf{Ugshs\ 3{,}000{,}000}$$

   d) Musiime exported coffee to USA and earned US$ 25,000. He also exported maize to Kenya and earned K shs 500,000.Calculate his total earning in Uganda currency.
   e) Convert £ 37,000 to Uganda shillings.
   f) Mr Santu Daniel went to the Forex Bureau with Ugsh. 207200. How much in US$ did he get in exchange.
   g) Convert GBP ____ to Kenya shillings.

Mathematics is the Key

4. The table below shows the rates at which different currencies are bought and sold.

CURRENCY	BUYING(UGX)	SELLING(UGX)
1 US dollar	3600	3650
1 Euro	4000	4020
1 Rwa. franc	4.0	5.0

(a) How many Euros did Musa get for ugsh.603,000?

$1\ Euro\ =\ Ugsh.4{,}020$

$\mathbf{Ugsh.603,000}$

$\mathbf{Ugsh.4,020}$

60300

402

150 *Euros*

(b) Amiina came from Rwanda with 111,000 Rwandese francs and exchanged them for us dollars. How many US dollars did she get from the bank?

Rwanda francs to Ugsh

$1\ Franc\ =\ Ugsh.4$

$111{,}000\ \times\ 4$

$Ugsh.444{,}000$

Ugsh to US dollars

$Ugsh.3700\ =\ 1US\ dollar$

$Ugsh.444{,}000$

$Ugsh.3700$

4440

37

$120\ US\ dollars$

Mathematics is the Key

TERM III

LENGTH, MASS AND CAPACITY

SUB TOPIC: ***Comparing units/conversion of metric units(review)***

Examples:

Comparing metric units

Km	***Hm***	***Dm***	***Metre***	***dm***	***cm***	***mm***
Kg	***Hg***	***Dg***	***Gram***	***dg***	***cg***	***mg***
Kl	***Hl***	***Dl***	***Litre***	***dl***	***cl***	***Ml***

(a) Change 7m to millimetres

1m = 1000mm

7m = (7 x 1000m)

= 7000mm

(b). Change 800m to km

1000m = 1km

$800m = \frac{800}{1000}$

$= \frac{8}{10}$

$= 0.8km$

Convert the following as instructed

(a) 4km to metres

(b) 0.4 litres to milliliters

(c) 2000g to kg

(d) 50cm to m

REFERENCE

A New MK Primary Mathematics Bk 7 Pg 34

Mathematics is the Key

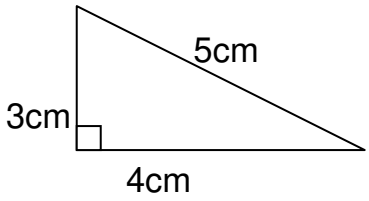
SUB TOPIC: Finding perimeter

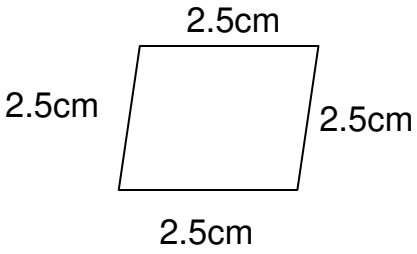
Perimeter is the total distance around the figure

Examples:

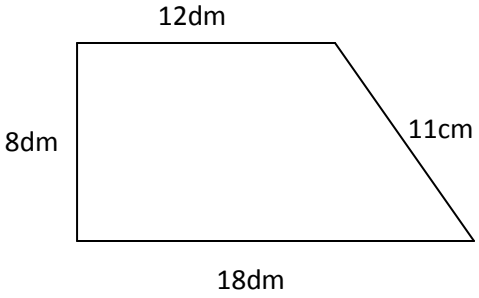
Find the distance (Perimeter) around the shapes given below:

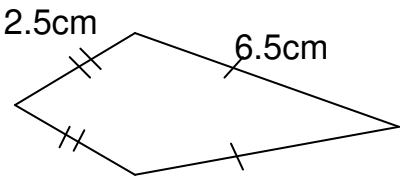
(i)





$$P = 4cm + 3cm + 5cm$$
$$= 7cm + 5cm$$
$$= 12cm$$





REFERENCE

A New MK Primary Mathematics Bk 7 Pg 347-350

SUB TOPIC: FINDING AREA OF SIMPLE SHAPES

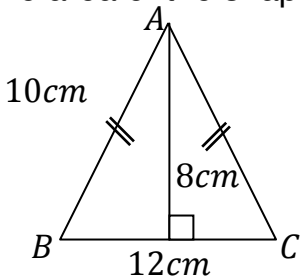
BASIC FORMULAE

$SQUARE = S \times S$
$RECTANGLE = L \times W$

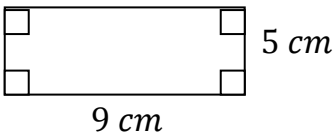
$TRIANGLE = \frac{1}{2}bh$

$TRAPEZIUM = \frac{1}{2}h(a+b)$

1. Find the area of the shapes below

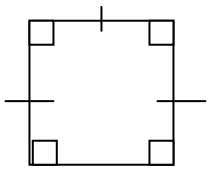


$$A = ½ \times b \times h$$
$$= ½ \times 12cm \times 8cm$$
$$= 6cm \times 8cm$$
$$A = 48cm^2$$



$$A = L \times W$$
$$= 9cm \times 5cm$$
$$= 45cm^2$$

Mathematics is the Key

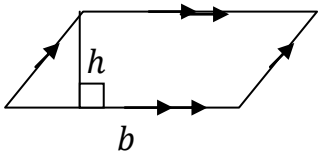


$$A = S \times S$$
$$= 7cm \times 7cm$$
$$= 49cm^2$$

Try these

a. *Find the area of a square whose side is 13m*
b. *Calculate the area of a rectangle whose length is 14dm and width is 9dm.*
c. *Find the area of a triangle whose base is 25cm and height is 30cm.*

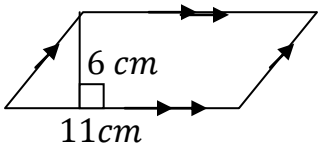
SUB TOPIC: Finding area of a parallelogram



$$PARALLELOGRAM = b \times h$$

Examples

1. Workout the area of the figure below.



$$A = b \times h$$
$$= 11cm \times 6\,cm$$
$$= 66cm^2$$

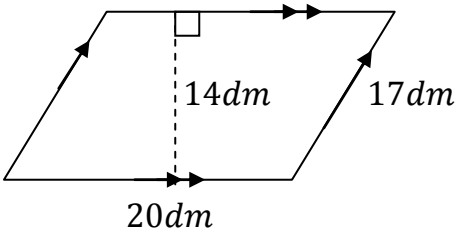
2. Find the area of a parallelogram whose base is 17cm and height is 10cm.

$$A = b \times h$$
$$A = 17cm \times 10cm$$
$$A = 170cm^2$$

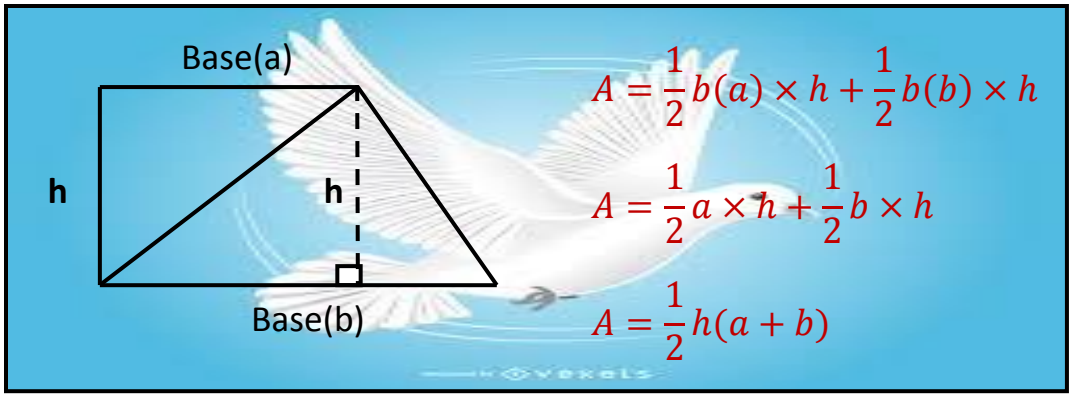
3. *Find the area of a parallelogram whose base and height are 16cm and 11cm respectively.*

Mathematics is the Key

4. Find the area and perimeter of the figure below

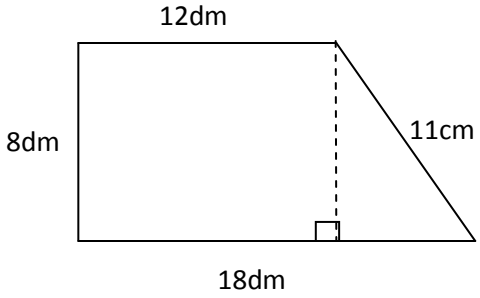


SUB TOPIC: Finding area of a Trapezium



Examples

1. Find the area of the figure below.



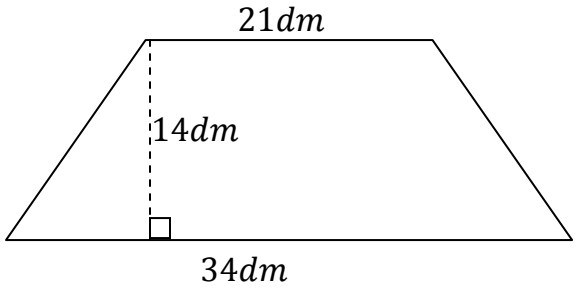
$$\boldsymbol{A = \frac{1}{2}h(a+b)}$$

$$\boldsymbol{A = \frac{1}{2} \times 8dm(18dm + 12dm)}$$

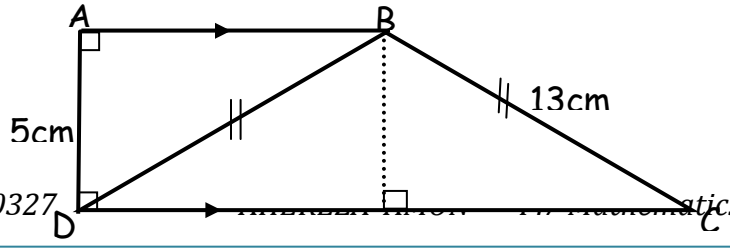
$$\boldsymbol{A = 4dm \times 30dm}$$

$$\boldsymbol{\underline{A = 120dm^2}}$$

2. Find the area of the figure below.



3. The figure below is made up of two triangles ABD and BCD. Line BC=BD = 13cm line AD = 5cm, line DC=24cm, AB= 12cm.



Mathematics is the Key

Calculate the area of the figure ABCD

REFERENCE

A New MK Primary Mathematics Bk 7 Pg 354

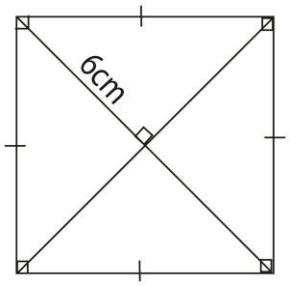
SUB TOPIC: QUADRILATERALS

CONTENT: finding area of a square, kite and rhombus using diagonals

NOTE: All shapes whose diagonals meet at a right angle use a similar formulae for area.

AREA = $\frac{1}{2} \times d_1 \times d_2$

1. Calculate the area of the square below



AREA = $\frac{1}{2} \times d_1 \times d_2$

d_1 = 6cm + 6cm

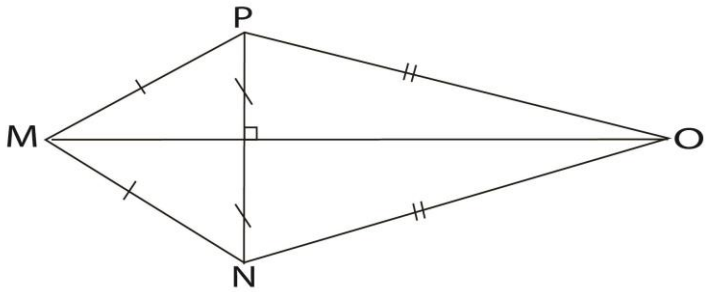
= 12 cm

Area = $\frac{1}{2} \times 12cm \times 12cm$

= 6cm x 12cm

= 72 cm²

2. In the figure below, line MO =12cm and line PN = 5cm.Calculate its area.



AREA = $\frac{1}{2} \times d_1 \times d_2$

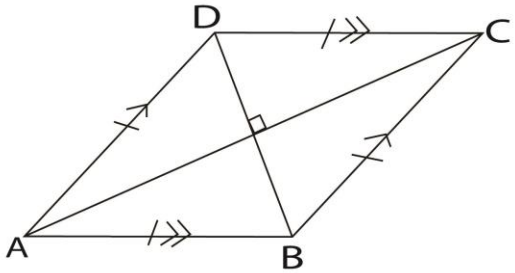
d_1 = 12 cm $d_2 = 5cm$

Area = $\frac{1}{2} \times 12cm \times 5cm$

= 6cm x 5cm

= 30 cm²

3. Diagonals of rhombus ABCD measure 16m by 12m. Calculate its area.



AREA = $\frac{1}{2} \times d_1 \times d_2$

d_1 = 16m $d_2 = 12m$

Area = $\frac{1}{2} \times 16m \times 12m$

= 8m x 12m

= 96 m²

Mathematics is the Key

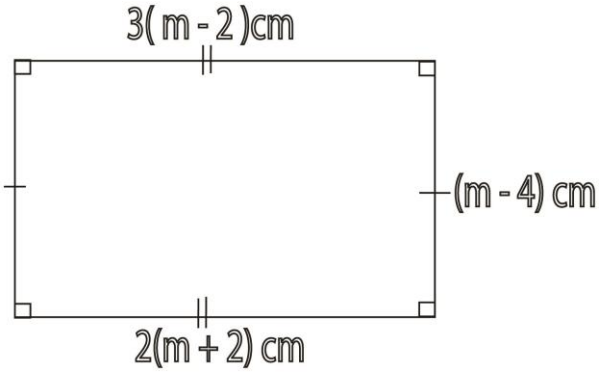
REMEMBER:
Since these shapes have diagonals which meet at a right angle.
Divide the shape into right angled triangles and look for area of each triangle.
Later combine the areas.

Try these

1. Find the area of a kite whose diagonals are 12cm and 4cm.
2. Find the area of a square whose diagonal is 10cm.
3. Calculate the area of a rhombus whose diagonals are 16cm and 10cm.

SUB TOPIC: Comparing sides of a polygon

1. Study the figure below



(a) Find its area

(a) Find the value of m

$2(m + 2)cm = 3(m - 2)cm$

$2(m + 2) = 3(m - 2)$

$2m + 4 = 3m - 6$

$2m - 3m = -6 - 4$

$-m = -10$

$\frac{-m}{-1} = \frac{-10}{-1}$

$m = 10$

$Length = 2(m + 2)cm$

$= 2(10 + 2)cm$

$= 2 \times 12cm$

$= 24cm$

$width = (m + 4)cm$

$= 10cm + 4cm$

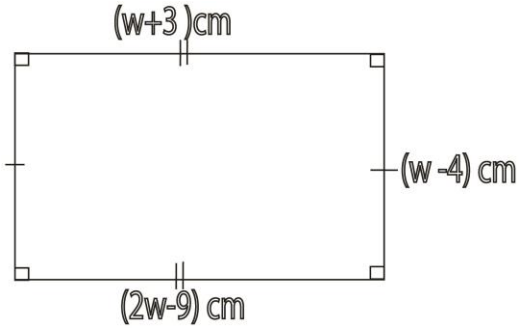
$= 14cm$

$Area = L \times W$

$= 24cm \times 14cm$

$= 336cm^2$

Use the figure below to answer the questions



Mathematics is the Key

(a) Find the value of w

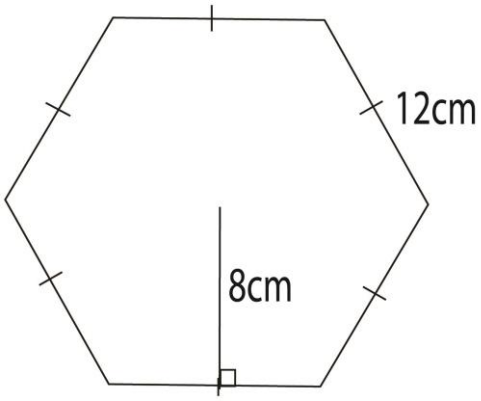
(b) Find the area and perimeter of the figure

SUB TOPIC: Using apothem to find area

An apothem is a line running from the centre perpendicular to any of the sides of a regular polygon.

Area = $\frac{1}{2} \times apothem \times perimeter$

1. **Study the figure below and find its area.**



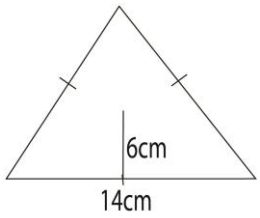
$Area = \frac{1}{2} \times apothem \times perimeter$

$= \frac{1}{2} \times 8cm \times (12cm \times 6)$

$= 4cm \times 72cm$

$= 288cm^2$

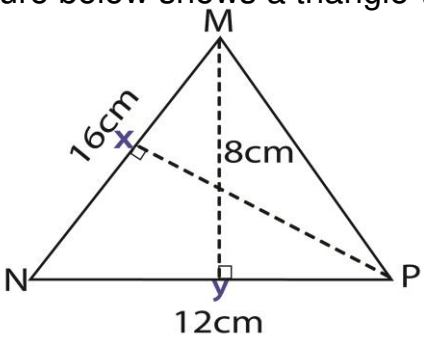
2. **Find the area of the figure below**



SUB TOPIC: Comparing areas

Example 1

1. The figure below shows a triangle with two heights. Find the length XP



Mathematics is the Key

$$\frac{1}{2}bh = \frac{1}{2}bh$$

$$\frac{1}{2} \times 16cm \times h = \frac{1}{2} \times 12cm \times 8cm$$

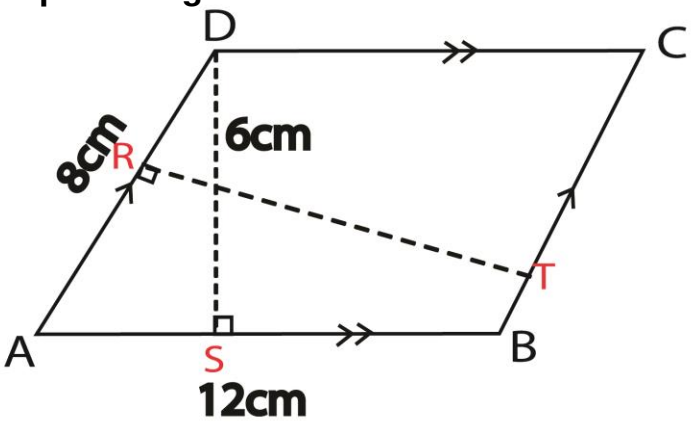
$$8cmh = 12cm \times 4cm$$

$$\frac{8cmh}{8cm} = \frac{12cm \times 4cm}{8cm}$$

$$h = 6cm$$

$$\underline{XP = 6cm}$$

2. **Study the parallelogram below and use it to answer the questions that follow**



Find the length of line RT

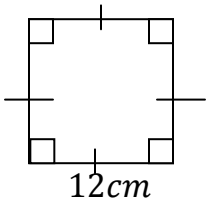
$$bh = bh$$

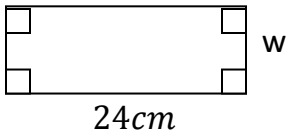
$$8cm \times h = 12cm \times 6cm$$

$$\frac{8cmh}{8cm} = \frac{12\cancel{cm} \times 6cm}{8\cancel{cm}}$$

$$\underline{h = 9cm}$$

3. The area of the rectangle is equal to the area of the square below.





Find the value of w

$$L \times W = S \times S$$

$$24cm \times W = 12cm \times 12cm$$

$$\frac{24cmW}{24cm} = \frac{12cm \times 12cm}{24cm}$$

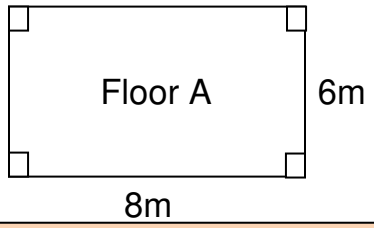
$$\underline{W = 6cm}$$

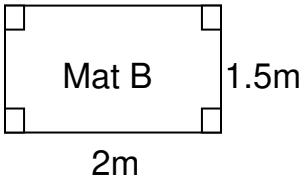
Mathematics is the Key

SUBTOPIC:More about area

Examples:

1. How many mats (B) can cover floor (A)?





NOTE: When carrying out division, the units must be similar

1m = 100cm
8m = 8 x 100cm =800cm
6m = 6 x 100cm =600cm
2m = 2 x 100cm =200cm
1.5m = 1.5 x 100cm=150cm

No. of mats
4 x 4
16mats

Along length: 800
200
= 4 mats

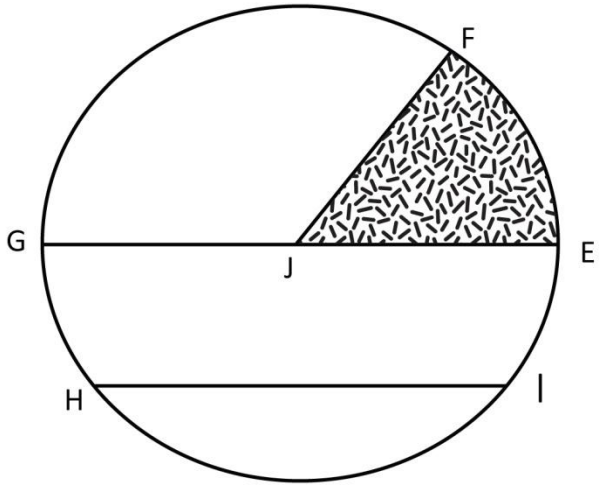
Along width: 600
150
= 4 mats

2. **Circular cards of radius 14cm were cut from a rectangular manila paper of length 150cm and width 120 cm. How many cards were cut from the manila paper?**

REFERENCE

A New MK Primary Mathematics Bk 7 Pg 356

CIRCLE PROPERTIES(review)

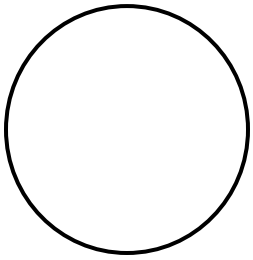


GE = diameter
JE = radius
HI = chord
FE =arc
JEF = sector
FEIHGF= circumference
JF = ???
NOTE: The diameter is the longest chord

Mathematics is the Key

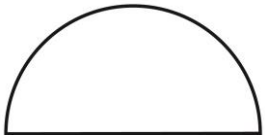
SUBTOPIC: Finding circumference of a circle and parts of a circle.

Circumference is the length of the arc.



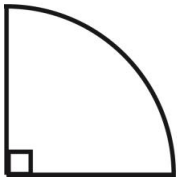
CIRCLE

$C = \pi D$



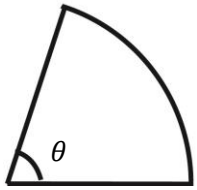
SEMI CIRCLE

$C = \frac{1}{2}\pi D$



QUADRANT

$C = \frac{1}{4}\pi D$



SECTOR

$C = \frac{\theta}{360^\circ}\pi D$

$\theta = sector\ angle$

1. Calculate the circumference of ;($\pi = \frac{22}{7}$)

(a) A circle whose diameter is 7m.

$$\boldsymbol{C = \pi D}$$
$$= \frac{\mathbf{22}}{\mathbf{7}} \times \mathbf{7m}$$
$$\underline{\underline{= \mathbf{22m}}}$$

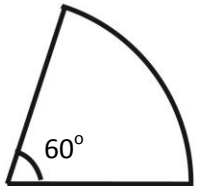
(b) A semi circle whose radius is 7cm

$$\boldsymbol{C = \frac{1}{2}\pi D}$$
$$= \frac{\mathbf{1}}{\mathbf{2}} \times \frac{\mathbf{22}}{\mathbf{7}} \times \mathbf{7cm} \times \mathbf{2}$$
$$= \mathbf{11cm} \times \mathbf{2}$$
$$= \mathbf{22m}$$

(c) A quadrant whose radius is 14cm

$$\boldsymbol{C = \frac{1}{4}\pi D}$$
$$= \frac{\mathbf{1}}{\mathbf{4}} \times \frac{\mathbf{22}}{\mathbf{7}} \times \mathbf{14cm} \times \mathbf{2}$$
$$= \frac{\mathbf{22}}{\mathbf{4}} \times \mathbf{2cm} \times \mathbf{2}$$
$$\underline{\underline{= \mathbf{22cm}}}$$

2. Calculate the circumference of the figure below.(Given that $\pi = 3.14$)

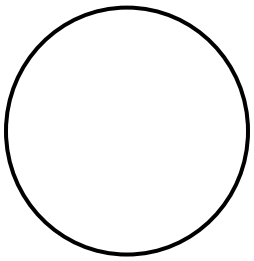


$$C = \frac{\theta}{360^\circ}\pi D$$
$$= \frac{60^\circ}{360^\circ} \times 3.14 \times 12cm \times 2$$
$$= \frac{1}{6} \times \frac{314}{100} \times 24cm$$
$$= \frac{1256}{100}cm$$
$$\underline{= 12.56cm}$$

Mathematics is the Key

SUB TOPIC: Finding perimeter of a circle and parts of a circle

PERIMETER is the total distance around the city.



CIRCLE

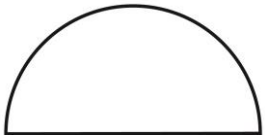
Perim. = Circ

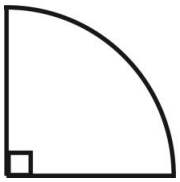
$P = \pi D$

SEMI CIRCLE

P = C + D

$P = \frac{1}{2}\pi D + D$





QUADRANT

P = C + r + r

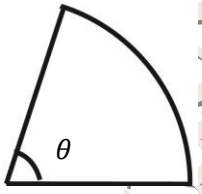
$P = \frac{1}{4}\pi D + D$

SECTOR

P = C + r + r

$P = \frac{\theta}{360^\circ}\pi D + D$

$\theta = sector\ angle$



Examples

1. Calculate the perimeter of ;

(a) A semi circle whose radius is 14cm($\pi = \frac{22}{7}$)

$$P = \frac{1}{2}\pi D + D$$
$$= \frac{1}{2} \times \frac{22}{7} \times 14cm \times 2 + 14cm \times 2$$
$$= 44cm + 28cm$$
$$= \underline{72cm}$$

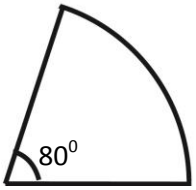
(b) A quadrant whose radius is 10cm($\pi = 3.14$)

$$P = \frac{1}{4}\pi D + D$$

D=10cm x 2 =20cm

$$P = \frac{1}{4} \times \frac{314}{100} \times 20cm + 20cm$$
$$= \frac{314 \times 5}{100} + 20cm$$
$$= \frac{1570}{100} + 20cm$$
$$= 15.7 + 20cm$$
$$= \underline{35.7cm}$$

2. Calculate the perimeter of the figure below.



$$\boldsymbol{P = \frac{\theta}{360^\circ}\pi D + D}$$

D = 9cm x 2 = 18cm

$$\boldsymbol{P = \frac{80^\circ}{360^\circ} \times \frac{22}{7} \times 18cm + 18cm}$$
$$\boldsymbol{= \frac{2}{9} \times \frac{22}{7} \times 18cm + 18cm}$$
$$\boldsymbol{= \frac{88}{7}cm + 18cm}$$
$$\boldsymbol{= 12\frac{4}{7}cm + 18cm}$$
$$\boldsymbol{= 30\frac{4}{7}cm}$$

Mathematics is the Key

SUB TOPIC: Finding the radius or diameter when given perimeter

Examples

1. The perimeter of a circle is 88m. Find its radius.

$$\pi D = P$$
$$\frac{22}{7}D = 88m$$
$$\frac{22D}{7} = 88m$$
$$7 \times \frac{22D}{7} = 88m \times 7$$
$$22D = 88 \times 7m$$
$$\frac{22D}{22} = \frac{88 \times 7m}{22}$$
$$D = 4 \times 7m$$
$$\underline{D = 28m}$$
$$r = \frac{28m}{2}$$
$$\underline{r = 14m}$$

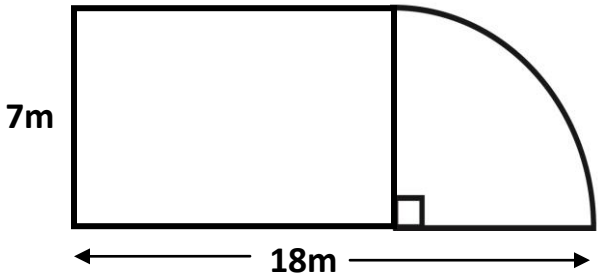
2. The perimeter of a semicircle is 72 cm. Find its diameter.

$$\frac{1}{2}\pi D + D = P$$
$$\frac{1}{2} \times \frac{22}{7} \times D + D = 72cm$$
$$\frac{11D}{7} + D = 72cm$$
$$7 \times \frac{11D}{7} + \frac{D}{1} \times 7 = 72cm \times 7$$
$$11D + 7D = 72cm \times 7$$
$$18D = 72cm \times 7$$
$$\frac{18D}{18} = \frac{72cm \times 7}{18}$$
$$D = 4cm \times 7$$
$$\underline{D = 28cm}$$

SUB TOPIC: More about perimeter

Example

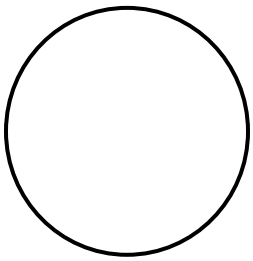
1.Study the figure below and find its perimeter



$$C = \frac{1}{4}\pi D$$
$$= \frac{1}{4} \times \frac{22}{7} \times 7m \times 2$$
$$= \frac{44m}{4}$$
$$\underline{= 11m}$$
$$P = 18m + 11m + (18m - 7m) + 7m$$
$$= 29m + 11m + 7m$$
$$\underline{= 47m}$$

Mathematics is the Key

SUB TOPIC: Finding area of a circle and parts of a circle

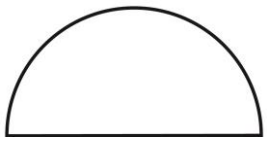


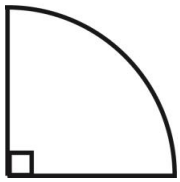
CIRCLE

$A = \pi r^2$

SEMI CIRCLE

$A = \frac{1}{2}\pi r^2$





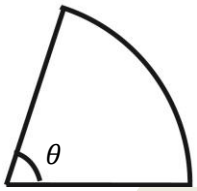
QUADRANT

$A = \frac{1}{4}\pi r^2$

SECTOR

$A = \frac{\theta}{360°}\pi r^2$

$\theta = sector\ angle$



1. Calculate the area of ;($\pi = \frac{22}{7}$)

(a) A circle whose diameter is 7m.

$$\boldsymbol{A = \pi r^2}$$
$$\boldsymbol{= \frac{22}{7} \times \frac{7m}{2} \times \frac{7m}{2}}$$
$$\boldsymbol{= \frac{11m \times 7m}{2}}$$
$$\boldsymbol{= \frac{77}{2} m^2}$$
$$\boldsymbol{= 38\frac{1}{2} m^2}$$

(b) A semi circle whose radius is 7cm

$$\boldsymbol{A = \frac{1}{2}\pi r^2}$$
$$\boldsymbol{= \frac{1}{2} \times \frac{22}{7} \times 7cm \times 7cm}$$
$$\boldsymbol{= 11cm \times 7cm}$$
$$\boldsymbol{\underline{= 77cm^2}}$$

(c) A quadrant whose radius is 14cm

$$\boldsymbol{A = \frac{1}{4}\pi r^2}$$
$$\boldsymbol{= \frac{1}{4} \times \frac{22}{7} \times 14cm \times 14cm}$$
$$\boldsymbol{= \frac{22}{4} \times 2cm \times 7cm}$$
$$\boldsymbol{= 11 \times 7cm^2}$$
$$\boldsymbol{\underline{= 77\ cm^2}}$$

SUB TOPIC: Finding radius or diameter when given area

1. The area of a circle is154cm^2. Find its radius**.**

$$\boldsymbol{\pi r^2 = A}$$
$$\boldsymbol{\frac{22}{7} r^2 = 154 m^2}$$
$$\boldsymbol{\frac{22r^2}{7} = 154m^2}$$
$$\boldsymbol{7 \times \frac{22r^2}{7} = 154m^2 \times 7}$$
$$\boldsymbol{22r^2 = 154 \times 7m^2}$$
$$\boldsymbol{\frac{22r^2}{22} = \frac{154 \times 7m^2}{22}}$$
$$\boldsymbol{r^2 = 7 \times 7m^2}$$
$$\boldsymbol{r^2 = \sqrt{49m^2}}$$
$$\boldsymbol{\underline{r = 7m}}$$

Mathematics is the key

2. The area of a semicircle is 77cm^2. Find its diameter.

$$\frac{1}{2}\pi r^2 = A$$

$$\frac{1}{2} \times \frac{22}{7} \times r^2 = 77\ cm^2$$

$$\frac{11\,r^2}{7} = 77\ cm^2$$

$$7 \times \frac{11\,r^2}{7} = 77\ cm^2 \times 7$$

$$11\,r^2 = 77cm^2 \times 7$$

$$\frac{11\,r^2}{11} = \frac{77cm^2 \times 7}{11}$$

$$r^2 = 7cm^2 \times 7)$$

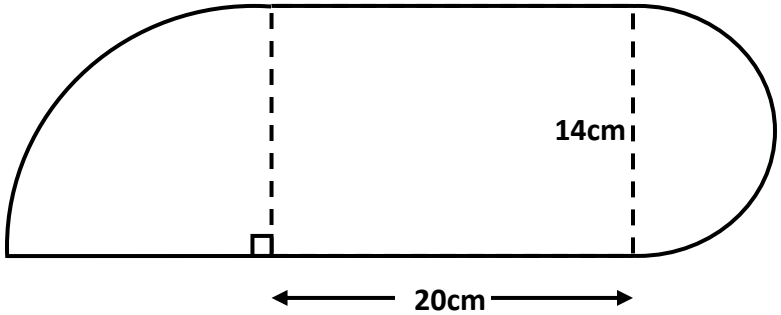
$$r^2 = \sqrt{49cm^2}$$

$$\underline{r = 7cm}$$

SUB TOPIC: Finding area of the combined shapes

Examples

1. Study the figure below and find its area.



Quadrant

$$A = \frac{1}{4}\pi r^2$$

$$= \frac{1}{4} \times \frac{22}{7} \times 14cm \times 14cm$$

$$= \frac{22}{4} \times 2cm \times 7cm$$

$$= 11 \times 7cm^2$$

$$\underline{= 77\ cm^2}$$

semicircle

r = 14cm÷ 2 = 7cm

$$A = \frac{1}{2}\pi r^2$$

$$= \frac{1}{2} \times \frac{22}{7} \times 7cm \times 7cm$$

$$= 11cm \times 7cm$$

$$\underline{= 77cm^2}$$

Rectangle

$$A = L \times W$$

$$= 20cm \times 14cm$$

$$\underline{= 280cm^2}$$

$$\underline{total\ area}$$

$$(280 + 77 + 77)cm^2$$

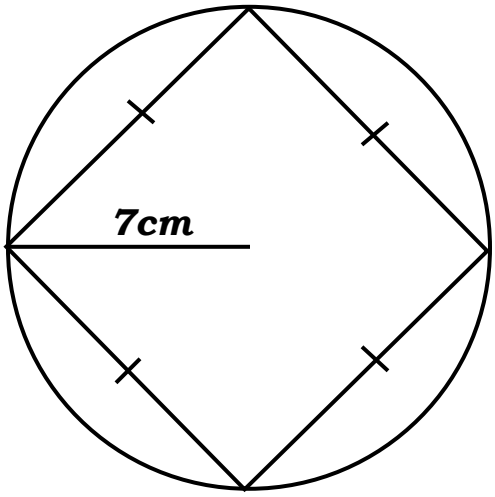
$$\underline{434cm^2}$$

Mathematics is the Key

SUB TOPIC: Finding shaded area

Examples

1. Study the figure below and use it to answer the questions that follow.



Find the shaded area($\pi = \frac{22}{7}$)

Square

$\boldsymbol{Diagonal = 7cm + 7cm = 14cm}$

$\boldsymbol{A = \frac{1}{2} \times d_I \times d_{II}}$

$\boldsymbol{= \frac{1}{2} \times 14cm \times 14cm}$

$\boldsymbol{= 7cm \times 14cm}$

$\underline{\boldsymbol{= 98cm^2}}$

circle

$\boldsymbol{A = \pi r^2}$

$\boldsymbol{= \frac{22}{7} \times 7cm \times 7cm}$

$\boldsymbol{= 22cm \times 7cm}$

$\underline{\boldsymbol{= 154cm^2}}$

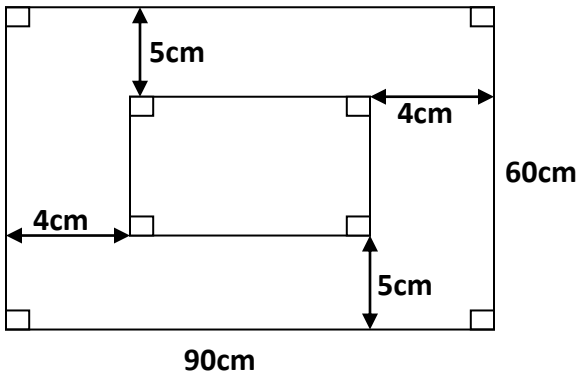
Shaded area

$\boldsymbol{Outer\ area - Inner\ area}$

$\boldsymbol{154cm^2 - 98cm^2}$

$\underline{\boldsymbol{56cm^2}}$

2. A table of size 90cm by 60cm was partly covered with a piece of cloth as shown in the figure below. What part of the table was uncovered?



Mathematics is the Key

SUB TOPIC: More about circumference(Revolutions)

$$\text{Revolutions} = \frac{distance}{circumference}$$

Examples

1. **A bicycle tyre of radius 35cm covered a distance of 4.4km.How many revolutions did it make?(take pi as $\frac{22}{7}$)**

$C = \pi D$

$= \frac{22}{7} \times 35cmx2$

$= 22 \times 10cm$

$\underline{= 220cm}$

Km to cm

$1km = 100,000cm$

$4.4km = 4.4 \times 100,000cm$

$\underline{= 440,000cm}$

$$\text{Revolution} = \frac{distance}{circumference}$$

$= \frac{440{,}000cm}{220cm}$

$\underline{= 2,000\ revolutions}$

2. A wire is wound round a cylindrical drum 1500times. If the length of the wire is 6.6km. Find the radius of the tank.

Km to cm

$1km = 100,000cm$

$6.6km = 6.6 \times 100,000cm$

$\underline{= 660,000cm}$

$$\frac{distance}{circumference} = revolutions$$

$$\frac{660,000cm}{C} = 1500$$

$$C \times \frac{660,000cm}{C} = 1,500 \times C$$

$$1500C = 660,000cm$$

$$\frac{1500C}{1500} = \frac{660,000cm}{1500}$$

$$C = \frac{6600cm}{15}$$

$$\underline{C = 440cm}$$

$\pi D = C$

$\frac{22}{7} D = 440cm$

$\frac{22D}{7} = 440cm$

$7 \times \frac{22D}{7} = 440cm \times 7$

$22D = 440cm \times 7$

$\frac{22D}{22} = \frac{440 \times 7cm}{22}$

$D = 20 \times 7cm$

$\underline{D = 140cm}$

$r = \frac{140cm}{2}$

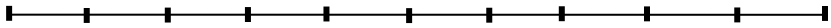
$\underline{r = 70cm}$

Mathematics is the Key

SUB TOPIC: Application of perimeter

(a) Poles in a straight line (Open fences)

In open fences, the number of poles is one more than the number of spaces



There are 11 poles and 10 spaces in the figure above

Number of poles = no. of spaces +1

No. of spaces = $\frac{distance}{interval}$

1. Electric poles are planted 20m apart. Find the distance from the first pole to the 10th pole.

No. of spaces = No of poles – 1

Distance = (10 – 1) X 20m

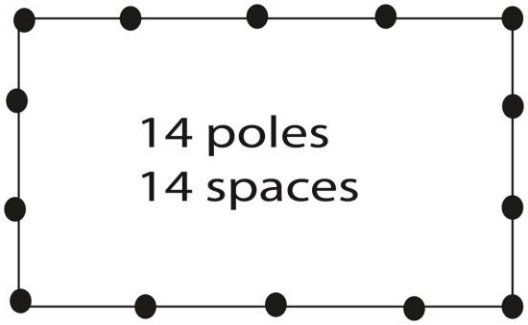
= 9 X 20m

= 180m

2. **Closed fences:**

In closed fences the number of poles corresponds with the number of spaces.

In the illustration below the number of poles is 14 and the number of spaces is also 14.



No. of poles = $\frac{perimeter}{interval}$

Example:

Mukasa's rectangular flower garden measures 10m by 8m. He fenced it, putting the poles 2m apart. How many poles did he need?

Perimeter of flower garden

P = 2(l + w)

= 2(10 + 8)m

= 2(18)

= 36m

No. of poles

= Perimeter

interval

= $\frac{36m^{18}}{2m}$

18 poles

Mathematics is the Key

ACTIVITY:

1. When sprinting, Ivan athlete covers 180cm with every stride.
(a) How many strides does he take to finish 100m.
(b) How far does he run in 200 strides?
2. Telephone poles are 20m apart. What is the distance from the first pole to the 16th pole?
3. The distance around my farm is 400m. If I want posts for fencing spaced 4m, how many posts will I need?

REFERENCE

Macmillan Primary Mathematics Bk 7 Pg 81.

VOLUME AND SURFACE AREA

SUB TOPIC: Converting from square centimetres (cm^2) to square metres(m^2) and vice versa.

$1m = 100cm$

$1m^2 = 1m \times 1m$

$= 100cm \times 100cm$

$= 10{,}000cm^2$

Examples

1. Convert the following as instructed.

(a). 0.5 m^2 to square centimetres.

$1m^2 = 10{,}000cm^2$

$0.5m^2 = 0.5 \times 10{,}000cm^2$

$= \underline{\underline{5{,}000cm^2}}$

(b). 8000cm^2 to square metres

$10{,}000cm^2 = 1m^2$

$$5000cm^2 = \frac{5{,}000cm^2}{10{,}000cm^2} = \frac{1}{2}\ m^2$$

2. Convert the following to square centimetres.
   a. $2m^2$
   b. $45m^2$
   c. $0.03m^2$
3. Convert the following to square metres
   a. $700{,}000cm^2$
   b. $1{,}200cm^2$
   c. $88{,}800cm^2$

SUB TOPIC: Converting from square kilometres (km^2) to square metres(m^2) and vice versa.

$1km = 1000m$

$1km^2 = 1km \times 1km$

$= 1000m \times 1000m$

$= 1{,}000{,}000m^2$

Mathematics is the key

Examples

1. Convert the following as instructed.

   (a). 0.5 km^2 to square metres.

   $\mathbf{1km^2 = 1,000,000m^2}$

   $\mathbf{0.5km^2 = 0.5 \times 1,000,000m^2}$

   $\mathbf{= \underline{\underline{500,000m^2}}}$

   (b). 970,000m^2 to square kilometres

   $\mathbf{1,000,000m^2 = 1km^2}$

   $\mathbf{970,000m^2 = \frac{970,000m^2}{1,000,000m^2}}$

   $\mathbf{= \frac{97}{100}\ km^2}$

   $\mathbf{= 0.97km^2}$

2. Convert the following to square metres.
   - **d. $2km^2$**
   - **e. $45km^2$**
   - **f. $0.03km^2$**
3. Convert the following to square kilometres
   - **d. $67,000,000m^2$**
   - **e. $1,200m^2$**
   - **f. $88,800m^2$**

SUB TOPIC: Converting from cubic metres (m^3) to cubic centimetres(cm^3) and vice versa.

1m = 100cm

1m³ = 1m x 1m x 1m

= 100cm x 100cm x100cm

=1,000,000cm³

Examples

1. Convert the following as instructed.

   (a). 0.24 m^3 to cubic centimetres.

   $\mathbf{1m^3 = 1,000,000cm^3}$

   $\mathbf{0.24m^3 = 0.24 \times 1,000,000cm^3}$

   $\mathbf{= \underline{\underline{240,000cm^3}}}$

   (b). 8,600,000cm^3 to cubic metres

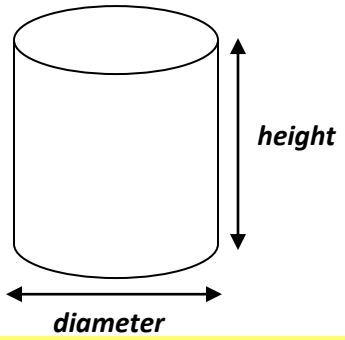
   $\mathbf{1,000,000cm^3 = 1m^3}$

   $\mathbf{8,600,000cm^3 = \frac{8,600,000cm^3}{1,000,000cm^3}}$

   $\mathbf{= \frac{86}{10}\ m^3 = 8.6m^3}$

2. Convert the following to cubic centimetres.
   - **g. $2\frac{1}{2}m^3$**
   - **h. $82m^3$**
   - **i. $0.63m^3$**
3. Convert the following to square metres
   - **g. $3,900,000cm^3$**
   - **h. $1,600cm^3$**
   - **i. $40,800cm^3$**

Mathematics is the Key



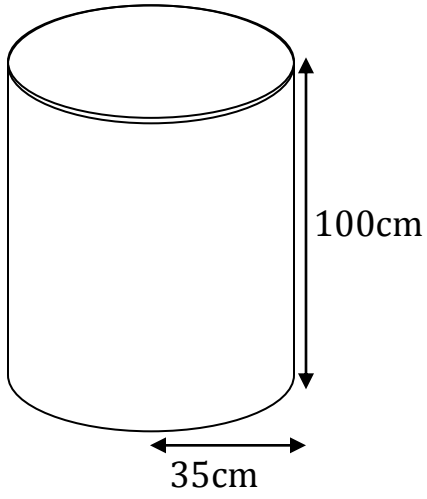
NOTE
1Litre = 1,000cm³
Volume =base area x height
$volume = \pi r^2 h$

Examples

1. Calculate the volume of a cylinder whose radius is 14cm and height is 30cm.

$$\boldsymbol{Volume = \pi r^2 h}$$
$$= \frac{22}{7} \times 14cm \times 14cm \times 30cm$$
$$= 22 \times 14cm \times 2cm \times 30cm$$
$$= 44 \times 420cm^3$$
$$\underline{= 18480cm^3}$$

2. Below is a cylindrical tank. Study it and use it to answer the questions that follow.



(a) **Calculate the volume of the tank.**

$$\boldsymbol{Volume = \pi r^2 h}$$
$$= \frac{22}{7} \times 35cm \times 35cm \times 100cm$$
$$= 22 \times 5cm \times 35cm \times 100cm$$
$$= 110 \times 3500cm^3$$
$$\underline{= 385,000cm^3}$$

Mathematics is the Key

(b).**How many litres of water can it hold when full.**

$$1000cm^3 = 1\ litre$$

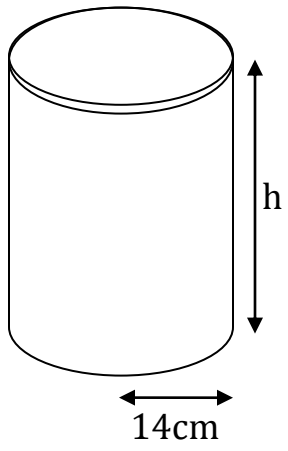
$$385,000cm^3 = \frac{385,000cm^3}{1,000cm^3}$$

$$\underline{= 385\ Litres}$$

SUB TOPIC: *Finding missing sides volume and capacity of cylinders*

Examples

1. **The volume of the cylinder below is 18480cm^3. Find the value of h.**



$$\pi r^2 h = Volume$$

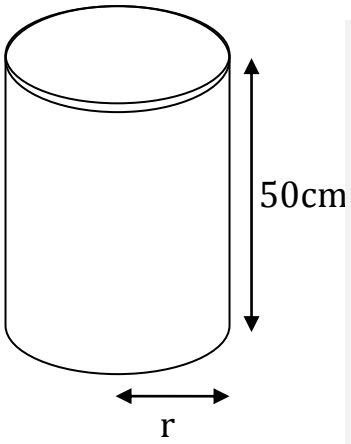
$$\frac{22}{7} \times 14cm \times 14cm \times h = 18480cm^3$$

$$44cm \times 14cm \times h = 18480cm^3$$

$$\frac{44cm \times 14cm \times h}{44cm \times 14cm} = \frac{18480cm^3}{44cm \times 14cm}$$

$$\underline{h = 30cm}$$

2. **The tank below holds 123.2litres of water when full. Find its radius**



$$\frac{\pi r^2 h}{1000cm^3} = capacity$$

$$\frac{\frac{22}{7} \times r \times r \times 50cm}{1000cm^3} = 123.2\ l$$

$$1000cm^3 \times \frac{\frac{22}{7} \times r \times r \times 50cm}{1000cm^3} = 123.2 \times 1000cm^3$$

$$7 \times \frac{1100cmr^2}{7} = 123200cm^3 \times 7$$

$$1100cmr^2 = 123200cm^3 \times 7$$

$$\frac{1100cmr^2}{1100cm} = \frac{123200cm^3 \times 7}{1100cm}$$

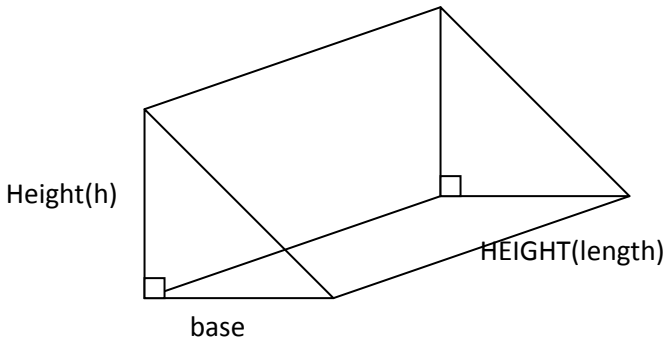
$$r^2 = 784cm^2$$

$$\sqrt{r}^2 = \sqrt{784cm^2}$$

$$\underline{r = 28cm}$$

Mathematics is the Key

SUB TOPIC: Volume and capacity of triangular prisms



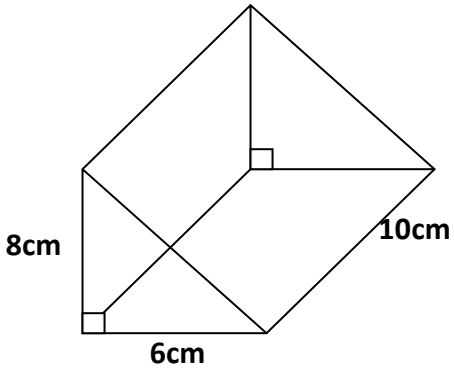
$$Volume = base\ area\ x\ height$$

$$Volume = \frac{1}{2}bh \times l$$

$$volume = \frac{1}{2}bhl$$

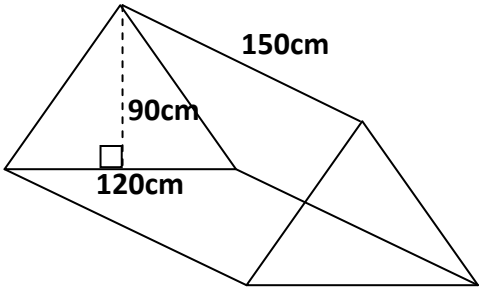
Examples

1. **Find the volume of the figure below**



$$Volume = \frac{1}{2}bhl$$
$$= \frac{1}{2} \times 6cm \times 8cm \times 10cm$$
$$= 3 \times 80cm^3$$
$$= 240cm^3$$

2. **Calculate the capacity of the figure below.**



$$Volume = \frac{1}{2}bhl$$
$$= \frac{1}{2} \times 120cm \times 90cm \times 150cm$$
$$= 60 \times 90 \times 150cm^3$$
$$= 5400 \times 150cm^3$$
$$= \underline{810{,}000cm^3}$$

$1000cm^3 = 1litre$

$$\frac{810{,}000cm^3}{1{,}000cm^3}$$

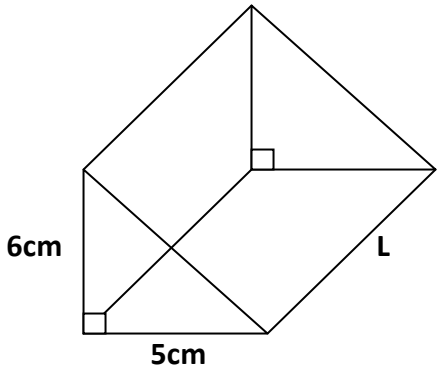
$\underline{810\ litres}$

Mathematics is the Key

SUB TOPIC: Finding missing sides of a triangular prism when given volume.

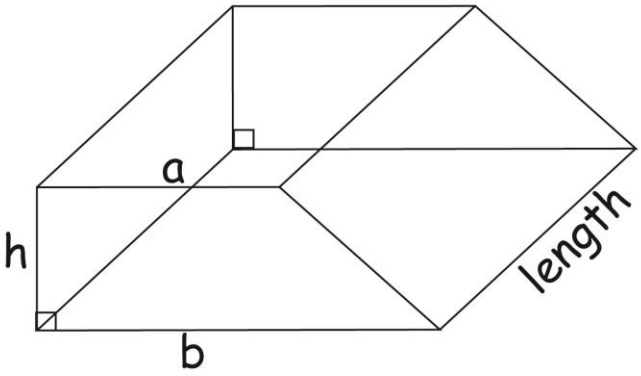
Examples

1. **Find the missing side in the figure below given that its volume is135cm^2**



$$\frac{1}{2}bhl = Volume$$
$$\frac{1}{2} \times 5cm \times 6cm \times L = 135cm^3$$
$$3cm \times 5cm \times L = 135cm^3$$
$$\frac{3cm \times 5cm \times L}{3cm \times 5cm} = \frac{135cm^3}{3cm \times 5cm}$$
$$L = 9cm$$

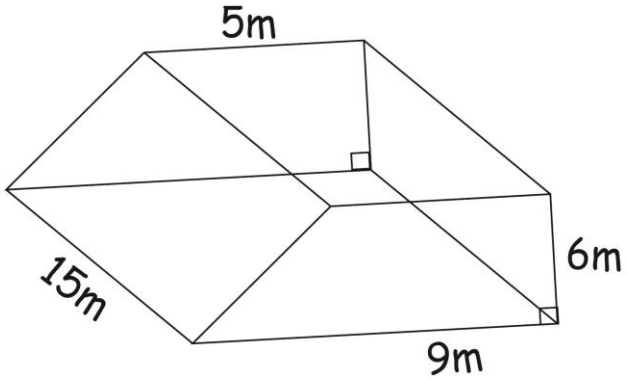
SUBTOPIC: Volume and capacity of trapezoidal prism



$$Volume = base\ area\ x\ height$$
$$Volume = \frac{1}{2}h(a+b) \times L$$
$$Volume = \frac{1}{2}h(a+b)L$$

Examples

1. **Calculate the volume of the figure below.**



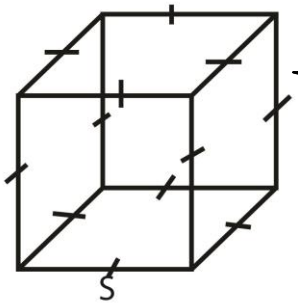
$$Volume = \frac{1}{2}h(a+b)L$$
$$= \frac{1}{2} \times 6m \times (5m + 9m) \times 15m$$
$$= 3m \times 14m \times 15m$$
$$= 42m^2 \times 15m$$
$$= 630m^3$$

Mathematics is the Key

SUBTOPIC: Total surface area of cubes and cuboids

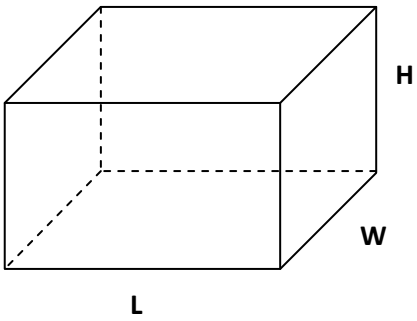
Total surface area is the area of all faces

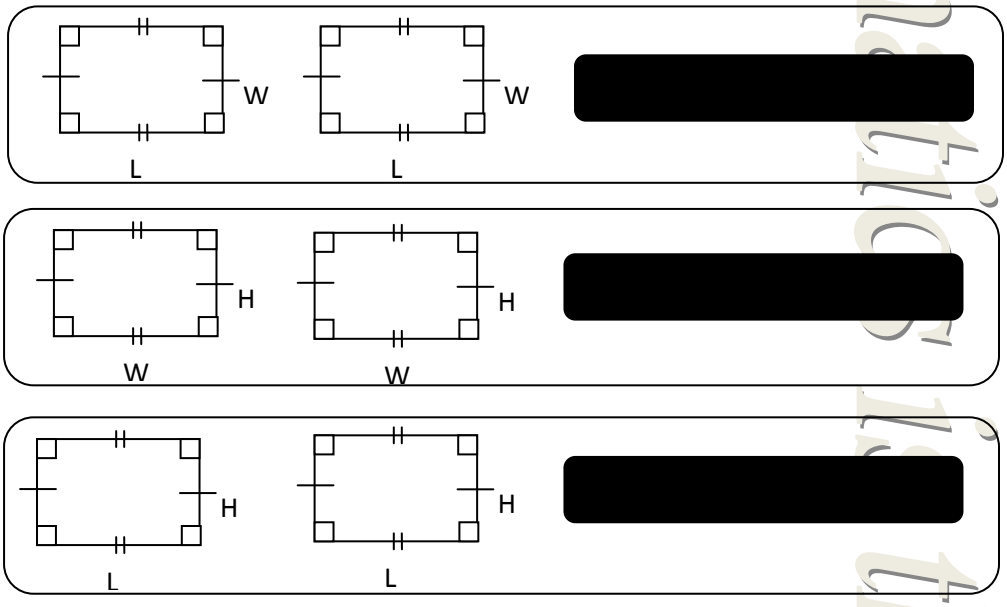
CUBE



A cube has six equal faces of which they are all squares.
Area of a square is (SXS)

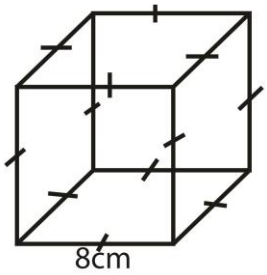
$$TSA = 6\ XSXS$$
$$TSA = 6 \times S^2$$
$$TSA = 6S^2$$





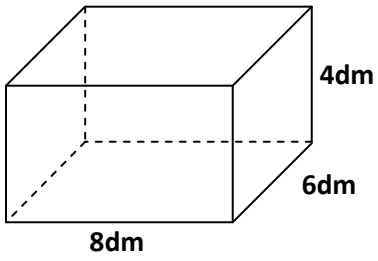
$$TOTAL\ SURFACE\ AREA = 2(L\ X\ W) + 2(W\ X\ H) + 2(L\ X\ H)$$

1. **Find the total surface area of the figures below.**



$$TSA = 6 \times S \times S$$
$$= 6 \times 8cm \times 8cm$$
$$= 6 \times 64cm^2$$
$$= \underline{384cm^2}$$

Mathematics the Key



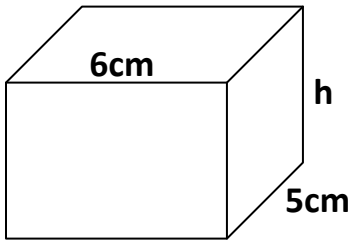
$$TSA = 2(L\ X\ W) + 2(W\ X\ H) + 2(L\ X\ H)$$
$$= 2(8dm \times 6dm) + 2(8dm \times 4dm) + 2(6dm \times 4dm)$$
$$= 2 \times 48dm^2 + 2 \times 32dm^2 + 2 \times 24dm^2$$
$$= 96dm^2 + 64dm^2 + 48dm^2$$
$$\underline{= 208dm^2}$$

2. Find the total surface area of the box measuring 10cm by 5cm by 4cm.
3. Find the total surface of the cube whose side is 10cm.

SUBTOPIC: Finding missing sides when given TSA of a cuboid.

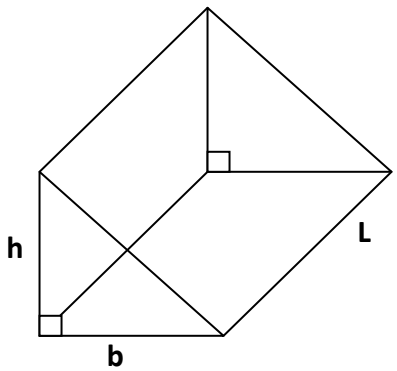
Examples

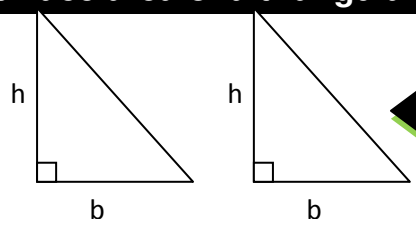
The total surface area of a cuboid is 148cm^2. Find the value of h.



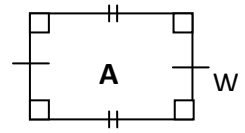
$$2(L\ X\ W) + 2(W\ X\ H) + 2(L\ X\ H) = TSA$$
$$2(6cm \times 5cm) + 2(5cm \times h) + 2(6cm \times h) = 148cm^2$$
$$2 \times 30cm^2 + 2 \times 5hcm + 2 \times 6hcm = 148cm^2$$
$$60cm^2 + 10hcm + 12hcm = 148cm^2$$
$$22hcm + 60cm^2 = 148cm^2$$
$$22hcm + 60cm^2 - 60cm^2 = 148cm^2 - 60cm^2$$
$$22hcm = 88cm^2$$
$$\frac{22hcm}{22cm} = \frac{88cm^2}{22cm}$$
$$\underline{h = 4cm}$$

SUBTOPIC: Finding total surface area of a triangular prism

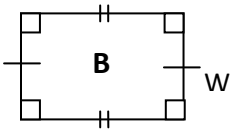




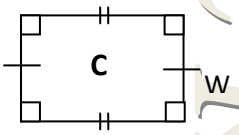
$$A = \frac{1}{2}bh \times 2$$



$$A = L \times W$$



$$A = L \times W$$



$$A = L \times W$$

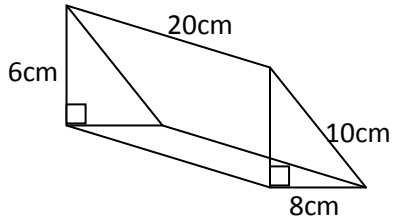
Mathematics is the key

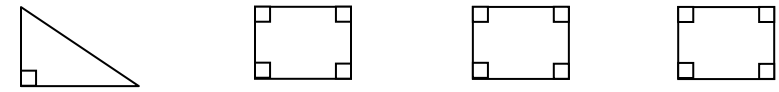
EXAMPLE

Find the total surface area of the triangular prism below.

Examples:

1. Find the surface area of the figure below.





½ bh x 2 | L x W | L x W | L x W

$$TSA = \frac{1}{2}bh \times 2 + L \times W + L \times W + L \times W$$

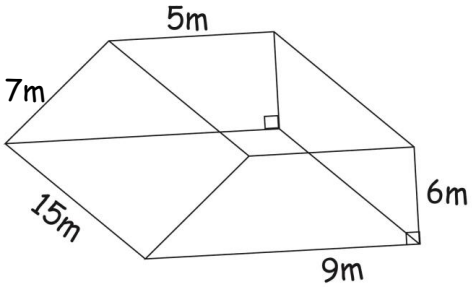
$$\left(\frac{1}{2} \times 8cm \times 6cm \times 2\right) + (8cm \times 20cm) + (10cm \times 20cm) + (6cm \times 20cm)$$

$$48cm^2 + 160cm^2 + 200cm^2 + 120cm^2$$

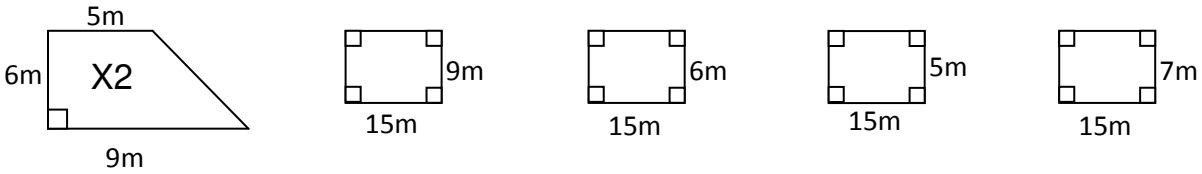
$$208cm^2 + 320cm^2$$

$$\underline{528cm^2}$$

SUB TOPIC: TSA of a trapezoidal prism



Main parts of the trapezoidal prism



$$TSA = \frac{1}{2}h(a+b) \times 2 + L \times W + L \times W + L \times W + L \times W$$

$$6m(9m + 5m) + (15m \times 9m) + (15m \times 6m) + (15m \times 5m) + (15m \times 7m)$$

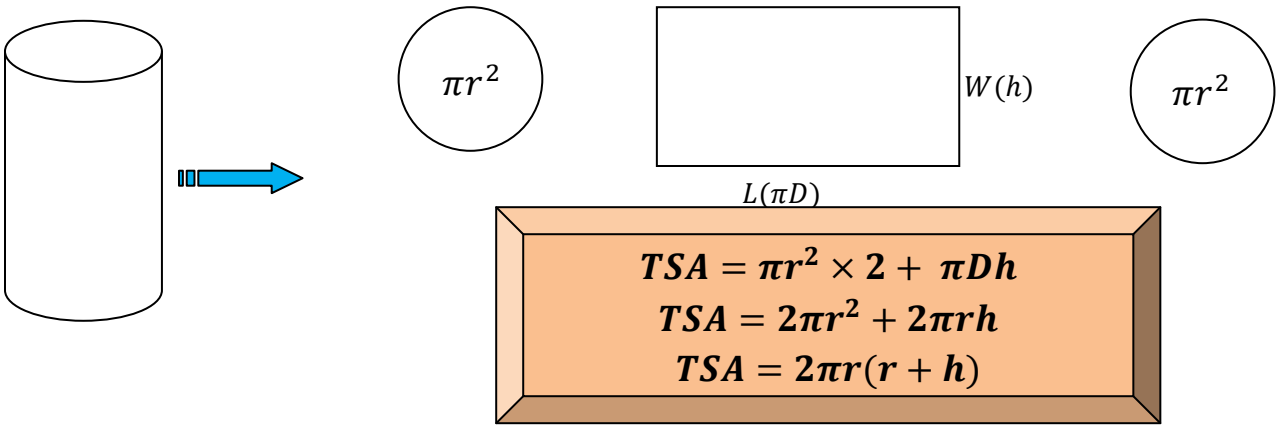
$$(6m \times 14m) + 135m^2 + 90m^2 + 75m^2 + 105m^2$$

$$84m^2 + 225m^2 + 180m^2$$

$$\underline{489m^2}$$

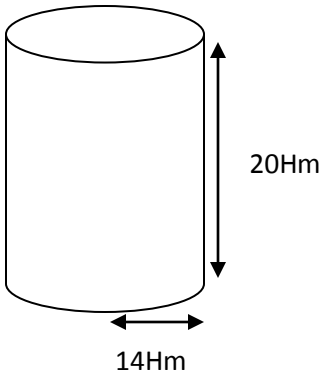
Mathematics is the Key

SUB TOPIC: Total surface area of closed cylinders



$$TSA = \pi r^2 \times 2 + \pi Dh$$
$$TSA = 2\pi r^2 + 2\pi rh$$
$$TSA = 2\pi r(r + h)$$

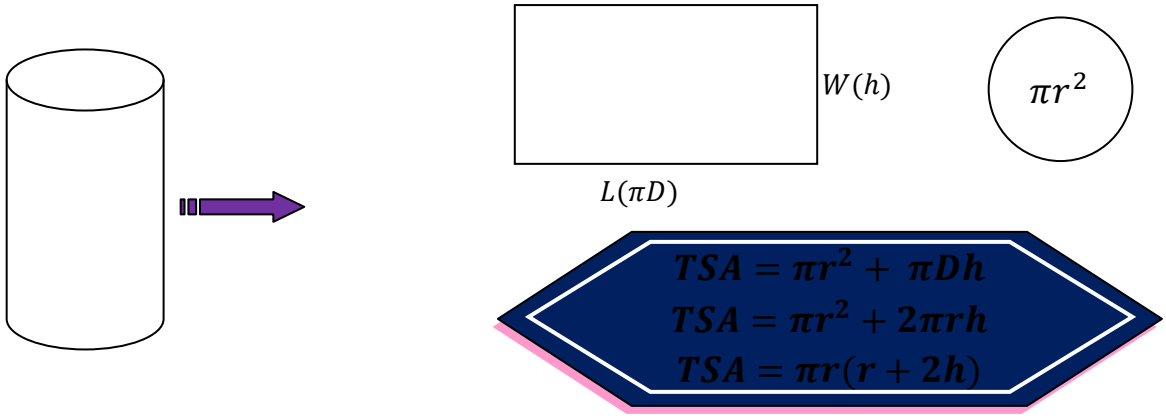
1. Calculate the TSA of the cylinder below.(***take pi as*** $\frac{22}{7}$)



$$TSA = 2\pi r(r + h)$$
$$2 \times \frac{22}{7} \times 14Hm(14Hm + 20Hm)$$
$$44 \times 2Hm \times 34Hm$$
$$88Hm \times 34Hm$$
$$\underline{TSA = 2992Hm^2}$$

2. Find the total surface area of a cylinder whose radius is 7cm and height 10cm

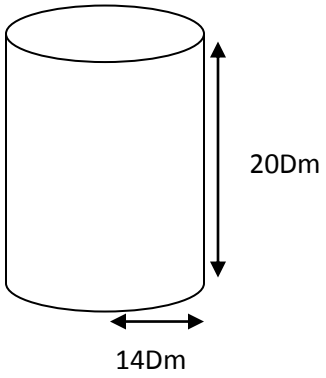
SUBTOPIC: Finding total surface of a cylinder open one end.



$$TSA = \pi r^2 + \pi Dh$$
$$TSA = \pi r^2 + 2\pi rh$$
$$TSA = \pi r(r + 2h)$$

Mathematics is the Key

Below is a metallic drum without a lid. Use it to answer the questions that follow.



$$TSA = \pi r(r + 2h)$$

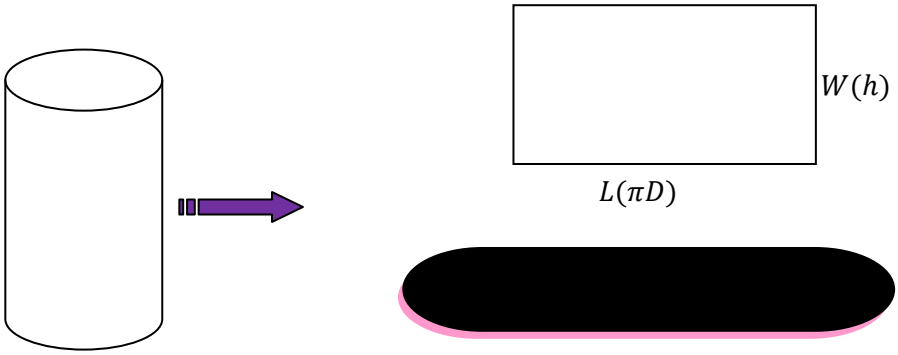
$$\frac{22}{7} \times 14Hm(14Hm + 2 \times 20Hm)$$

$$44Dm \times (14 + 40)Dm$$

$$44Dm \times 54Dm$$

$$\underline{TSA = 2376Dm^2}$$

SUB TOPIC: Finding total surface area of hollow cylinders



A metallic drum of radius 21cm and height 75cm was cut properly to form a metallic door for the kitchen. Calculate the area of the door that was formed.

$$\underline{area\ of\ the\ door}$$

$$Area = Circumference \times Height$$

$$= \pi D \times h$$

$$= \frac{22}{7} \times (21cm + 21cm) \times 75cm$$

$$= \frac{22}{7} \times 42cm \times 75cm$$

$$= 22 \times 6cm \times 75cm$$

$$= 132cm \times 75cm$$

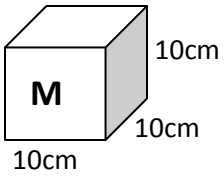
$$\underline{= 9900cm^2}$$

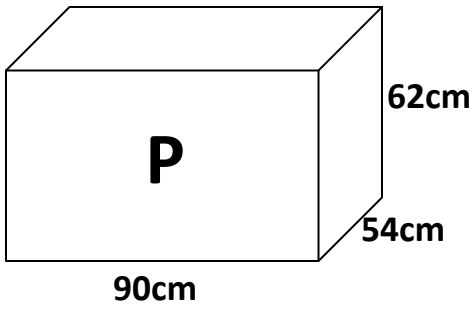
Mathematics is the Key

SUBTOPIC: Packing boxes in boxes.

Examples.

1. **Boxes of size M were packed in box P. Study them and answer the questions that follow.**





(a) How many boxes were packed in the first layer?

Along the length

$$\frac{90cm}{10cm} = 9\ boxes$$

Along the width

$$\frac{54cm}{10cm} = 5 boxes$$

No. of boxes

$$9 \times 5 = 45\ boxes$$

(b) How many layers of box M were formed in box P?

Along the height

$$\frac{62cm}{10cm} = 6\ layers$$

(c).how many boxes were packed in the whole box

$$45 \times 6 = 270\ boxes$$

(c) Calculate the volume of the space that remained.

Volume of the box P

$$V = L \times W \times H$$
$$= 90cm \times 54cm \times 62cm$$
$$= 4860cm^2 \times 62cm$$
$$= 301320cm^3$$

Volume of 270 small boxes

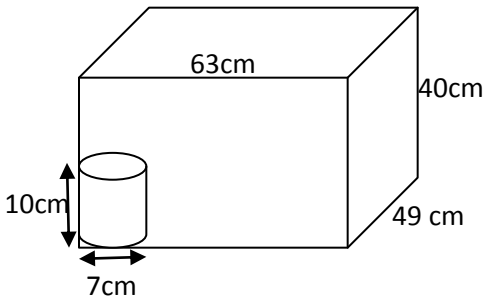
$$V = S \times S \times S \times 270$$
$$= 10cm \times 10cm \times 10cm \times 270$$
$$= 1000cm^3 \times 270$$
$$= 270,000cm^3$$

Volume of the remaining space

$$301,320cm^3$$
$$-270,000cm^3$$
$$31,320cm^3$$

SUBTOPIC: Packing cylinders in boxes

Tins of wood glue were packed in the box as shown below.



Mathematics Answer Key

(a) How many tins were packed in the box altogether?

Along the length

$\frac{63cm}{7cm} = 9\ tins$

Along the width

$\frac{49cm}{7cm} = 7tins$

Along the height

$\frac{40cm}{10cm} = 4\ tins$

No. of tins

$9 \times 7 \times 4 = 252\ tins$

(b) Calculate the volume of the space that was left after packing.

Volume of the box

$\boldsymbol{V = L \times W \times H}$

$\boldsymbol{= 63cm \times 49cm \times 40cm}$

$\boldsymbol{= 3087cm^2 \times 40cm}$

$\boldsymbol{= 123,480cm^3}$

Volume of 252 tins

$\boldsymbol{V = \pi r^2 h \times 252}$

$\boldsymbol{= \frac{22}{7} \times \frac{7cm}{2} \times \frac{7cm}{2} \times 10cm \times 252}$

$\boldsymbol{= 77cm^2 \times 5cm \times 252}$

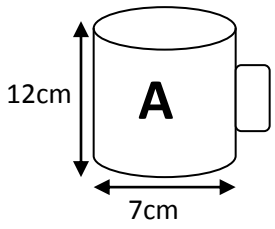
$\boldsymbol{= 97,020cm^3}$

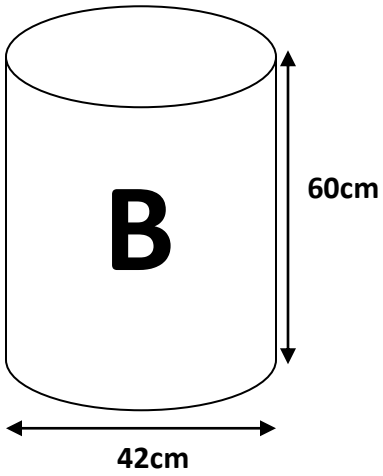
Volume of the remaining space

$\boldsymbol{123,480cm^3 - 97,020cm^3 = 26,460cm^3}$

SUB TOPIC: Comparing volume

At a party, milk was served using cups of size A from container B as shown below.





(a) How many full cups of milk were served to the visitors?

$\frac{\boldsymbol{volume\ of\ B}}{\boldsymbol{volume\ of\ A}}$

$\frac{\boldsymbol{\pi r^2 h}}{\boldsymbol{\pi r^2 h}}$

$\frac{\frac{22}{7} \times \frac{42cm}{2} \times \frac{42cm}{2} \times 60cm}{\frac{22}{7} \times \frac{7cm}{2} \times \frac{7cm}{2} \times 12cm}$

$\frac{11 \times 6cm \times 21cm \times 60cm}{11cm \times 7cm \times 6cm}$

3×60

$\boldsymbol{180\ full\ cups}$

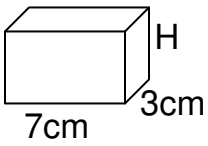
(b) If each visitor drank two cups, how many visitors attended the party?

$\boldsymbol{180 \div 2 = 90\ visitors}$

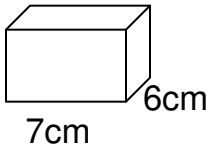
Mathematics is the Key

TOPICAL QUESTIONS

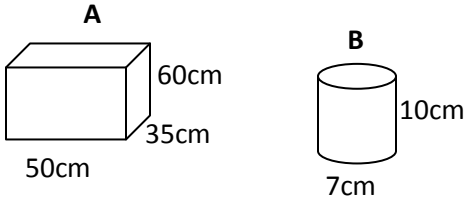
1. How many centimeters are in 0.75 metres?
2. The circumference of a circle is 17.584cm. Find the radius of the circle
   (Use $\pi = 3.14$)
3. A cylindrical tank is 7m high. What is the capacity (in litres) of the tank if its radius is 7m?
4. The volume of the figure below is $105cm^3$. Find its height.



5. Find the base area of the figure below.



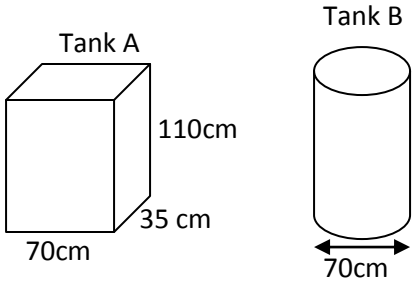
6. Given that the cylindrical tins B are to be packed into box A.



(a) How many tins will be packed in the box?
(b) If container A is a tank full of water, how many full cups of container B can you draw from the tank?

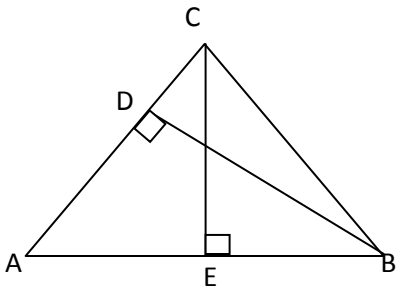
7. Abdul cut out circular plates of diameter 7cm from a rectangular sheet of metal of length 45cm and width 35cm as shown below.
   (a) How many circular plates did he cut out from the rectangular sheet?
   (b) Find the area of the unused sheet after cutting out the circular plates.
   (take $\pi = \frac{22}{7}$)

8. A cuboid water tank (A) which is 70cm long by 35cm wide by 110cm high was filled with water. The water from tank A was all poured into the cylindrical tank B of diameter 70cm

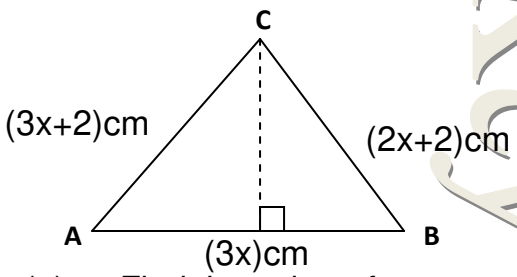


   (a) Find the volume of water in tank A when fill.
   (b) Find the new height of water after it has been poured into tank B. (take $\pi = \frac{22}{7}$)

9. In the triangle below, AB = 12cm, CE = 10cm and AC = 16cm. Find the length of BD in cm.



10. The figure ABC below is an isosceles triangle. Use it to answer the questions that follow.



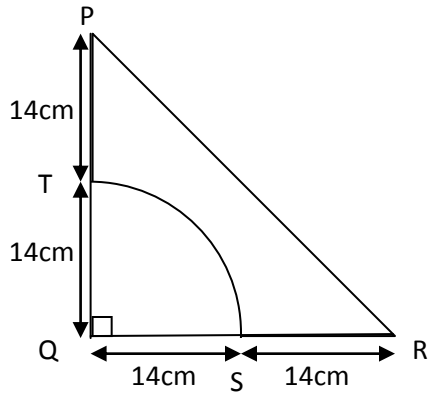
   (a) Find the value of x.
   (b) Find the area of triangle ABC

Mathematics is the key

(c) Calculate the perimeter of the triangle.

(d) Find the circumference of a circular compound whose radius is 14m. (take $\pi = \frac{22}{7}$)

11. In the figure below, PQ = QR = 28cm use it to answer the questions that follow.



(a) Find the area of triangle PQR.
(b) Find the area of the sector QST
(c) What is the area of the shaded part?

Mathematics is the Key

ALGEBRA

SUB TOPIC: SUBSTITUTITON

CONTENT: Substituting or replacement of letters with numbers

1. $If\ a = 5, b = 4\ and\ c = 0$
$Find\ the\ value\ of\ a + b + c$
$\mathbf{5 + 4 + 0}$
$\mathbf{9 + 0}$
$\mathbf{9}$

2. $Given\ that\ x = 2\ and\ y = -2$
$Evaluate\ x - y$
$\mathbf{(x) - (y)}$
$\mathbf{2 - (-2)}$
$\mathbf{2 + 2}$
$\mathbf{4}$

3. $Given\ a = \frac{3}{4}, b = \frac{1}{3}. Find\ the\ value\ of\ a + b$
$\mathbf{(a) + (b)}$
$\mathbf{\frac{3}{4} + \frac{1}{3}}$
$\mathbf{\frac{9 + 4}{12}}$
$\mathbf{\frac{13}{12}}$
$\mathbf{1\frac{1}{12}}$

4. $4. If\ y = 2,$
$(a). what\ is\ the\ value\ of\ 3y^2?$
$\mathbf{3y^2 = 3 \times y \times y}$
$\mathbf{= 3 \times 2 \times 2}$
$\mathbf{= 3 \times 4}$
$\mathbf{= 12}$
$\mathbf{(b)} what\ is\ the\ value\ of\ (3y)^2?$
$\mathbf{(3y)^2 = 3y \times 3y}$
$\mathbf{= 3 \times 2 \times 3 \times 2}$
$\mathbf{= 6 \times 6}$
$\mathbf{= 36}$

5. $Given\ that\ a = 3, b = 4\ and\ c = 5$
$(a). What\ is\ 3a\ x\ 3b$
$(b) What\ is\ c\ (b - a)$

6. $If\ m = 2, what\ is\ the\ value\ of\ m^6?$

7. $If\ a = ½, c = \frac{2}{3}\ and\ d =$
$¼. Evaluate\ ac + d$

8. $If\ m = 4, n = 3\ and\ p =$
$2, what\ is\ \frac{n^3\ x\ m^2}{mp}$

REFERENCE
A New MK Primary Mathematics 2000 Bk 7 Pg 434 (New Edition)

SUB TOPIC: Collecting and simplifying like terms

Examples:

1. $a + a + a = 3a$

2. $2p + 3p + p = 6p$

3. $2ab + ab + 5ab = 8ab$

4. $x + y + x + y + x$
$x + x + x + y + y$
$\underline{3x + 2y}$

5. $3p - 6f - p + 2f$
$3p - p + 2f - 6f$
$\underline{2p - 4f}$

Simplify the following
(a) $2m + m + 4m$
(b) $6k + 4p - 3k - 5p$
(c) $2xy - y + 5xy - y$

REFERENCE
A New MK Primary Mathematics 2000 Bk 7 Pg 430 & 431 (New Edition)

Mathematics is the Key

SUB TOPIC: Addition and subtraction

1. **Simplify the following**

(a) $\frac{2m}{3} + \frac{m}{2}$

$\frac{2m}{3} \times \frac{2}{2} + \frac{m}{2} \times \frac{3}{2}$

$\frac{4m}{6} + \frac{3m}{6}$

$\frac{4m + 3m}{6}$

$\frac{7m}{6}$

$1\frac{1}{6}m$

(b) $p - \frac{p}{3}$

$\frac{p}{1} - \frac{p}{3}$

$\frac{\frac{p}{1} \times 3 - \frac{p}{3} \times 3}{3}$

$\frac{3p - p}{3}$

$\frac{2p}{3}$

2. Simplify the following

(a) $\frac{3d}{4} + d + \frac{d}{2}$

(b) $\frac{3r}{7} - \frac{2r}{6} + \frac{r}{4}$

REFERENCE

A New MK Primary Mathematics 2000 Bk 7 Pg 435 (New Edition)

SUB TOPIC: multiplication and division

1. **Simplify the following.**

(a) $\frac{3k}{7} \times \frac{1}{6}$

$\frac{3k}{7} \times \frac{1}{6}$

$\frac{3k}{42}$

$\frac{k}{14}$

(b) $\frac{4m}{11} \div \frac{m}{15}$

$\frac{4m}{11} \div \frac{m}{15}$

$\frac{4m}{11} \times \frac{15}{m}$

$\frac{60}{11}$

$5\frac{5}{11}$

(c) $\frac{6x}{9} \times \frac{1}{2} \div \frac{x}{4}$

(d) $\frac{3b}{13} \times \frac{3b}{5}$

SUB TOPIC: Factorising completely

Examples

1. ***Factorise*** $4xy - 12y$ ***completely***

2	$4xy$	$-12y$
2	$2xy$	$-6y$
y	xy	$-y$
	x	-1

$2 \times 2 \times y(x - 1)$

$\underline{4y(x - 1)}$

2. ***Factorise*** $2\pi r^2 + 2\pi rh$ ***completely***

2	$2\pi r^2$	$2\pi rh$
π	πr^2	πrh
r	r^2	rh
	r	h

$2 \times \pi \times r(r + h)$

$\underline{2\pi r(r + h)}$

3. **Factorise the following completely.**

(a) $4mn - 18mn^2$

(b) $3a + 12ab - 18$

Mathematics is the Key

SUB TOPIC: Removing brackets

REMEMBER:

- *When removing brackets, multiply the factor by every term inside brackets.*
- *A negative integer before brackets affects every sign inside brackets.*
- *A positive integer before brackets cannot affect the signs inside brackets.*

Remove the brackets and simplify.
Example:

1. $3(x + y)$
   $3(x + y)$

   $\underline{3x + 3y}$

2. $2(a - b)$
   $2(a - b)$
   $\underline{2a - 2b}$

3. $\mathbf{4(2x - 6)}$
4. $\mathbf{-9(m - 4)}$

5. $Add: x + 4\ to\ x + 1$
   $(x + 4) + (x + 1)$
   $X + 4 + x + 1$
   $X + x + 4 + 1$
   $\underline{2x + 5}$

6. $Subtract\ y - 1\ from\ 2y + 3$
   $(2y + 3) - (y - 1)$
   $2y + 3 - y + 1$
   $2y - y + 3 + 1$
   $\underline{y + 4}$

7. $Add.x - 4\ to\ 3x - 5$
8. $Subtract\ 3p - 1\ from\ 5p - 3$
9. $Find\ the\ supplement\ of\ (x - 20)°$

REFERENCE
A New MK Primary Mathematics 2000 Bk 7 Pg 432,433 & 434 (New Edition)

SUB TOPIC: Removing brackets involving fractions

Example:
Remove brackets and simplify

1. $\frac{1}{3}(3a + 9b)$
   $\frac{1}{3}(3a + 9b)$
   $(\frac{1}{3} \times 3a) + (\frac{1}{3} \times 9b)$
   $\underline{a + 3b}$

2. $\frac{3}{4}(8m - 12p)$
   $\frac{3}{4} \times 8m - \frac{3}{4} \times 12p$
   $3 \times 2m - 3 \times 3p$
   $\underline{6m - 9p}$

3. $Half\ of\ (2x + 4y)\ plus\ a\ third\ of\ (6x + 9y)$
   $\frac{1}{2}(2x + 4y) + \frac{1}{3}(6x + 9y)$
   $\frac{1}{2} \times 2x + \frac{1}{2} \times 4y + \frac{1}{3} \times 6x + \frac{1}{3} \times 9y$
   $x + 2y + 2x + 3y$
   $x + 2x + 2y + 3y$
   $\underline{3x + 5y}$

Mathematics is the Key

4. $Subtract\ \frac{1}{2}(4x - 2y)\ from\ \frac{1}{3}(6x - 9y)$

$\frac{1}{3}(6x - 9y) - \frac{1}{2}(4x - 2y)$

$\frac{1}{3}\ x\ 6x - \frac{1}{3}\ x\ 9y - \frac{1}{2}\ x\ 4x + \frac{1}{2}\ x\ 2y$

$2x - 3y - 2x + y$

$2x - 2x - 3y + y$

$\underline{-2y}$

5. $Subtract\ \frac{2}{3}(6x - 3y)\ from\ \frac{1}{4}(8x - 12y)$
6. Remove brackets and simplify. $\frac{2}{5}(5x + 15y) - \frac{1}{6}(12x - 24y)$

REFERENCE

A New MK Primary Mathematics 2000 Bk 7 Pg 436 (New Edition)

SUB TOPIC: *POWERS or INDICES(Addition and subtraction with powers)*

Example:

Simplify the following

1. $\mathbf{2^2 + 2^4}$

$(2\ x\ 2) + (2\ x\ 2\ x\ 2\ x\ 2)$

$2\ x\ 2 + 2\ x\ 2\ x\ 2\ x\ 2$

$\underline{20}$

2. $\boldsymbol{p^2 + p^2}$

$p^2 + p^2$

$\underline{2p^2}$

3. $\mathbf{3m^3 + 4m^3}$

$3m^3 + 4m^3$

$\underline{7m^3}$

4. $\mathbf{3p^2 - 2p^3}$

$3p^2 - 2p^3 (they\ are\ unlike\ terms)$

5. $\mathbf{4m^2 - m^2}$
6. $\mathbf{20k^4 + 17k^4}$
7. $\boldsymbol{b^5 - b^3}$

REFERENCE

A New MK Primary Mathematics 2000 Bk 7 Pg 441 (New Edition)

SUB TOPIC: POWERS or INDICES (multiplication of powers with similar bases)

NOTE:
When multiplying powers with similar bases, write a single base and add the powers.

Example:

Simplify the following

a) $4^3\ x\ 4^2$

$\mathbf{4 \times 4 \times 4 \times 4 \times 4}$

$\mathbf{4^5}$

OR

$\mathbf{4^3\ x\ 4^2}$

$\mathbf{4^{3+2}}$

$\mathbf{4^5}$

b) $x^3 \times x^2$

$\boldsymbol{x \times x \times x \times x \times x}$

$\boldsymbol{x^5}$

OR

$\boldsymbol{x^3 \times x^2}$

$\boldsymbol{x^{3+2}}$

$\boldsymbol{x^5}$

Simplify the following

(a) $\boldsymbol{m^2 \times m \times m^4}$

(b) $\mathbf{3^2 \times 3^5}$

(c) $\boldsymbol{b^7 \times b^6}$

Mathematics is the Key

REFERENCE

A New MK Primary Mathematics 2000 Bk 7 Pg 442 (New Edition)

SUB TOPIC: *POWERS or INDICES*
(Division of powers with similar bases)

NOTE:
When dividing powers with similar bases, write a single base and subtract the powers.

Example:
Simplify the following.

1. $3^4 \div 3^2$

$$\frac{3 \times 3 \times 3 \times 3}{3 \times 3}$$
$$3^2$$

OR

$$3^4 \div 3^2$$
$$3^{4-2}$$
$$\underline{\underline{3^2}}$$

2. $p^8 \div p^2$

$$\frac{p \times p \times p \times p \times p \times p \times p \times p}{p \times p}$$
$$p \times p \times p \times p \times p \times p$$
$$p^6$$

OR

$$p^8 \div p^2$$
$$p^{8-2}$$
$$p^6$$

3. $n^7 \div n^9$

$$\frac{n \times n \times n \times n \times n \times n \times n}{n \times n \times n \times n \times n \times n \times n \times n \times n}$$
$$\frac{1}{n \times n}$$
$$\frac{1}{n^2}$$
$$n^{-2}$$

OR

$$n^7 \div n^9$$
$$n^{7-9}$$
$$n^{-2}$$

4. **Simplify the following**
   (a). $m^2 \div m$
   (b). $3^2 \div 3^5$
   (c). $b^3 \div b^6$

REFERENCE

A New MK Primary Mathematics 2000 Bk 7 Pg 442 (New Edition)

SUB TOPIC: *POWERS or INDICES*
(Multiplication and Division of powers with similar bases)

1. Simplify the following.

i. $\frac{k^4 \times k^3}{k^5}$

$$(k^4 \times k^3) \div k^5$$
$$(k^{4+3}) \div k^5$$
$$k^7 \div k^5$$
$$k^{7-5}$$
$$k^2$$

ii. $\frac{w^3 \times w^0 \times w^6}{w^{10}}$

iii. $\frac{p^5 \times p^3}{p^4}$

Mathematics is the Key

SUB TOPIC: POWERS or INDICES (Solving for un known powers)

1. Solve for the unknowns

(a) $2^x = 8$

$2^x = 8$

$2^x = 2^3$

$\underline{x = 3}$

2	8
2	4
2	2
	1

$8 = 2^3$

(b) $3^m \times 3^2 = 81$

$3^m \times 3^2 = 81$

$3^{m+2} = 3^4$

$m + 2 = 4$

$m + 2 - 2 = 4 - 2$

$\underline{m = 2}$

3	81
3	27
3	9
3	3
	1

$81 = 3^4$

(c) $4^{2x} \div 16 = 64$

$4^{2x} \div 16 = 64$

$4^{2x} \div 4^2 = 4^3$

$4^{2x-2} = 4^3$

$2x - 2 = 3$

$2x - 2 + 2 = 3 + 2$

$2x = 5$

$\frac{2x}{2} = \frac{5}{2}$

$x = 2\frac{1}{2}$

4	64
4	16
4	4
	1

$64 = 4^3$

4	16
4	4
	1

$16 = 4^2$

(d) $5^k = 125$

(e) $2^{m+4} \times 8 = 1$

SUB TOPIC: Solving simple equations.

Example: Solve the following equations

a) $\boldsymbol{x + 5 = 13}$

$\boldsymbol{x + 5 - 5 = 13 - 5}$

$\underline{\boldsymbol{x = 8}}$

b) $\boldsymbol{2x + 6 = 18}$

$\boldsymbol{2x + 6 - 6 = 18 - 6}$

$\boldsymbol{2x = 12}$

$\frac{\boldsymbol{2x}}{\boldsymbol{2}} = \frac{\boldsymbol{12}}{\boldsymbol{2}}$

$\underline{\boldsymbol{x = 6}}$

c) $\boldsymbol{y - 3 = 5}$

$\boldsymbol{y - 3 + 3 = 5 + 3}$

$\underline{\boldsymbol{y = 8}}$

d) $\boldsymbol{3a - 8 = 7}$

$\boldsymbol{3a - 8 + 8 = 7 + 8}$

$\boldsymbol{3a = 15}$

$\frac{\boldsymbol{3a}}{\boldsymbol{3}} = \frac{\boldsymbol{15}}{\boldsymbol{3}}$

$\underline{\boldsymbol{a = 5}}$

e) $\boldsymbol{6m = 24}$

f) $\boldsymbol{5k - 3 = 37}$

g) $\boldsymbol{4 - x = 7}$

h) $\boldsymbol{16 = 9 + 2p}$

REFERENCE

A New MK Primary Mathematics 2000 Bk 7 Pg 452 - 456 (New Edition)

SUB TOPIC: Solving equations involving brackets.

Solve the following equations

a) $2(m + 4) = 20$

$\boldsymbol{2(m + 4) = 20}$

$\boldsymbol{2m - 8 = 20}$

$\boldsymbol{2m - 8 + 8 = 20 + 8}$

$\boldsymbol{2m = 28}$

$\frac{\boldsymbol{2m}}{\boldsymbol{2}} = \frac{\boldsymbol{28}}{\boldsymbol{2}}$

$\underline{\boldsymbol{m = 14}}$

b) $2(k - 2) - 3(k - 4) = -10$

$\boldsymbol{2(k - 2) - 3(k - 4) = -10}$

$\boldsymbol{2k - 4 - 3k + 12 = -10}$

$\boldsymbol{2k - 3k - 4 + 12 = -10}$

$\boldsymbol{-k + 8 = -10}$

$\boldsymbol{-k + 8 - 8 = -10 - 8}$

$\boldsymbol{-k = -18}$

$\frac{\boldsymbol{-k}}{\boldsymbol{-1}} = \frac{\boldsymbol{-18}}{\boldsymbol{-1}}$

$\underline{\boldsymbol{k = 18}}$

Mathematics is the Key

c) $6(z-4)=0$

d) $3x-(2-x)=14$

e) $5(m-2)+6(m-3)=16$

SUB TOPIC: Solving equations involving fractions

When solving fractional equations, multiply the LCD (LCM of the denominators) on each algebraic term.

Solve the following equations

1. $\frac{1}{2}p = 6$

$$\frac{1}{2}\boldsymbol{p} = \boldsymbol{6}$$
$$\boldsymbol{LCD = 2}$$
$$\boldsymbol{2 \times \frac{p}{2} = 6\,x\,2}$$
$$\underline{\boldsymbol{p = 12}}$$

2. $\frac{13t}{3} + 2 = 15$

$$\frac{\boldsymbol{13\,t}}{\boldsymbol{3}} + \frac{\boldsymbol{2}}{\boldsymbol{1}} = \frac{\boldsymbol{15}}{\boldsymbol{1}}$$
$$\boldsymbol{LCD = 3}$$
$$\boldsymbol{3 \times \frac{13t}{3} + \frac{2}{1} \times 3 = \frac{15}{1} \times 3}$$
$$\boldsymbol{13t + 6 = 45}$$
$$\boldsymbol{13t + 6 - 6 = 45 - 6}$$
$$\boldsymbol{13t = 39}$$
$$\boldsymbol{\frac{13t}{13} = \frac{39}{13}}$$
$$\underline{\boldsymbol{t = 13}}$$

3. $0.4P + 0.5 = 2.1$

$$\boldsymbol{\frac{4P}{10} + \frac{5}{10} = \frac{21}{10}}$$
$$\boldsymbol{10 \times \frac{4P}{10} + \frac{5}{10} \times 10 = \frac{21}{10} \times 10}$$
$$\boldsymbol{4p + 5 = 21}$$
$$\boldsymbol{4p + 5 - 5 = 21 - 5}$$
$$\boldsymbol{4p = 16}$$
$$\boldsymbol{\frac{4p}{4} = \frac{16}{4}}$$
$$\underline{\boldsymbol{P = 4}}$$

4. $3x + 7 - \frac{3x}{4} = 10$

$$\boldsymbol{\frac{3x}{1} + \frac{7}{1} - \frac{3x}{4} = \frac{10}{1}}$$
$$\boldsymbol{LCD = 4}$$
$$\boldsymbol{4 \times \frac{3x}{1} + \frac{7}{1} \times 4 - \frac{3x}{4} \times 4 = \frac{10}{1} \times 4}$$
$$\boldsymbol{12x + 28 - 3x = 40}$$
$$\boldsymbol{12x - 3x + 28 = 40}$$
$$\boldsymbol{9x + 28 = 40}$$
$$\boldsymbol{9x + 28 - 28 = 40 - 28}$$
$$\boldsymbol{\frac{9x}{9} = \frac{12}{9}}$$
$$\boldsymbol{x = 1\frac{1}{3}}$$

5. $\frac{3m}{4} = 9$
6. $\frac{2p}{3} - p = 5$
7. $\frac{2k}{5} + k = 12$
8. $1.5y - 2.5 = 5.0$
9. $2p - 5 - \frac{3p}{5} = 10$

REFERENCE

A New MK Primary Mathematics 2000 Bk 7 Pg 457 (New Edition)

Mathematics is the Key

SUB TOPIC: Solving more equations involving fractions.

Examples:

Solve the following equations

1. $\frac{m+1}{3} + \frac{m}{4} = 2$

$$\frac{\boldsymbol{m+1}}{\boldsymbol{3}} + \frac{\boldsymbol{m}}{\boldsymbol{4}} = \boldsymbol{2}$$

$$\boldsymbol{LCD = 12}$$

$$\boldsymbol{12 \times \frac{m+1}{3} + \frac{m}{4} \times 12 = 2 \times 12}$$

$$\boldsymbol{4(m+1) + m \times 3 = 2 \times 12}$$

$$\boldsymbol{4m + 4 + 3m = 24}$$

$$\boldsymbol{4m + 3m + 4 = 24}$$

$$\boldsymbol{7m + 4 = 24}$$

$$\boldsymbol{7m + 4 - 4 = 24 - 4}$$

$$\boldsymbol{7m = 20}$$

$$\boldsymbol{\frac{7m}{7} = \frac{20}{7}}$$

$$\boldsymbol{m = 2\frac{6}{7}}$$

2. $\frac{(3x+1)}{4} = \frac{(x+2)}{2}$

$$\frac{(3x+1)}{4} = \frac{(x+2)}{2}$$

$$LCD = 4$$

$$4 \times \frac{(3x+1)}{4} = \frac{(x+2)}{2} \times 4$$

$$3x + 1 = 2(x + 2)$$

$$3x + 1 = 2x + 4$$

$$3x + 1 - 1 = 2x + 4 - 1$$

$$3x = 2x + 3$$

$$3x - 2x = 2x - 2x + 3$$

$$\underline{x = 3}$$

3. $\frac{3x-1}{4} = = \frac{7x+1}{6}$

4. $\frac{w-5}{3} - w = \frac{2w+4}{5}$

5. $\frac{3}{k+3} = \frac{2}{2k-5}$

REFERENCE

A New MK Primary Mathematics 2000 Bk 7 Pg 461,462 (New Edition)

SUB TOPIC: *Solving equations involving squares and square roots*

Examples:

Solve the following equations

1. $m^2 - 4 = 21$

$$\boldsymbol{m^2 - 4 = 21}$$

$$\boldsymbol{m^2 - 4 + 4 = 21 + 4}$$

$$\boldsymbol{m^2 = 25}$$

$$\boldsymbol{\sqrt{m^2} = \sqrt{25}}$$

$$\underline{\boldsymbol{m = 5}}$$

2. $\frac{1}{2} p^2 = 8$

$$\tfrac{1}{2}\boldsymbol{p^2 = 8}$$

$$\boldsymbol{2 \times \frac{p^2}{2} = 8 \times 2}$$

$$\boldsymbol{p^2 = 16}$$

$$\boldsymbol{\sqrt{p^2} = \sqrt{16}}$$

$$\underline{\boldsymbol{p = 4}}$$

3. $\sqrt{2k} = 14$

$$\boldsymbol{\sqrt{2k} = 14}$$

$$\boldsymbol{\sqrt{2k}^2 = 14^2}$$

$$\boldsymbol{2k = 196}$$

$$\boldsymbol{\frac{2k}{2} = \frac{196}{2}}$$

$$\underline{\boldsymbol{k = 98}}$$

4. $\frac{1}{4} x^2 = 16$

$$\tfrac{1}{4}\boldsymbol{x^2 = 16}$$

$$\boldsymbol{4 \times \frac{x^2}{4} = 16 \times 4}$$

$$\boldsymbol{x^2 = 64}$$

$$\boldsymbol{\sqrt[2]{x^2} = \sqrt[2]{64}}$$

$$\underline{\boldsymbol{x = 8}}$$

Mathematics is the Key

5. $b^2 = 49$
6. $6m^2 = 54$
7. $2w^2 - 18 = 224$
8. $\frac{2p^2}{3} = 54$

A New MK Primary Mathematics 2000 Bk 7 Pg 461 & 460 (New Edition)

SUB TOPIC: Forming and solving equations

Example:

1. Baker bought 2kg of suagr at sh. 3p and 1kg of salt at sh (p + 200). Find P if Baker paid sh 3700.

The cost of 2kg of sugar is
$sh\ (2\ x\ 3p) = sh\ 6p$
The cost of 1kg of salt is
$sh\ (p\ +\ 200)$

$$Sh6p + sh.p + shs.200 = shs.3700$$
$$Sh7p + sh.200 = sh.3700$$
$$Sh7p + sh.200 - shs.200 = sh.3700 - sh.200$$
$$Sh.7p = sh.3500$$
$$\frac{Sh.7p}{sh.7} = \frac{sh.3500}{sh.7}$$
$$\underline{p = 500}$$

2. **In a market, the cost of a pawpaw is sh.800 more than the cost of a mango. A mango costs two thirds the cost of a pine apple. The total cost of three fruits is sh 4300. Calculate the cost of a pineapple.**

Let the cost of a pineapple be m

pawpaw	*pineapple*	*mango*
$\frac{2}{3}m + sh.800$	m	$\frac{2}{3}m$

$$m + \frac{2}{3}m + \frac{2}{3}m + sh.800 = sh.4,300$$
$$\frac{m}{1} + \frac{2m}{3} + \frac{2m}{3} + \frac{sh.800}{1} = \frac{sh.4,300}{1}$$
$$\frac{m}{1} \times 3 + \frac{4m}{3} \times 3 + \frac{sh.800}{1} \times 3 = \frac{sh.4300}{1} \times 3$$
$$3m + 4m + sh.2,400 = sh.12,900$$
$$7m + sh.2,400 = sh.12,900$$
$$7m + sh.2,400 - sh.2,400 = sh.12,900 - sh.2,400$$
$$7m = sh.10,500$$

Mathematics is the Key

$$\frac{7m}{7} = \frac{sh.10,500}{7}$$
$$\underline{m = sh.1,500}$$

Let the cost of a mango be k

pawpaw	*pineapple*	*mango*
$k + sh.800$	$\frac{3}{2}k$	k

$$k + \frac{3}{2}k + k + sh.800 = sh.4,300$$
$$\frac{k}{1} + \frac{3k}{2} + \frac{k}{1} + \frac{sh.800}{1} = \frac{sh.4,300}{1}$$
$$\frac{k}{1} \times 2 + \frac{3k}{2} \times 2 + \frac{k}{1} \times 2 + \frac{sh.800}{1} \times 2 = \frac{sh.4300}{1} \times 2$$
$$2k + 3k + 2k + sh.1,600 = sh.8,600$$
$$7k + sh.1,600 = sh.8,600$$
$$7k + sh.1,600 - sh.1,600 = sh.8,600 - sh.1,600$$
$$7k = sh.7,000$$
$$\frac{7k}{7} = \frac{sh.7,000}{7}$$
$$\underline{k = sh.1,000}$$
pineapple
$$\frac{3}{2} \times sh.1,000$$
$$\frac{3 \times sh.500}{1}$$
$$\underline{sh.500}$$

Let the cost of a pawpaw be w

pawpaw	*pineapple*	*mango*
w	$\frac{3}{2}(w - sh.800)$	$w - sh.800$

$$w + \frac{3}{2}(w - sh.800) + w - sh.800 = sh.4,300$$
$$\frac{w}{1} + \frac{3(w - sh.800)}{2} + \frac{w}{1} - \frac{sh.800}{1} = \frac{sh.4,300}{1}$$
$$\frac{w}{1} \times 2 + \frac{3(w - sh.800)}{2} \times 2 + \frac{w}{1} \times 2 - \frac{sh.800}{1} \times 2 = \frac{sh.4300}{1} \times 2$$
$$2w + 3(w - sh.800) + 2w - sh.1,600 = sh.8,600$$
$$2w + 3w - sh.2,400 + 2w + sh.1,600 = sh.8,600$$
$$7w - sh.1,600 - sh,2,400 = sh.8,600$$
$$7w - sh.4,000 + sh.4,000 = sh.8,600 + sh.4,000$$

Mathematics is the Key

$7w = sh.12,600$

$\frac{7w}{7} = \frac{sh.12,600}{7}$

$\underline{w = sh.1,800}$

pineapple

$\frac{3}{2}(w - sh.800)$

$\frac{3}{2}(sh.1800 - sh.800)$

$\frac{3}{2} \times sh.1,000$

$3 \times sh.5,00$

$\underline{sh.1,500}$

3. **A cup costs twice as much as a fork and a plate costs sh.600 more than a fork. If the total cost of all the three items is sh.3600, find the cost of each item.**

4. **James, Joan and Peter shared a certain amount of money. James got three times as much as Peter. Joan got sh.900 more than Peter. If Peter and James got sh.2,800, how much did Joan get?**

REFERENCE

A New MK Primary Mathematics 2000 Bk 7 Pg 464 (New Edition)

SUBTOPIC: Application of algebra in ages

Examples.

1. **Amon is twice as old as Bob. If their total age is 33 years. How old is each?**

Let Bob's age be A

Amon	*Bob*	*TL*
$2A$	A	33years

$2A + A = 33$

$3A = 33$

$\frac{3A}{3} = \frac{33}{3}$

$A = 11years$

Amon	*Bob*
$2A$ $2 \times 11 = 22yrs$	A $11years$

Mathematics is the Key

2. **A father is 18years older than his son. In 5 years ,their total age will be 48years. How old is each?**

Let the son's age be m

	father	son	TL
now	$m+18$	m	
then	$m+18+5$	$m+5$	48years

$$m+18+5+m+5=48years$$
$$m+m+18+10=48years$$
$$2m+28=48years$$
$$2m+28-28=48-28$$
$$2m=20$$
$$\frac{2m}{2}=\frac{20}{2}$$
$$\underline{m=10years}$$

father	son
$m+18$ $10+18=28yrs$	$10years$

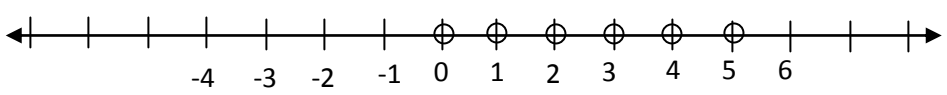
3. Jacob is 10 years younger than Jerome. Six years ago, Jerome was twice as old as Jacob. How old is Jacob?
4. A son is a half of his mother's age while the daughter is a third of his mothers age. If the total age of the son and the daughter is 30 years, how old is the mother?
5. The father is 25 years old and the son is 5 years old.
   (a) In how many years time will the father be thrice as old as the son.?
   (b) How old will the father be then?
6. January is a third as old as march. Four years ago the ratio of their age was 1:5.How old is each now?

SUB TOPIC: Writing solution sets

Examples:

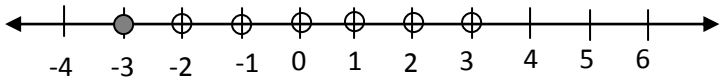
1. Write down the integers for the following inequalities.

(i) $x < 6$



$\underline{x = \{5,4,3,2,1,0,-1 \ldots.\}\ (infinite\ set)}$

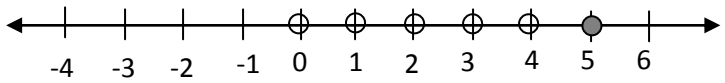
(ii) $m \geq -3$



$\underline{m = \{-3,-2,-1,0,1,2 \ldots.\}\ (infinite\ set)}$

Mathematics is the Key

(iii) $k \leq 5 (where\ k\ is\ a\ whole\ number)$



$k = \{5,4,3,2,1,0\}$

2. Write the solution sets for the following

h≥ 9

b< −4

y≤ −5

A New MK Primary Mathematics 2000 Bk 7 Exercise 6:1 Pg 71 (New Edition)

SUB TOPIC: Solving inequalities and writing their solution sets

When diving by a negative co-efficient, the sign changes at the step of division.

Examples:

Solve the following and write the solution set

1. $4X > 20$

$4X > 20$

$\frac{4X}{4} > \frac{20}{4}$

$X > 5$

$X = \{6, 7, 8, 9, 10 \ldots.\}$

2. $-4m > 20$

$-4m > 20$

$\frac{-4m}{-4} < \frac{20}{-4}$

$m < -5$

$\boldsymbol{m = \{-6, -7, -8, -9 \ \ldots\}}$

3. $3x + 6 < 9$

$3x + 6 - 6 < 9 - 6$

$3x < 3$

$\frac{3x}{3} < \frac{3}{3}$

$X < 1$

$x = \{0, -1, -2, -3, \ldots.\}$

Mathematics is the Key

4. $\frac{x}{7} - 5 > -4$

$\frac{x}{7} - 5 > -4$

$7 \times \frac{x}{7} - 5 \times 7 > -4 \times 7$

$x - 35 > -28$

$x - 35 + 35 > -28 + 35$

$x > 7$

$\underline{x = \{8, 9, 10, 11, \ldots.\}}$

Solve the following and write the solution sets

a) $5m < 20$
b) $6p > -18$
c) $2(x + 1) > 4$
d) $3(2x + 3) < 18$
e) $3y + 2 < 11$
f) $4 - k \geq 9$
g) $\frac{2w}{3} - 12 > 0$

REFERENCE

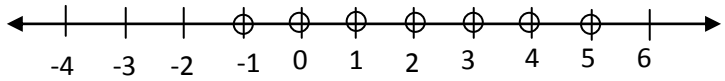
A New MK Primary Mathematics 2000 Bk 7 Exercise 6:3 and 6:4 Pg 74 (New Edition)

SUB TOPIC: Compound inequalities(writing solution sets)

Examples

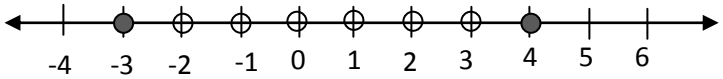
1. Write the solution set for

(a) $-2 < d < 6$



$\underline{d = \{-1,0,1,2,3,4,5\}}$

(b) $4 \geq m \geq -3$



$\underline{m = \{-3, -2, -1,0,1,2,3,4\}}$

(c) $-6 < w < 2$
(d) $1 < p < 9$
(e) $7 > x - 4$

A New MK Primary Mathematics 2000 Bk 7 Pg 75 (New Edition)

Mathematics is the Key

SUB TOPIC: Solving and writing solution sets with compound inequalities.

Examples

Solve the following and write the solution sets

1. $8 > 2x > 2$

$8 > 2x > 2$

$\frac{8}{2} > \frac{2x}{2} > \frac{2}{2}$

$4 > x > 1$

$\underline{x = \{2, 3\}}$

2. $12 < -3x < 24$

$\mathbf{12} < -3\boldsymbol{x} < 24$

$\frac{\mathbf{12}}{\mathbf{-3}} > \frac{\mathbf{-3x}}{\mathbf{-3}} > \frac{\mathbf{24}}{\mathbf{-3}}$

$\mathbf{-4} > x > -8$

$\underline{\boldsymbol{x = \{-5, -6, -7\}}}$

3. $13 \geq 3x - 2 \geq 4$

$\mathbf{13 \geq 3x - 2 \geq 4}$

$\mathbf{13 + 2 \geq 3x - 2 + 2 \geq 4 + 2}$

$\mathbf{15 \geq 3x \geq 6}$

$\frac{\mathbf{15}}{\mathbf{3}} \geq \frac{\mathbf{3x}}{\mathbf{3}} \geq \frac{\mathbf{6}}{\mathbf{3}}$

$\mathbf{5 \geq x \geq 2}$

$\underline{\boldsymbol{x = \{2, 3, 4, 5\}}}$

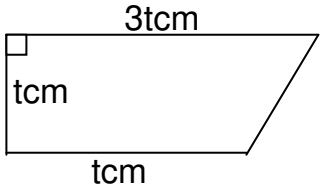
4. $12 > 3m > 3$
5. $15 \leq -5m \leq 40$
6. $-12 \geq 6b > 18$

TOPICAL WORK ON ALGEBRA

1. $Solve: x + 4x = 5$
2. $Find\ the\ value\ of\ \frac{5a - (m - a)}{a}\ when\ a = 3\ and\ m = 6$
3. Solve for b in $\frac{3}{5}(2b - 3) = 3$
4. If $\frac{1}{6}x = 1$. Find the value of x.

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5. Solve $\frac{2x+2}{3} = \frac{x+3}{2}$
6. What is the value of $\frac{bc-d}{c^2}$ when b = 8, c = 3 and d = 6?
7. Solve: $x - 1 = 2x + 5$
8. Simplify: $(3x + 5) - (x + 1)$
9. Solve: ½ $(3y - 2) = \frac{2}{3}(2y + 3)$
10. Solve: $3(p - 4) - 2(3p - 1) = 2p - 15$
11. Simplify: $(4p - 3q) - (2q + p)$
12. Solve: $\frac{12}{x} + 2 = 6$
13. The area of the trapezium is 50cm^2. Find the value of t.



14. Factorise completely: $2xy - 4x$.
15. Given that a = ½, b = $\frac{1}{3}$ and c = ¼ .Find the value of $b + 2c + 3a$.
16. Subtract $2x - 4$ $from$ $5x - 4$
17. Given that $x = 2y + 1$, complete the table.

x	1	……	5	…	9
y	…	1	…	3	…

18. Zahara's mother bought 8 books at shs $(x - 150)$ each and 2 Mathematical sets at $sh(x + 100)$ each. She spent shs 5300 altogether. Find the amount of money spent on books.
19. Tom has three daughters; Amanda, Brenda and Kate. Brenda is 2 years younger than Amanda, Kate's age is ½ that of Brenda. The total age of the three girls is 27 years. How old is Kate?
20. Find the solution set for the following inequalities:

(i) $x > 3$ $(ii)x < -5$ $(iii)x < 2$

$(iv)x > 2$ $(v)x < 4$

(ii) Solve and give the solutions for x.

(i) $-3x < -9$ (ii)$-30 < 6x$

(iii) $3x + 2 < 11$ (iv) $4x - 5 < 19$

(iii) Solve and find the solution set for y.$\frac{y}{3} + 4 < 6$

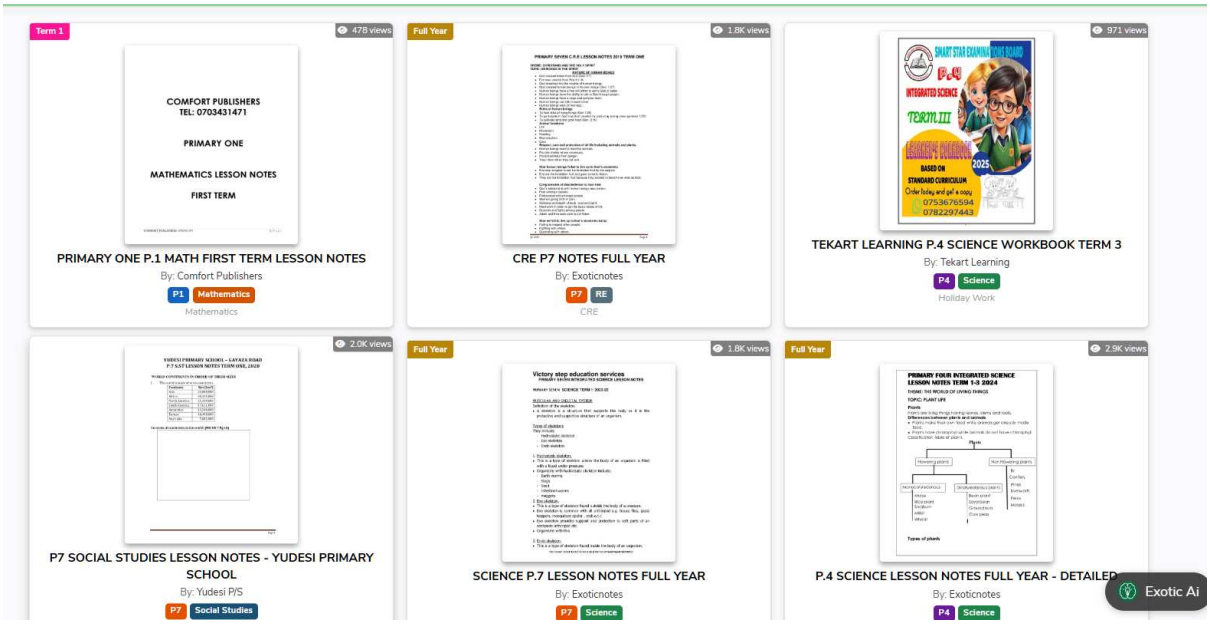
(iv) Solve the inequality below:

$8 > 2x > -4$

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