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P.5 MATHEMATICS LESSON NOTES

SETS

TERM I

Empty sets

- Intersection sets

✓ Intersection of sets on a venn diagram
✓ Number of elements in the intersection set

Union of sets

✓ Union of sets on venn diagram
✓ Number of elements in the union set
✓ Difference/complement of sets
✓ Number of elements in the difference of sets
✓ Describing regions on venn diagram

Subsets

✓ Forming/listing subsets
✓ Finding number of subsets

Application of sets

✓ Comparing elements and number of elements

Probability

✓ Using a coin
✓ Using a dice
✓ Random picking

WHOLE NUMBERS (NUMERACY)

✓ Forming numerals from digits
✓ Place values of whole numbers
✓ Values
✓ Writing numbers in words
✓ Writing numbers in figures
✓ Expanding numbers using, values, place values, powers/exponents
✓ Finding expanded numbers
✓ Rounding off whole numbers to the nearest hundreds

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Roman numerals

- ✓ Hindu Arabic to Roman numerals
- ✓ Roman numerals to Hindu Arabic
- ✓ Operation on Roman numerals
- ✓ Application on Roman numerals

OPERATION ON WHOLE NUMBERS

- ✓ Addition up to 6 – digits
- ✓ Word problems of addition
- ✓ Subtraction up to 6 – digits
- ✓ Word problems of subtraction
- ✓ Multiplication by 2 – digits
- ✓ Word problems of multiplication
- ✓ Division by 2 – digit numbers
- ✓ Word problems of division
- ✓ Combined operations
- ✓ Average/mean

BASES

- ✓ Grouping in base five
- ✓ Place values of bases
- ✓ Writing base in words/figures
- ✓ Expanding bases
- ✓ Changing to base ten
- ✓ Changing to base five
- ✓ Addition of base five
- ✓ Subtraction of base five
- ✓ Multiplication of base five

Finite system

- ✓ Addition of finite 5
- ✓ Subtraction in subtraction
- ✓ Using a dial

NUMBER PATTERNS

- ✓ Groups of numbers
- ✓ whole, even, odd, prime, composite, square, counting, triangular
- ✓ Number sequences

Multiples

- ✓ L.C.M
- ✓ Factors
- ✓ G.C.F / H.C.F / L.C.F / G.C.D
- ✓ Prime factorization
- ✓ Finding prime factorized numbers
- ✓ Finding L.C.M and G.C.F by prime factorization
- ✓ Use of venn diagram
- ✓ Square numbers and square roots

FRACTIONS

- ✓ Reducing fractions
- ✓ Comparing fractions
- ✓ Ordering fractions
- ✓ Addition of fractions
- ✓ Subtraction of fractions
- ✓ Multiplication of fractions
- ✓ Reciprocal/multiplicative inverse
- ✓ Division of fractions
- ✓ Mixed operations of fractions
- ✓ Application of fractions

Decimals

- ✓ Changing fractions to decimals
- ✓ Changing decimals to fractions
- ✓ Ordering decimals
- ✓ Addition of decimals
- ✓ Writing decimals in words
- ✓ Writing decimals in figures
- ✓ Place values of decimals
- ✓ Values of decimals
- ✓ Subtraction of decimals
- ✓ Multiplication of decimals
- ✓ Division of decimals
- ✓ Mixed addition and subtraction

INTEGERS

- ✓ Additive inverse
- ✓ Showing integers on a numberline

- ✓ Writing integers shown on the numberline
- ✓ Ordering integers
- ✓ Addition without numberline
- ✓ Addition with a numberline
- ✓ Subtraction without a numberline
- ✓ Subtraction with a numberline

TERM II & III

1. Algebra
2. Data handling
3. Money
4. Geometry
5. Time
6. Length, Mass and Capacity

1. **ALGEBRA**
   - ✓ Collecting like terms
   - ✓ Collecting like terms and simplifying
   - ✓ Forming algebraic expressions from phrases
   - ✓ Simplifying expressions by removing brackets
   - ✓ Substitutions
   - ✓ Solving equations by adding
   - ✓ Solving equations by subtracting
   - ✓ Solving equations involving division
   - ✓ Solving equations involving multiplication
   - ✓ Solving equations involving square roots
   - ✓ Finding unknown side when given
     - i) Perimeter
     - ii) Area
     - iii) Volume
   - ✓ Solving more equations

2. **DATA HANDLING**
   - ✓ Interpreting picto graphs
   - ✓ Drawing picto graphs
   - ✓ Drawing and interpreting tables
   - ✓ Interpreting bar graphs
   - ✓ Drawing bar graph
   - ✓ Interpreting line graphs
   - ✓ Drawing line graphs
3. **MONEY**

- ✓ Simple rates and properties
- ✓ Shopping lists
- ✓ Shopping tables/bills
- ✓ Transport charges/fares
- ✓ Buying and selling
- ✓ Profit
- ✓ Loss

4. **GEOMETRY**
   - ✓ Drawing parallel lines
   - ✓ Lines of symmetry
   - ✓ Construction of polygons (equilateral triangles and Hexagon in a circle)
   - ✓ Constructing equilateral triangles with side
   - ✓ Angles and rotation
   - ✓ Angles in a compass
   - ✓ Clockwise and anti-clockwise turns
   - ✓ Types of angles
     - Acute
     - Obtuse
     - Reflex
     - Complementary
     - Supplementary
     - Centre angles
   - ✓ Drawing and measuring angles using a productor
   - ✓ Constructing angles using a pair of compasses 45°, 90°, 60°, 30°, 120°
   - ✓ Finding unknown angles
   - ✓ Constructing squares and rectangles
5. **TIME**
   - ✓ Review on telling time and writing time (12 hrs)
   - ✓ Comparing 12hrs and 24hrs
   - ✓ Changing from 12hrs to 24 hrs and vice versa
   - ✓ Finding duration
   - ✓ Finding speed, distance and time
6. **LENGTH**
   - ✓ Metric UNITS
   - ✓ Changing metres to Cm
   - ✓ Changing cm to metres
   - ✓ Changing km to metres
   - ✓ Changing metres to km
   - ✓ Addition of metres and km
   - ✓ Addition of metres and km

- ✓ Addition of metres and cm
- ✓ Finding perimeter
- ✓ Finding area
- ✓ Finding sides using perimeter
- ✓ Perimeter of irregular shapes
- ✓ Area of irregular shapes
- ✓ Total surface are (T.S.A)

7. **MASS**
   - ✓ Metric unit
   - ✓ Changing kg to grams
   - ✓ Changing grams to kg
   - ✓ Addition of kg and grams
   - ✓ Subtraction of kg and grams
   - ✓ Multiplication of kg and grams
8. **CAPACITY**
   - ✓ Metric units
   - ✓ Addition of litres
   - ✓ Subtraction of litres
   - ✓ Multiplication of litres
   - ✓ Division
   - ✓ Volume
   - ✓ Changing cm^3 to litres

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THEME: **SETS**

TOPICS: **SET CONCEPT**

SET SYMBOLS

Definition

A set is a collection of clearly/well defined elements, objects, things or members.

Symbols

1.	{ }	empty, null or void set
2.	$\leftrightarrow$	Equivalent to
3.	$\not\leftrightarrow$	Not equivalent
4.	$=$	Equal to
5.	$\subset$	Is a subset of
6.	$\not\subset$	Is not a subset of
7.	$\cup$	Union with
8.	$\cap$	Intersection of
9.	$\in$	Is element of
10.	$\notin$	Is not element of
11.	$\sum$	Universal set
12.	$\neq$	Is not equal to

Activity

1. Define a set.
2. Draw atleast 10 set symbols and name them.
3. What is a member?
4. Write 6 examples of sets.
   Reference primary school mathematics bk 5 pg 1

Evaluation

→ Strong points _____
→ Weak points _____
→ The way forward _____

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PERIOD 2

DESCRIPTION OF SETS

Examples

Describe the sets below.

1. A = {January, February, March}
   A is a set of the first 3 months of a year
2. Y= {a, e, i, o, u}
   Y is a set of vowel letters
3. M = {1, 3, 5, 7, 9}
   M is a set of the first five odd numbers.

Evaluation: Activity

Description the following sets.

1. A = {a, e, i, o, u}
2. Y = {1, 2, 3, 4, 5, 6, 8, 9}
3. D = {Jan, June, July}
4. Q = {x, y, z}
5. K = {a, b, c, d, e}
6. M = {Tuesday, Thursday}
7. R = {pupils in P.6 aged 50 years}
8. N = {March, May, July, August}
9. S = {2, 4, 6, 8, 10, 12}
10. B = (Uganda, Kenya, Tanzania, Rwanda, Burundi, South Sudan}

Evaluation Strong points _____

Weak points _____

Way forward _____

PERIOD 3

EMPTY SET

Definition: An empty set is a set without elements/members.

1. A = {Birds with four legs}
   A is an empty set
   A = { } or $\varnothing$
2. T = {cars with legs
   T is an empty set.

3. P = {P.6 pupils with two hands}

P is not empty set.

Evaluation Activity

State whether the sets below are empty or not empty.

1. F = {son who is as old as his father}
2. C = {A car which can fly like aeroplane}
3. K = {Calves which produce milk}
4. P = {Man who has been a president in Uganda}
5. Q = {English alphabet of 80 letters}
6. E = {Cash crops in Uganda}
7. B = {Birds which produce young ones alive}
8. P = {A grasshopper which is as big as an elephant}
9. V = {A car that uses water for fuel}
10. Y = {Hills in Uganda}
11. Z = {Pupils in P.5 who are 10 years old}

Reference: Primary School MTC bk 5 page 2

Evaluation

Strong points _____

Weak points _____

Way forward _____

PERIOD 4: EQUIVALENT AND NON – EQUIVALENT SETS ($\Longleftrightarrow$ and $\not\Longleftrightarrow$)

- Equivalent sets are sets with the same numbers of elements.
- Non equivalent sets are the sets which do not have the same number of elements.

Examples

1. A= {1, 2, 3, 4, 5,}

B= {a, b, c, d, e}

Set A ⟷ set B

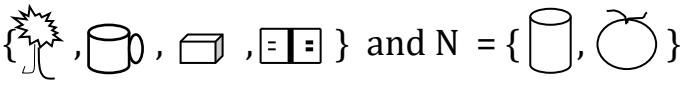
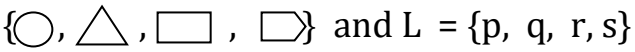
2. P = {book, spoon, fork}

Q = {book, pen}

Set P ↮ set Q

Evaluation activity

Find equivalent and non equivalent sets from the pairs below using a symbol.

1. A = {1, 2, 3, 4, 5} and B = {o, e, f, g, h}
2. M = {  } and N = { }
3. C = { k, l, m, n} and D = {a, b, c, d, e}
4. K = {  } and L = {p, q, r, s}
5. M = {1, 2, 3} and N = a, e, i}
6. L = {p, q, r, s} and J = { p, 4, b}
8. X = {4, 0, 2, 6} and Y = {  }
9. T = {girl, boy, woman} and R = {m, a, n}
10. U = {1, 4, 9, 16} and V ={2, 3, 5, 7, 9, 11}
11. W = {b, c, d, f, g} and X = {a, e, i, o, u}

Evaluation: Strong points_____

Weak points _____

The way forward _____

PERIOD 5: **EQUIVALENT AND EQUAL SETS**

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

Equivalent sets are the sets which do not have the same number of elements.

Examples

1. A = {a, e, i, o, u} and B = {1, 2, 3, 4, 5}

   Set A is equivalent to set B.

   Set A ⟷ set B

2. C = {t, o, p} and D = {p, o, t}

   Set C is equal to set D

   Set C = set D

Evaluation activity

Write equal sets or equivalent sets.

1. S = {1, 2, 3, 4} and K = {4, 2, 1, 3}
2. 

Evaluation activity

Draw venn diagrams and find the intersection of the given set below.

1. A = {d, e, f, g} and B = {f, g, h, i, j}
2. P = {a, e, i, o, u} and Q = {a, b, c, d, e, f}
3. X = {p, q, r, s, t} and Y = {m, n, o, p, q, r}
4. T = { u, g, a, n, d, a} and F = {d, u, b, a, i}

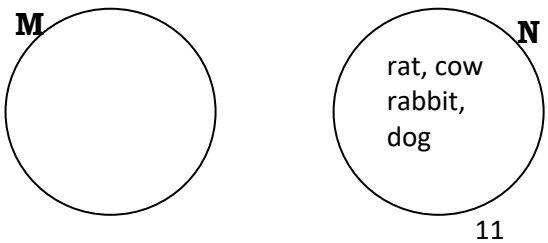
Evaluation Strong points _____

Weak points _____

Way forward _____

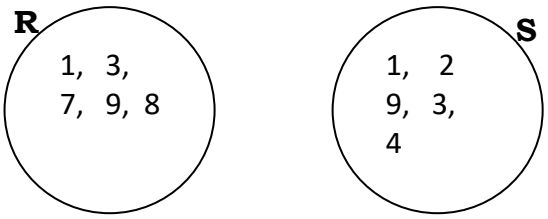
WEEK 2: PD 1

Find the intersection sets below



6. L = {chair, desk, bench, stool}

   K ={mat, chair, bed, desk}

7. 

8. V = {m, e, a, t} and U = {t, e, a, m, s}

9. Y = {tomato, orange, onion, garlic}

   Z = {apples, carrot, tomato, onion, garlic}

Evaluation: Strong points _____

Weak points _____

The way forward _____

PERIOD 2: UNION SETS

Definition

A union set is a set containing all elements from two or more given sets without repeating any.

Examples

1. X ={oranges, ~~ma~~ngoes, pawpaw}

   Y ={tomatoes, peas, oranges, ~~pin~~eapples}

   XUY ={oranges, mangoes, pawpaw, tomatoes, peas, pineapples}

2. R = {a, e, i, o, u}, S = {1, 2, e, f, o}

   RUS = {a, e, i, o, u, 1, 2, f}

Evaluation activity

Find the union of the following sets.

1. A = {Alex, Betty, tom, Robert, David}

   B = {Stella, Robert, Annet, Betty , Rachael}

2. P = {Mungu, Akello, Abdul}

Q ={Twine, Aguti, Magezi}

3. M = {book, pen, bottle}

   N = {cups, spoon, bottle}

4. A = {2, 4, 5} ND b = {1, 2, 4, 6}

5. T = {a, b, c, d} and S= {b, c, f, g, h}

6. R = {paper, ruler, pencil}

   S = Pencil, paper, ruler}

7. C = {lion, elephant, dog}

   D = {cat, sheep, goat}

8. U = {Masaka, Sembabule, Rakai}

   V = {Mbale, Pallisa, Kumi, Kotido}

Evaluation: Strong points _____

Weak points _____

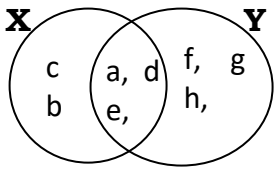
The way forward _____

PERIOD 3: UNION OF SETS ON VENN DIAGRAMS

Examples

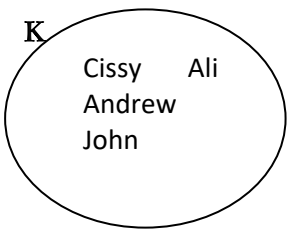
Draw a venn diagram and find the union sets.

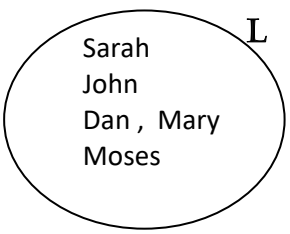
1. X ={a, b, c, d, e,} and Y = {a, d, e, f, g, h}

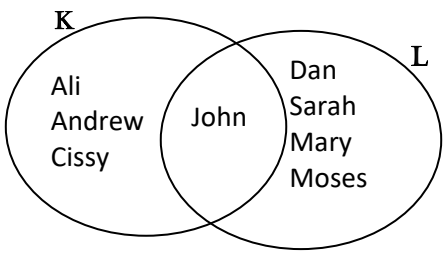


XUY = {a, b, c, d, e, f, g, h}

2.



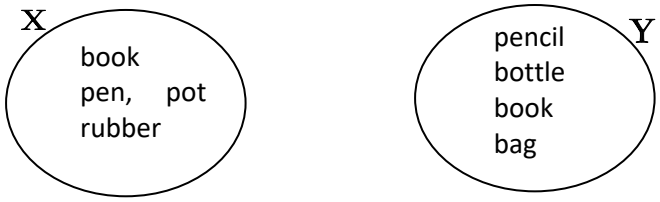




KUL = {Ali, Andrew, John, Dan, Mary, Moses}

Evaluation Activity

Draw venn diagrams to show the union sets in the given sets below.

1. C = {3, 4, 5, 6} and D = {5, 6, 7, 8}
2. G = {b, c, d, e} and H = {c, d, f, i}
3. 

4. A = {a, b, c, d, e} and B = {d, e, f, g, h}
5. S = {2, 4, 6, 8} and T = {0, 4, 7,9,5}
6. A = {a, b, c,} and B = {b, d, e, f}
7. T = {1, 2, 3, 4, } and R = {2, 3, 7, 8, 9}

Evaluation: Strong points _____

Weak points _____

The way forward _____

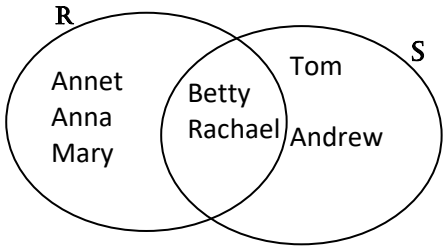
PERIOD 4: **INTERSECTION AND UNION OF SETS ON VENN DIAGRAMS**

Examples:

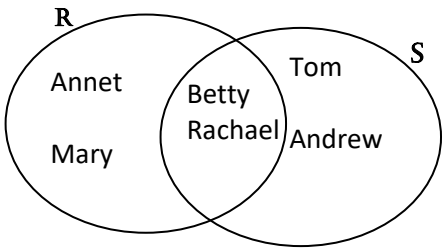
Draw venn diagram to find the intersection and union sets below.

1. R = {Annet, Betty, Rachael, Mary, Anna}

   S = Tom, Rachael, Betty, Andrew}



RUS = {Annet, Mary, Betty, Rachael, Tom, Andrew, Anna}



RnS = {Betty, Rachael}

Evaluation activity

Draw venn diagrams to show (represent) intersection and union of the following sets.

1. A = {sweets, bread, biscuits, beans} B = {sodas, biscuits, juice}
2. Z = {a, n, p, i} P ={a, f, x, y}
3. L = {chat, cap, helmet} H = {shirt, trouser, helmet}
4. P = {wheat, maize, mango} Q = {pineapple, guava, orange}
5. C = {bottle, jerrycan, pail} D = {drum, pail, jug}
6. A = {1, 2, 3, 4, 5, 6} B = {1, 4, 16, 25}
7. A = {2, 4, 6, 8} B = {1, 5, 3, 7}
8. R= { 9, 2, 4, 6, 8} R = {4, 3, 5, 7, 9}
9. Q = {posho, beans, beef, mangoes, millet}

   R = {piece, rice, beef}
10. X = {odd numbers less than 13}

    Y = {prime numbers less than 10}

Evaluation Strong points _____

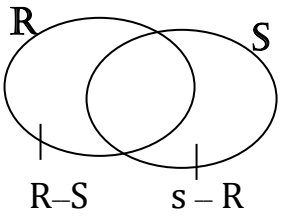
Weak points _____

Way forward _____

WEEK 3:

PERIOD 1

DIFFERENCE OF SETS / COMPLEMENT OF SETS

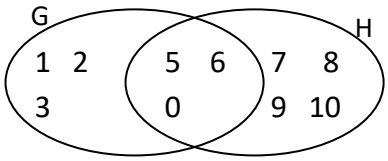


Or S^1 R^1

Examples

1. Given P ={a, b, c, d, e, f} and Q = {a, e, i, o, u}
   Find i) P – Q
   P – Q mean set P only
   P – Q = {b, c, d, f}

   ii) Q – P
   Q – P mean set Q only
   Q – P = {i, o, u, }

2. 

Find i) G – H
G – H means set G only
G – H = {2, 4, 1}

ii) H – G
H – G means set H only
H – G = {7, 8, 9, 10}

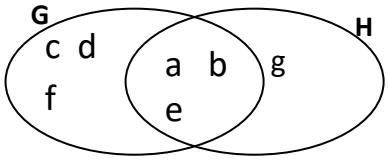
Evaluation activity

1. Given that A = {2, 4, 6, 8, 10, 12, 14} and B = {1, 2, 3, 4, 5, 6, 7, 8}
   Find i) A — B
   ii) B — A

2. If Q = {Daniel, John, Norah, Amina, Abdul}
R = {Abdul, Pascal, Rose, Joseph}
Find i) Q – R
ii) R – Q

3. A = {Cameroon, Kora, Germany}
B = {Brazil, Turkey, Cameroon}
Find i) B – A
ii) A – B

4. If K = {banana, mangoes, guava, onion}
L = {pineapple, oranges, banana}
Find i) K – L/ K only
ii) L – K/L only

5. 

Find i) D only
ii) D^1

Evaluation Strong points _____

Weak points _____

Way forward _____

PERIOD 2: NUMBER OF ELEMENTS (N) IN GIVEN SETS

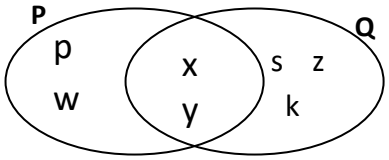
Examples

1. M = {a, e, i, o, u} and N ={a, b, c, d, e, f, g, h}
Find i) n(MnN)
MnN = {a, e}
n(MnN) = 2

ii) n(MUN)

MUN = { a, e, i, o, u, b, c, d, f, g, h}
n(MUN) = 11

2. Study the venn diagram and answer the questions below.



Find i) n(P) ii) n(PnQ) iii) n(Q – P)
P = {p, w ,x, y} PnQ = {x, y} Q –P = {s, z, k}
n(P) = 4 n(PnQ} = 2 n(Q – P) = 3

iv) n(PUQ) v) n(Q)
PUQ = {p, w, x, y, s, z, k} Q – P = {s, z, k}
n(PUQ) = 7 n(Q) =5

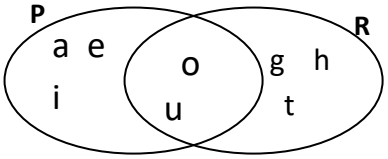
Evaluation activity

1. V = {a, b} and W = (b, c}
Find: i) n(VnW) ii) n(VUW)

2. P = {a, b, c, d, e} and Q = {e, d, m, r f}
Find i) n(PnQ) ii) n(QUP} iii) n(Q) only iv) n(P –Q)

3. S ={counting numbers less than 10}
T = {counting numbers less than 13}
Find i) n(S) ii) n(T) iii) n(SnT) iv) n(T –S)

4. Study the venn diagram below and answer the questions that follow.



Find: i) n(P) ii) n(R) iii) n(P–R) iv) n(PUR) v) n(R) only

Evaluation Strong points _____

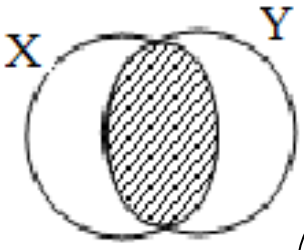
Weak points _____

Way forward _____

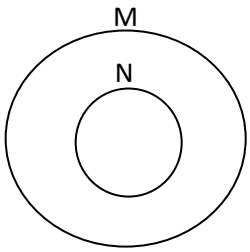
PERIOD: 3 DESCRIPTIONS OF REGIONS ON VENN DIAGRAMS

Examples

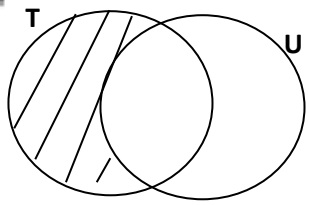
1. Describe the shaded regions.



X∩Y



M∩N

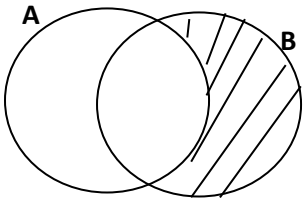


T — U

T only U[1]

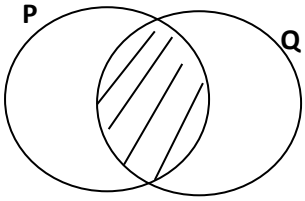
2. Describe the un shaded region.

a)



Set A/B-A

b)

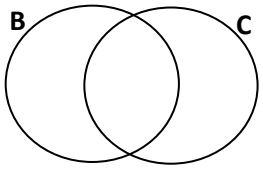


Set (PnQ)[1]

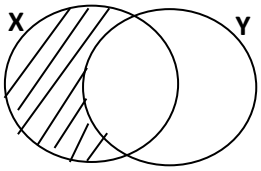
Evaluation activity

1. Describe the shaded regions.

a)

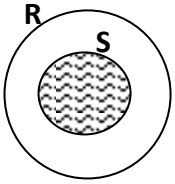


b)

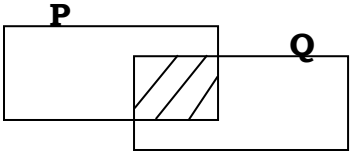


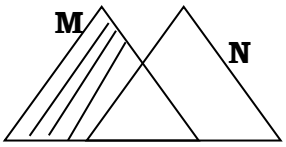
d)

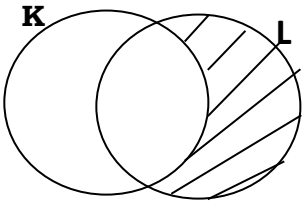
c)

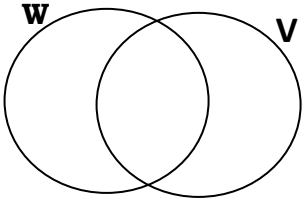


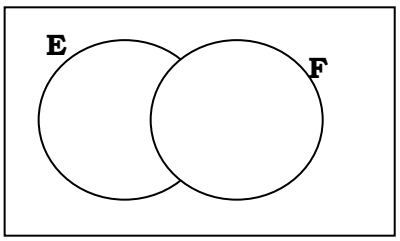
e)



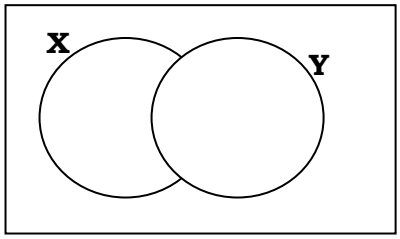
f) 

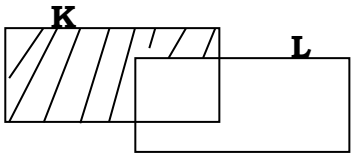
g) 

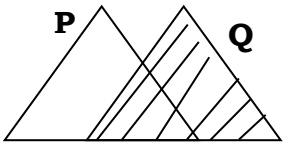
h) 

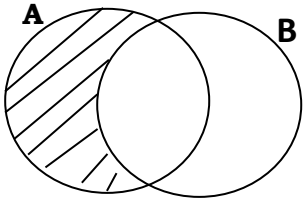
i) 

2. Describe the unshaded regions below.









3. Draw and shade the regions.

a) X∩Y b) AnBnN c) PUQ d) W-Z

Evaluation Strong points _____

Weak points _____

Way forward _____

WEEK 4

FORMATION OF SUBSETS

A subset is a small set formed from universal set/super set

Any set is a subset of itself.

An empty set is a subset of every set.

Examples

1. If A = {a, b, c} List down all possible subsets that can be formed from A.

Solution

Subsets are; (by listing)

{ }, {a} , {b}, {c}

{a, b}, {a, c}, {b, c}

{a, b, c}

2. B = {1, 2, 3, 4}. Form any five subsets from B

Subsets { }, {1}, {2}, {3}, {4}

{1,2}, {1, 3}, {1, 4}

{2, 3}, {2, 4}, etc.

Evaluation activity

1. Form subsets from the following sets.
   a) A = {a, a, t}
   b) X = {a, b}
   c) Q = { p, e, n, s}
2. Form five subsets from each of the following sets.
   a) M ={a, b, c, d, e, f}
   b) T ={ Annet, Rachael, Kate, Peace, Hope}
3. If M is a set of even numbers between 30 and 50. Write five subsets of M.
4. P = {Mary, John, Amos, Betty, Anna}. Write down four subsets of P.
5. V = {a, e, i, o, u}, which of the following are sub sets of V?
   A = { a, e, i } B = { o, u } C = { b } D = { a }
   E = { o, m }
6. Draw venn diagrams to represent the following:
   a) All boys are males.
   b) All girls are females
   c) All trees are plants.

Evaluation Strong points _____

Weak points _____

Way forward _____

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Website: www.tekartlearning.com

PERIOD 5

FINDING NUMBER OF SUBSETS

Formular = 2^n

Where **n** stands for the number of elements in a given set.

Example

1. Given that Y = {2, 3, 5}, find the number of subsets in Y.

n(Y) =3

Number of subsets = 2^n

= 2^3

= 2 x 2 x 2

= 4 x 2

= 8 subsets

1. If n(P)=5 find the number of subsets in P.

n(Y) =3

Number of subsets = 2^n

= 2^5

= 2 x 2 x 2 x 2 x 2

= 4 x 4 x 2

= 16 x 2

= **32 subsets**

Evaluation activity

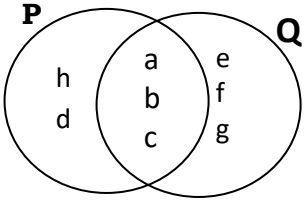
Find the number of subsets in the following sets.

1. P = {1, 2} 2. X = { } 3. M = {cow}
4. N = {Prime numbers less than 10}
5. Q = {a, b, c, d, e}
6. T = {vowel letters}
7. S = {days of a week starting with letter S}
8. Find the number of subsets if;

a) n(x) = 2 b) n(M) = 3 c) n(P) = 4 d) n(H) = 5

e) n(Q) = 1 f) n(W) = 0

9.



Find the number of subsets in;

i) PnQ ii) P iii) PUQ

10. Y is a set of snakes with legs.
How many subsets can be got from Y?

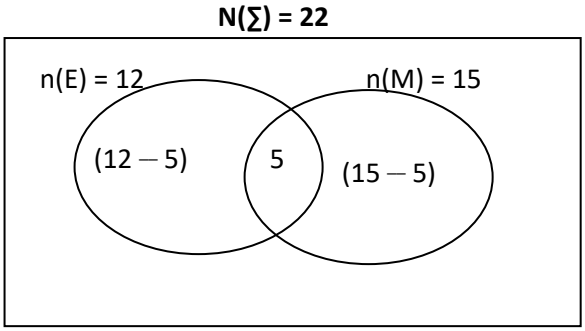
PERIOD 7

APPLICATION OF SETS

Examples

1. In a class, 12 pupils like English €, 15 like Mathematics (M) and 5 pupils like both English and Mathematics.

a) Represent the above information on a venn diagram.



b) How many pupils like Mathematics only?

n(M) only = 15 – 5

= 10 pupils

c) How many pupils like English only?

n(E) only = 12 – 5

= 7 pupils

d) Find the number of pupils who like only one subject.

Only one subjects = n(M) only + n(E) only

= (15 –5) + (12 – 5)

= 10 + 7

= 17 + 7

= 17 pupils

e) How many pupils are in the class?

∑ = 7 + 5 + 10

= 22 pupils

Evaluation activity

1. In a class, 24 pupils like Matooke (M), 30 pupils like Rice (R) and 16 pupils like both Matooke and Rice.

a) Represent the above information on a venn diagram.

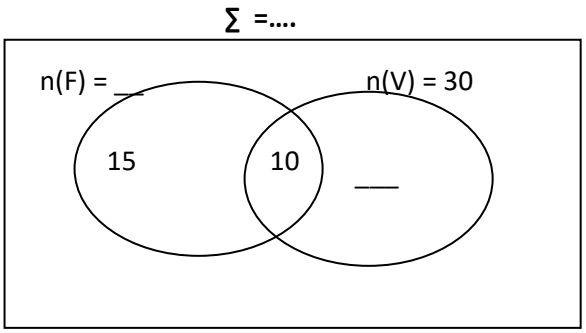
b) How many pupils like,

i) Rice only
ii) Matooke only

c) Find the number of pupils who like only one type of food.
d) How many pupils are in the class?

2. Given that 21 farmers grow beans (B), 17 grow G/nuts (G), 9 farmers grow both beans and G/nuts.
a) Draw a venn diagram to show the given information.
i) G/nuts only
ii) Beans only
c) How many farmers grow only one type of crop?

3. The venn diagram below shows a group of boys who played football (F) and volley ball (V). Study it and answer the questions that follow.



a) Complete the venn diagram above.
b) How many boys played only one game?
c) Find the total number of boys in the group

PERIOD 8

PROBABILITY (COIN/DIE)

Probability is a measure of chance.
Chance is the possible outcome of an event to occur/happen.
Sample space is the total number of possible outcomes.

$$\text{Probability} = \frac{n(\text{chance})}{N(\text{sample space})} \quad \text{OR} \quad \frac{\text{Desired chance}}{\text{Total chances}}$$

Examples

1. When you toss a coin, what is the probability that a head will show up?
Sample space = {head (H), Tail (T)

Probability = n(chance)
= n(sample space)
= n(H)
n(S)
= ½

The face with the court of arms is the head and the other face is the tail (T)

Evaluation activity

1. When a coin is tossed, what is the probability that:
   a) A tail shows up?
   b) A head shows up?
2. When a die is tossed, what is the probability that:
   a) An even number appears on top?
   b) 2 appear on top?
   c) 3 appear on top?
   d) 5 appear on top?
   e) 6 appear on top?
   f) An odd number shows up?
   g) A number greater than 2 shows up?
   h) A multiple of 3 shows up?
   i) A prime number shows up?

WEEK 3 (PERIOD 1)

RANDOM PICKING

Random picking is picking without intended plan/picking without seeing.

Examples

1. In a basket, there are 7 ripe mangoes and 9 raw mangoes. What is the probability of picking?
   a) a raw mango?
   n(S) = 7 + 9
   = 16
   Probability = n(raw)
   n(S)
   = 9
   16
   b) a ripe mango?
   n(S) = 7 + 9
   = 16

Probability = n(ripe)
n(S)
= $\frac{7}{16}$

Evaluation activity

1. There are 4 pens and 8 blue pens in a packet. What is the probability of picking?
   a) a red pen at random?
   b) a blue pen at random?
2. A basket contains 6 good eggs and 3 bad ones. What is the probability of picking?
   a) a bad egg?
   b) a bad egg?
3. In a class there are 25 girls and 15 boys. What is the probability that a head monitor is;
   a) a boy?
   b) a girl?
4. In a class, 13 pupils enjoy music and 18 enjoy art. If a pupils is picked at random, what is the probability that the pupil picked likes;
   a) Art?
   b) Music
5. In a basket there are 7 raw mangoes and 14 ripe mangoes. What is the probability of picking;
   a) a ripe mango?
   b) a raw mango?

Evaluation Strong points _____

Weak points _____

Way forward _____

THEME 2: NUMERACY
TOPIC 1: WHOLE NUMBERS

FORMATION OF NUMERALS

- A number is an idea of quality e.g, how much, how many or how far.
- Numeral is a symbol used to represent a number.
- Numeration is a way of representing numbers.
  16 is formed by combining 1 and 6.
  327 is formed by combining 3, 2 and 7

Examples

1. Form any four numerals using all the digits 7, 6 and 9
   1st 769

2nd 679
3rd 976
4th 796

2. Write the smallest numeral formed from the digits 3, 4, and 7
Digits in ascending order 3, 4, 7
Therefore; the smallest numeral = 347

3. Write the biggest numeral formed from the digits 9, 6, and 8.
Digits in descending order 9, 8, 6
Therefore; the biggest numeral 986

4. Find the sum of the biggest and the smallest numerals formed using all the digits 2, 9 and 1.
Digits in ascending order = 1, 2, 9
Smallest numeral = 129
Digits in descending order = 9, 2, 1
Biggest numeral formed = 921
Sum = 1 2 9
+ 9 2 1
1050

5. What is the difference between the smallest and the largest numerals got from the digits 6, 2, and 5?
Digits in ascending order = 2, 3, 6
Smallest numeral = 256
Digits in descending order = 6, 5, 2
Difference = 6 5 2
- 2 5 6
3 9 6

Evaluation activity

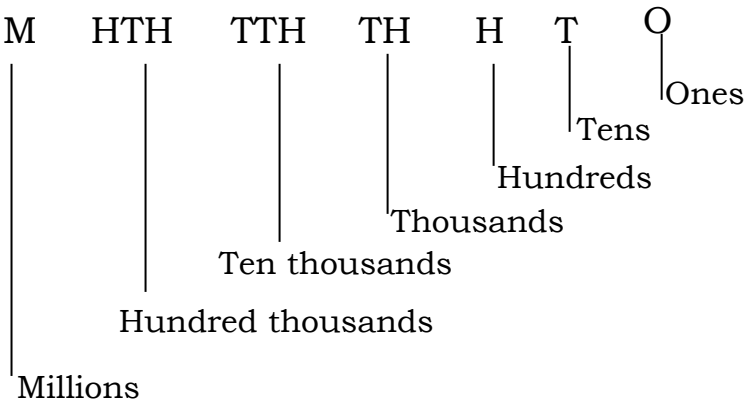
1. From the digits 5, 8 and 1, form any three numerals using all the digits.
2. Write down any four numerals that can be formed using all the digits given below.
   a) 2, 5, 3, 7
   b) 9, 2, 6, 7, 8
   c) 5, 6, 4
   d) 4, 3, 7, 9
3. Write the smallest numeral that can be formed using digits 7, 3, 2 and 6.
4. What is the biggest numeral that can be got from the digits 8, 9, 4.
5. What is the difference between the smallest and largest numerals got using all the digits 6, 3, 9?
6. Find the sum of the biggest and the smallest numerals that can be obtained from the digits 1, 9, 4, 7.
7. What is the value of 4 from the biggest numeral formed using the digits 6, 1, 8 and 4.
8. Find the difference in values of 2 and 9 form the biggest numeral formed using the digits 7, 2, 9, 3.

Evaluation Strong points _____

Weak points _____

Way forward _____

PERIOD 3
PLACE VALUES



Examples

Find the place value of each digit in the number 1563849

M	HTH	TTH	TH	H	T	O
9	6	0	8	1	7	6

Ones
Tens
Hundreds
Thousands
Ten thousands
Hundred thousands
Millions

Evaluation activity

1. Write the place value of each digit in the numbers below.
   a) 168 b) 179 c) 164 d) 8194

2. What is the place of 8 in the number 18476?

3. Find the place value of the digit 2 in each of the following numerals.
   a) 28,994 b)2143 c) 298 d) 4529

4. What is the place value of each of the underlined digits in the numerals below?
   a) 23498 b) 485 c) 2015 d) 2795 e) 1700 f) 485

Evaluation Strong points _____

Weak points _____

Way forward _____

PERIOD 4
VALUES OF DIGITS

Examples

1. Write the value of each digit in the numeral 823769

M	HTH	TTH	TH	H	T	O
	8	2	3	7	6	9

(9 x 1) = 9
(6 x 10) = 60
(7 x 100) = 700
(3 x 1000 = 3000
(2 x 10000 = 20000
(8 x 100000 = 800000

2. Find the value of 3 in the number 263094

HTH	TTH	TH	H	T	O
2	6	8	0	9	4

(8 x 1000)

= 8000

Evaluation activity

1. Write the value of each digit in the numbers below.

   a) 979 b) 981 c) 9014 d) 1679

2. Find the value of each of the underlined digit in the numerals below.

   a) 1$\underline{2}$95 b) 3$\underline{7}$84 c) 3$\underline{4}$012 d) $\underline{6}$03789 e) 172$\underline{6}$00

3. What is the value of 0 in the numerals 908734?
4. Find the sum of the values of the underlined digits in the numeral 46$\underline{7}$2$\underline{5}$3.
5. Find the product of the values of the underlined digits in the numerals 4$\underline{8}$76.

Evaluation Strong points _____

Weak points _____

Way forward _____

PERIOD 5
WRITING NUMERALS IN WORDS

Examples

1. Write 809243 in words

Thousands	Units
809	243

Two hundred forty three

Eight hundred nine thousand

809243 = Eight hundred nine thousand, two hundred forty three.

2. Write 990009 in words.

Thousands	Units
990	009

Nine

Nine hundred ninety thousand

990009 = Nine hundred ninety thousand nine.

Evaluation activity

Write the following numerals in words.

a) 89 b) 2024 c) 2422 d) 7007 e) 756 f) 2096

g) 5602 h) 8015 i) 9099 k) 2400

Evaluation Strong points _____

Weak points _____

Way forward _____

PERIOD 6
WRITING NUMERAL (NUMBER WORDS) IN FIGURES

Examples

1. Write "one thousand four hundred twenty five" in figures.

One thousand	=	1000
Four hundred twenty five	=	+ 425
		1435

2. Write "Two hundred fifteen thousand, forty seven" in figures.

Two hundred fifteen thousand	= 215000
Forty seven	= + 47
	215047

Evaluation activity

Write the following in figures.

I. Three thousand, eighty eight.

II. Five thousand, four hundred twenty.

III. Twelve thousand, twelve.

IV. Nineteen thousand, nine hundred nine.

V. One hundred thousand, one.

VI. Two hundred thousand, two hundred forty two.

VII. Six hundred thirty two thousand, two hundred fifty.

VIII. Nine hundred thirty two thousand, two hundred fifty.

IX. Four hundred three thousand.

X. Nine hundred ninety thousand, nine hundred ninety nine.

Evaluation Strong points _____

Weak points _____

Way forward _____

EXPANDING WHOLES USING/VALUE FORM

Examples

HTH	TTH	TH	H	T	O
4	6	7	9	0	7

= (4x100,000) + (6 x 10,000) + (7 x 1000) + (9 x 100) + (9 x100) + (0 x10)+ (7x1).

= 467907 = 400000 + 60,000 + 7000 + 900 + 7

Evaluation activity

Expand the following in value form.

a) 310 b) 9750 c) 1449 d) 4940 e) 1568

EXPANDING WHOLES USING PLACE VALUES

Example

Expand 78354 using place values

TTH	TH	H	T	O
8	2	3	7	6

(4 x1)
(5 x 10)
(3 x 100)
(8 x 1000)
(7 x 10000)

78354 = (7 x10000) + (8 x1000) + (3x100) + (5x10) + (4x1)

Evaluation activity

Expand the following using place values.

a)203 b) 769 c) 4864 d) 1008 e) 8318 f) 5149

h)1459 i) 780 j) 8099

WEEK 3 (PERIOD 1)

EXPANDING WHOLES USING POWERS OF 10

1	=	1	=	10^0
10	=	10	=	10^1
100	=	10 x 10	=	10^2
1000	=	10 x 10 x 10	=	10^3
10000	=	10 x10 x10 x 10	=	10^4
100000	=	10 x10 x10 x 10 x 10	=	10^5
1000000	=	10 x 10 x 10 x 10 x 10 x 10	=	10^6

1. Expand 8794 using powers of 10.

8794 =

10^3	10^2	10^1	10^0
8	7	9	4

8794 = $(8 \times 10^3) + (7 \times 10^2) + (9 \times 10^1) + (4 \times 10^0)$

2. Write 20618 in expanded form using powers of 10.

8794 =

10^4	10^3	10^2	10^1	10^0
2	0	6	1	8

20618 = $(2x10^4) + (0x10^3) (6x10^2) + (1 x10^1) + (8x10^0)$

Evaluation activity

Expand the following using powers of 10.

a) 1239 b) 290 c) 4268 d) 9099 e) 6074 f) 2090

g) 658 h) 614 i) 36145 j) 2614 k) 847093 l) 1009

Evaluation Strong points _____

Weak points _____

Way forward _____

PERIOD 2

WRITING IN SHORT FORM/AS SINGLE NUMBERS

Examples

1. Write 3000 + 20 + 900 + 7 as a single number.

```
 3000
  900
   20
+   7
 3927
```

2. Write $(9 \times 10^3) + (4 \times 10^2) + (6 \times 10^0)$ in short form.

$(9 \times 1000) + (4 \times 100) + (6 \times 1)$

$9000 + 400 + 6$

```
 9000
  400
+   6
 9406
```

Evaluation activity

Write the following in short form.

a) 60000 + 700 + 90 + 7

b) 3000 + 90 + 400 + 5

c) 50 + 70000 + 400 + 700000

d) (9 x 1000) + (5 x 1000) + (9 x 10) + (8 x 1)

e) (8 x 10000) + (6 x 1000) + (5 x 100) + (4 x 10)

f) $(6 \times 10^4) + (7 \times 10^3) + (3 \times 10^2) + (4 \times 10^1)$

g) $(3 \times 10^2) + (7 \times 10^0)$

h) $(4 \times 10^5) + (6 \times 10^1) + (9 \times 10^0)$

i) $(2 \times 10^3) + (8 \times 10^2) + (9 \times 10^4) + (6 \times 10^0)$

j) (1 x 10) + (6 x 1000) + (5 x 100)

Evaluation Strong points _____

Weak points _____

Way forward _____

PERIOD 3
ROUNDING OFF WHOLES

- The digits after the place required or place value after the required place values is maintained by 0's.
- When the digit following the required place value is 0, 1, 2, 3 or 4, we round down i.e, we add 0 to that place.
- When the digit following the mentioned place value is 5, 6, 7 or 9, we round up i.e, we add 1 to the mentioned place value.

Examples

1. Round off 163 to the nearest tens.

H	T	O
1	6	3
+		0
1	6	0

163 approximately 160

2. Round off 2981 to the nearest hundreds.

TH	H	T	O
2	9	8	1
	+	1	

Therefore, 2981 is approximately 3000

Evaluation activity

Round off the following as instructed in the brackets.

a) 15 (to the nearest tens)
b) 23 (to the nearest tens)
c) 159 (to the nearest tens)
d) 3193 (to the nearest hundreds)
e) 159 (to the nearest hundreds)
f) 2995 (to the nearest tens)
g) 278 (to the nearest tens)
h) 278 (to the nearest hundreds)
i) 151 (to the nearest tens)
j) 99 (to the nearest tens)
k) 31938 (to the nearest hundreds)
l) 486107 (to the nearest tens)

Evaluation Strong points _____

Weak points _____

Way forward _____

PERIOD 4

ROMAN NUMERALS

Hindu Arabic	1	5	10	50	100	500	1000
Roman	1	V	X	L	C	D	M

Numbers with 2 and 3 are repeating roman numerals.
2 = (1 + 1) = II
3 = (1 + 1 + 1) = III
20 = (10 + 10) = XX
30 = (10 + 10 + 10) = XXX

Number 4 and 9 are obtained by subtraction
4 = (1 from 5) = IV
9 = (1 from 10) = IX
40 = (10 from 50) = XL
90 = (10 from 100) = XC

Number 6, 7 and 8 are obtained by addition.

6 = (5 + 1) = VI
7 = (5 + 2) = VII
8 = (5 + 3) = VIII
60 = (50 + 10) = LX
70 = (50 + 20) = LXX
80 = (50 + 30) = LXXX
600 = (500 + 100) = DC

EXPRESSING HINDU ARABIC NUMERALS AS ROMAN NUMERALS

Examples

1. Express 25 in roman numerals
   25 = 20 + 5
   = XX + V
   = XXV
2. Change 49 to Roman numerals.
   49 = 40 + 9
   = XL + IX
   = XLIX
3. Write 694 in roman numerals
   694 = 600 + 90 + 4
   = DC + XC + IV
   = DCXCIV

Evaluation activity

Express the following as roman numerals

1. 49	2. 26
3. 47	4. 55
5. 109	6. 124
7. 444	8. 99
9. 19	10. 22
11. 344	12. 669
13. 999	14. 38

Evaluation Strong points _____

Weak points _____

Way forward _____

PERIOD 5

CHANGING ROMAN NUMERALS TO HINDU ARABIC NUMERALS

NB: Roman numerals are usually written from biggest to smallest.
If a small Roman numeral comes before a big one, then it should be read together with the next one as one number.

Examples

1. Express LXIX in Hindu Arabic

LXIX = LX + IX
= 60 + 9
= 69

2. Express CXLIV in Hindu Arabic

C = 100
XL = 40
IV = + 4
CXLIV= 144

Evaluation activity

Change the following roman numerals to Hindu Arabic

a) XLII	b) LXXIX
c) CXLII	d) XXX
e) XXXIX	f) CDLII
g) CDX	h) CDXXV
i) CDXLVI	j) CDLII
k) XCIX	l) XXIV

Ref. Primary School Mathematics book 5 pg 12

Evaluation Strong points _____

Weak points _____

Way forward _____

PERIOD 6

ADDITION AND SUBTRACTION USING ROMAN NUMERALS

Examples

1. Add: CCL + CXXIX and answer in Roman numerals.

	CCL	=		250
+	CXXIX	=	+	129
				379

Therefore; 379 = 300 + 70 + 9
= CCC + LXX + IX
= CCCLXXIX

2. Subtract: CXCV – LIV (answer in Roman numerals)

	CXCV	=	195
-	LIV	=	- 54
			141

Therefore, 141 = 100 + 40 + 1
= C + XL + I
= CXLI

Evaluation activity

Add or subtract the following and answer in Romans

a) DLXX + XIX
b) XIV + XLV
c) XLV + XLV
d) XII + XXXIV
e) XII + XII + V + V
f) XII + X + X + IV
g) XV + IX + V + XIX
h) L + L
i) C + C + C
j) CX + XC

k) Subtract C – LX
l) CCXX – XCI
m) C-IX
n) Subtract DCC from MCC
o) Subtract XC from C
p) Subtract XXVII – XV
q) Subtract C – XV
r) CLXXX – LXXVII

Evaluation Strong points _____

Weak points _____

Way forward _____

PERIOD 7

APPLICATION OF ROMAN NUMERALS

Examples

1. A book had CDLX pages, write the number of pages in Hindu – Arabic

   CD = 400
   LX = 60
   V = + 5
   465 pages

2. A man earned sh. CMXCV. How much money was it in Hindu Arabic numerals?

   CM = 900
   XC = 90
   V = 5
   Sh. 995

Evaluation activity

1) Mary had CDXXV cows. Write the number of cows in Hindu Arabic numerals.
2) There are XC pupils in a school. How many pupils are these in Hindu Arabic numerals?
3) There are 274 pupils in Aduku P/S. Write the number of pupils in Roman numerals.
4) Alex has CCXXIX chicken. Write this number in Hindu Arabic numerals.
5) A man lived for LXXV years. What is his age in Hindu Arabic numerals?
6) My brother gave me CCL shillings for luch, Express this into Hindu Arabic system.
7) Ahmed moved LX km and he further moved XCV km. What is the total distance travelled in Hindu Arabic numerals?
8) A water tank contains DCC litres. How much water does it contain in Hindu Arabic numerals?

Evaluation

Strong points _____

Weak points _____

Way forward _____

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TOPIC 8

TOPIC: OPERATIONS ON WHOLE NUMBERS

ADDITION UP TO SIX DIGITS (SUM, TOTAL, ALTOGETHER)

Examples

1. Add:
$$\begin{array}{r} 4\,4\,2 \\ +\,5\,1\,3 \\ \hline 9\,5\,5 \end{array}$$

2. Add: 368479 + 234567
$$\begin{array}{r} 3\,6\,8\,4\,7\,9 \\ +\,2\,3\,4\,5\,67 \\ \hline 6\,0\,3\,0\,46 \end{array}$$

3. A piece of land measures 241683 sq. metres and another 742813 sq. meters

What is the size of the two pieces of land in sq.meters

$$\begin{array}{rr} & 2\,4\,1\,6\,8\,3 \text{ sq. metres} \\ & 2\,3\,4\,5\,6\,7 \text{ sq. metres} \\ \text{Total} + & 9\,8\,4\,4\,9\,6 \text{ sq. metres} \end{array}$$

Evaluation activity

a) 112230 + 112230
b) 123674 + 112230
c) 176571 + 112230
d) 221165 + 132146
e) 536432 + 134248
f) 843174 + 132182
g) 743358 + 249777
h) The table below shows the amount of rainfall received by the East African countries. Study it and answer the questions that follow.

Months	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
R/fall (mm)	1742	24174	18147	86475	96478	121476	243346	24167	245167	443364	55467	687476

How much rainfall was received in:

a) January and February?
b) March and June?
c) July and December?
d) The first 4 months of the year?
e) In a district, 120125 boys and 146000 girls sat for exams. What was the total number of pupils who sat for the exams in the district?

f) Diary corporation processes 456995 litres of milk, Jesa Farm processes 213143 much milk do they process altogether?
g) Kanaya went to the market and bought 10 goats at sh. 135000 and 12 sheep at sh.107900. How much did he spend altogether?

h) Study Ahmed's daily sales in the table below and answer questions that follow.

Day	**Sales**
Monday	sh. 124, 650
Tuesday	sh. 348,496
Wednesday	sh. 110,345
Thursday	sh. 95,550
Friday	sh. 450,635

a) What was the value of goods sold on Monday and Tuesday?
b) What was the value of goods sold during the first 3 days?
c) What was the value of goods sold on Friday and Thursday?

Evaluation Strong points _____

Weak points _____

Way forward _____

WEEK 4 (PERIOD 1)

SUBTRACTION UP TO 6 DIGITS

Examples

1. Subtract 123643 – 36749

   1 2 3 6 4 3
   _ 3 6 7 4 9
   8 6 8 9 4

2. Subtract 12348 from 123645

   1 2 3 6 4 5
   _ 1 2 3 4 8
   1 1 1 2 97

3. What is the difference between 124567 and 25635

   1 2 4 5 6 7
   _ 2 5 6 3 5
   9 8 9 3 2

4. A water tank holds 100000 litres of water. If 36190 litres are used, how much water is left in the tank?

   1 0 0 0 0 0 litres
   - 3 6 1 9 0 litres
   6 3 8 1 0 litres

Evaluation activity

Subtract the following:

a) 234863 – 52684

b) 134567 – 45325

c) 363654 – 143995

d) 932450 – 316360

e) Subtract 24898 from 637865

f) By how much is 367015 greater than 346729?

g) What must be added to 403126 to get 520200?

h) What is the difference between 10000 and 999?

i) Farmers planted 298770 seedlings of coffee, 112429 trees did not grow. How many trees grew up?

j) Out of 498500 people in a town, 239718 are employed. Find the number of people that are unemployed?

k) The distance between two airports is 123908 km, if a plane had covered 99045km only. What distance was left?

j) The following people had the following amount of money left on their accounts.

Masiko	Ojok	Nabirye	Kasibante	Busingye
Sh. 123813	Sh. 232171	Sh. 313130	Sh. 747352	Sh.25134

a) What is the difference between the money on Kasibante's account and that on Masiko's account?

b) What is the difference between the total amount of the money on Masiko, Ojok, Nabirye and Busingye's accounts and that on Kasibante's account?

Evaluation Strong points _____

Weak points _____

Way forward _____

PERIOD 2

MULTIPLICATION UP TO 4 DIGITS BY 2 DIGITS NATURAL NUMBERS

Examples

1. Multiply 249 x 32

$$\begin{array}{r} 249 \\ \times\ 32 \\ \hline 498 \\ +\ 747 \\ \hline 7968 \end{array}$$

2. A rectangle floor is covered by 26 tiles along the length and 15 tiles along its width. How many tiles are there altogether?

2 6 litres
x 1 5 litres
1 3 0
+ 2 6
3 9 0 tiles

3. There are 146 rows of scouts and girl guides. In each row there are 27 guides and scouts. How many scouts and guides are on the parade?

2 4 6 litres
x 2 7 litres
1 0 2 2
+ 2 9 2
3 9 4 2 scouts and guides

Evaluation activity

a) 12 x 12 b) 123 x 12 c) 55 x 13
d) 1300 x 11
f) What is the product of 69 and 76?
g) Find the product of 432 and 63.

h) A rectangle play ground measures 120m by 48m. How many sq. metres make up that play ground?

i) A parade of soldiers was made up of 233 rows. There are 50 soldiers in each row. How many soldiers were there?

j) A lorry can carry 600 crates of soda. Each crate contains 24 bottles of soda. How many bottles does it carry?

k) There are 32 classrooms in Kaderin P/S. If each classroom has 109 pupils, how many pupils are in that school?

l) A library has 16 shelves of books with 256 books on each shelf, how many books are in that library?

Evaluation Strong points _____

Weak points _____

Way forward _____

DIVISION OF WHOLES BY 2 DIGIT NUMBERS

Examples

1. Divide 5424 by 12

```
        0452
    12 | 5424
```

O x 12 = - 0
54
4 x 12 = -48
62
5 x 12 = - 60
24
2 x 12 = - 24

5424 ÷ 12 = 452

2. 20 men off loaded the same number of bags from a lorry carrying 340 bags. How many did each off load?

```
        017
    20 | 340
```

0 x 20 = - 0
34
1 x 20 = -20
140
7 x 20 = - 140

Each man off loaded 17 bags.

Evaluation activity

a) 748 ÷ 3 b) 698 ÷ 2 c) 372 ÷ 4 d) 1300 ÷ 40
e) 9750 ÷ 2

f) A school has 480 pupils. Each classroom can take 40 pupils, how many classrooms are there in the school?

g) 260 litres of petrol are to be put equally into 20 vehicles. How much fuel will each vehicle get?

h) Mr. Menge divided sh. 14475 equally among 5 children. How much did each get?

i) A charcoal dealer has 903 sacks of charcoal to transport to a market.
   i) If each vehicle carries 60 sacks of charcoal, how many vehicles will he need?
   ii) How many sacks will be left behind?

iii) A retail shop keeper buys 70 dozens of pens from a wholesaler. If he is given 849 pens in all, how many will he get free of charge?

Evaluation Strong points _____

Weak points _____

Way forward _____

COMBINED OPERATIONS OF NUMBER

Question consisting of 2 or more operations i.e addition (A), subtraction (S),
Multiplication (M), Division (D), of (O) and brackets are worked out using the following order:

First	**B**rakets	(B)
Second	**O**f	(O)
Third	**D**ivision	(D)
Fourth	**M**ultiplication	(M)
Fifth	**A**ddition	(A)
Sixth	**S**ubtraction	(S)

The order of operation forms the word BODMAS which is followed when working out mixed operations.

Examples

1. 5 + (3 x 10)
   5 + 30
   = 35

2. (8 + 7) x 10
   15 x 30
   = 150

3. 2 - 8 + 9
   2 + 9 – 8
   11 – 8
   = 3

4. 5 x 12 ÷ 4
   5 x 3
   = 15

Evaluation activity

Work out the following.

a) ½ of 10 + 15 ÷ 5
b) 28 – (4 x 5)
c) 8 + 4 x 5
d) (9 x 9) + 3
e) 6 – 10 + 7
f) 32 – 40 + 18
g) 8 ÷ 4 x 2
h) 8 ÷ (4 x 2)
i) (24 + 16) ÷ 5
j) 10 + 10 ÷ 5
k) (10 + 10)÷ 5
l) 9 – 15 + 6
m) 6 ÷ 6 + 2 –3
n) 18 – (4 x 3) ÷ 6
o) (8 –5) –(3 x 2) + (2 x 2)
p) 33 x 2 + 12 ÷ 12
q) 42 ÷ (7 x 6) x 2
r) 3 x 4 – 2
s) 28 ÷ 4 x 2

Evaluation Strong points _____

Weak points _____

Way forward _____

MEAN/AVERAGE

To find mean, get the sum divided by the number of items.

Example:

1. Find the mean of 2,4 and 6

   Mean = $\frac{\text{Sum}}{\text{No. of items}}$

   $= \frac{2+4+6}{3}$

   $= \frac{6+6}{3}$

   $= \frac{12^{4}}{\cancel{4}^{1}}$

   $= 4$

2. Work out the average of 6, 10, 4 and 10

   AV $= \frac{\text{Sum}}{\text{No. of items}}$

   $= \frac{(6+10)+(4+10)}{4}$

   $= \frac{16+14}{4}$

   $= \frac{30}{4}$

   $= 7\frac{2}{4}$ / 7 ½

Evaluation activity

Find the average of the following.

1. 3, 4, 5
2. 7, 8, 9
3. 0, 2, 4, 8
4. 6, 4, 8, 10

Evaluation Strong points _____

Weak points _____

Way forward _____

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NON-DECIMAL SYSTEM

Decimal system means grouping numbers in tens.

Non - Decimal system means grouping numbers in other groups which are not tens.

- Grouping numbers in twos is base two system of counting also called Binary.
- Grouping in fives is base five system of counting called quinary, etc.

SUMMARY TABLE

Twos	Two	Binary	0, 1
Threes	Three	Trinary	0, 1, 2
Fours	Fours	Quaternary	0, 1, 2, 3
Fives	Fives	Quinary	0, 1, 2, 3, 4,
Sixes	Six	Senary	0, 1, 2, 3, 4, 5,
Sevens	Seven	Septenary/ heptanary	0, 1, 2, 3, 4, 5, 6
Eights	Eight	Octal	0, 1, 2, 3, 4, 5, 6, 7
Nines	Nine	Nonary	0, 1, 2, 3, 4, 5, 6, 7, 8
Tens	Ten	Decimal	0, 1, 2, 3, 4, 5, 6, 7, 8,9

We do not use a digit equal or greater than base itself.
In any system of counting we consider the number of groups of groups made and then objects left.

Grouping in base five

Examples

1. ||||||| In base ten means 7 ones

2. ||||||| In base five = (|||||) |||
   1 group of five, 3 ones
   = 13 five

3. 3 tens to base five
   ||| = 3 ones
   = 3 five

4. (|||) | 6 tens to base five
   base five
   = 1 group of fives, 1 ones
   = 11 five

Evaluation activity

Express the following required base.

a) 4 in base five
b) 8 in base five
c) 4 in base five
d) 7 in base five
e) 11 in base five
f) 8 in base five
g) 18 in base five

Evaluation Strong points _____

Weak points _____

Way forward _____

PLACE VALUES OF BASES

NUMBER	PLACE VALUE	WE READ
12 five	1 group of fives 2 ones 1 2 five Ones Fives	one, two base five
231 five	2 groups of fives 3 groups of fives, 1 ones 2 3 1 four Ones Fives fives fives	Two three one base five

Examples

1. Write the place value of each digit in 302 five.

3 0 2 five
Ones
Fives
Fives fives

2. Find the place value of each digit in 124 six.

1 2 4 Five
Fives
Fives
Five fives

Evaluation Activity

Write the place value of each digit below

a) 4_{five} b) 213_{five}
c) 13_{five} d) 300_{five}
e) 123_{five} f) 123_{five}
g) 234_{five} h) 101_{five}
i) 202_{five} j) 121_{five}
k) 316_{five} l) 24_{five}

Evaluation Strong points _____

Weak points _____

Way forward _____

WRITING BASES IN WORDS

Examples

a) 43_{five} = 4, 3 base five
= four, three base five

b) Write 123 five in words

213_{five} = 2, 1, 3, base five
= two, one three base five

Activity

Write the following in words.

a) 11_{five} b) 243_{five} c) 100_{five}
d) 123_{five} e) 400_{five} f) 201_{five}
g) 101_{five} h) 233_{five}

Evaluation Strong points _____

Weak points _____

Way forward _____

CHANGING NON-DECIMAL TO DECIMAL BASE

Examples

1. Change 14 five to base ten

14_{five} = (1 x fives) + (4 x ones)
= (1 x 5) + (4 x 1)
= 5 + 4
= 9 ten

2. Express 213_{five} in base ten.

123 five = (2 x $_{\text{five}}$ fives) + (1 x fives) + (3 x ones)
= (2 x 5 x 5) + 1 x 5) + (3 x 1)
= (2 x 25) + (1 x 5) + (3 x 1)
= 50 + 5 + 3
= 58 ten

Evaluation Activity

Change the following to base ten.

a) 13_{five} c) 112_{five} b) 124_{six} d) 55_{eight}

e) 23_{four} f) 100_{two} g) 101_{five} h) 211_{three}

i) 41_{five} j) 111_{five}

Evaluation Strong points _____

Weak points _____

Way forward _____

CHANGING FROM DECIMAL TO NON – DECIMAL

Examples

1. Change 9_{ten} to base five

B	N^0.	Rem	3
5	9	4	4
5	1	1	1
	0		

14_{five}

$9_{ten} = 14_{five}$

2. Change 58 ten to base five

B	N^0.	Rem
5	58	3
5	11	1
5	2	2
	0	

213_{five}

$58_{ten} = 213_{five}$

Activity

Change the following to base five

a) 8
b) 6
c) 14
d) 11
e) 30
f) 24

ADDITION IN BASES

Examples

1. Add: $2_{five} + 1_{five}$

$$\begin{array}{r} 2_{five} \\ +\ 1_{five} \\ \hline 3_{five} \end{array}$$

2. Add: $42_{five} + 32_{five}$

$$\begin{array}{r} 4\ 2_{five} \\ +\ 3\ 2_{five} \\ \hline 124_{five} \end{array}$$

7/5 = 1 rem 2

Activity

Add the following:

a) $3_{five} + 2_{five}$
b) $23_{five} + 21_{five}$
c) $11_{five} + 22_{five}$
d) $42_{five} + 15_{five}$
e) $11_{five} + 101_{five}$
f) $142_{five} + 101_{five}$
g) $321_{five} + 333_{five}$
h) $404_{five} + 44_{five}$
i) $101_{five} + 11_{five}$
j) $312_{five} + 32_{five}$

Evaluation Strong points _____

Weak points _____

Way forward _____

SUBTRACTION IN BASES

Examples

1. Subtract: $34_{five} - 13_{five}$

$$\begin{array}{r} 3\ 2_{five} \\ -\ 1\ 3_{five} \\ \hline 21_{five} \end{array}$$

2. $43_{five} - 24_{five}$

$$\begin{array}{r} 4\ 3_{five} \\ -\ 2\ 4_{five} \\ \hline 1\ 4_{five} \end{array}$$

Activity

Subtract the following:

a) $43_{five} - 31_{five}$
b) $53_{five} - 45_{five}$
c) $33_{five} - 22_{five}$
d) $111_{five} - 101_{five}$
e) $203_{five} - 112_{five}$
f) $121_{five} - 22_{five}$
g) $404_{five} - 24_{five}$
h) $110_{five} - 101_{five}$
i) $100_{five} - 11_{five}$
j) $243_{five} - 34_{five}$

Evaluation Strong points _____

Weak points _____

Way forward _____

MULTIPLICATION IN BASES

1. Multiply: $2_{five} \times 3$

2 five (2 x 3) = $^{6}/_{5}$ = 1 rem 1
x 3 6 = 11 five
11 five

2. Work out: $421_{five} \times 2$

421 five (2 x 4) = $^{8}/_{5}$ = 1 rem 3
x 2 8 = 13 five
1342 five

Activity

Workout the following:

a) $3_{five} \times 3$
b) $4_{five} \times 4$
c) $32_{five} \times 3$
d) $12_{five} \times 2$
e) $211_{five} \times 3$
f) $44_{five} \times 3$
g) $321_{five} \times 2$
h) $421_{five} \times 4$
i) $113_{five} \times 3$
j) $110_{five} \times 5$

Finite system

Finite system is a way of counting in remainder.

Finite 5

0	1	2	3	4
5	6	7	8	9
10	11	12	13	14
15	16	17	18	19
20	21	22	23	24

0(finite 5) 5, 10, 15, 20
when divided by 5 give, 0 as a remainder
3(finite 5) 8, 13, 18, 23 give 3 as a remainder
when divided by 5

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Addition of finite system (clock arithemetic)

Example

1. 2 + 1 = _____ (clock 5)
   = 3 (finite 5)

2. 3 + 4 = ____ (finite 5)
   = 7 ÷ 5 (finite 5)
   = 1 rem 2 (finite 5)
   = 2 (finite 5)

Activity:

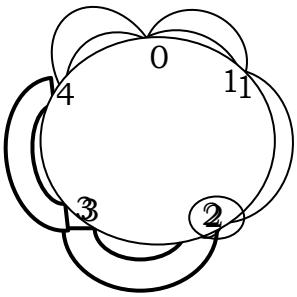
Add the following

1. 3+3 = ____ (mod 5)
2. 4+1 = ___ (finite 5)
3. 2+2 = ____ (finite 5)
4. 4+1 = ____ (mod 5)
5. 4+2 = ___ (finite 5)
6. 4+4 = ___ (mod 5)

Addition of finite system using a dial.

Example:

1. Add 4+3 using a dial in finite 5
   4+3 = ___ (finite 5) Digits used (0,1,2,4)



Therefore 4+3 = 2 (finite 5)

Activity:

Add the following using a dial system

1. 3+2 = ____ (finite 5)
2. 2+4 = ____ (finite 5)
3. 4+4 = ____ (finite 5)
4. 4+1 = ____ (finite 5)
5. 3+4 = ____ (mod 5)

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Subtraction of finite system

Example

1. Subtract 2 – 1 = ___ (mod 5)
   2 – 1 = 1 (mod 5)

2. Subtraction 2-4 = ___ (finite 5)
   (2+5) – 4 ___ (finite 5)
   7 – 4 = ___ (finite 5)
   3 (finite 5)

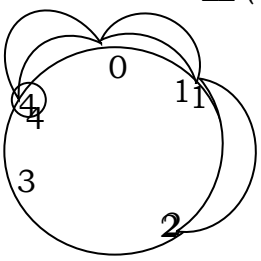
Evaluation activity:

Subtract the following.

1. 4-1 = ___ (finite 5)
2. 3-1 = ___ (finite 5)
3. 4-3 = ___ (mod 5)
4. 3-4 = ___ (finite 5)
5. 2-4 = ___ (mod 5)
6. 4-3 = ___ (mod 5)

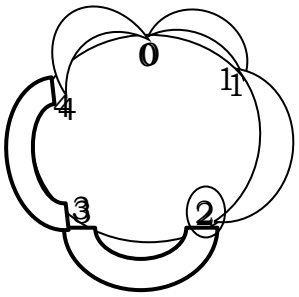
subtraction of finite 5 using a dial system

1. Subtract 2-3 = __ (mod 5) using a dial



Therefore 2-4 = 4 (mod 5)

2. Subtract 1-3 = ___ (finite 5) using a dial



1-3 = 2 (finite 5)

Evaluation activity:

Subtract the following using a dial.

1. 2-1 = ___ (finite 5)
2. 3-2 = ___ (finite 5)

3. 4-1 = ___ (finite 5)
4. 3-4 = ___ (finite 5)
5. 1-4 = ___ (mod 5)
6. 3-1= ___ (mod 5)
7. 0-2 = ___ (mod 5)
8. 4-3 = ____ (mod 5)

NUMBER PATTERNS AND SEQUENCES

Types of numbers

1. Whole numbers e.g (0, 1, 3, 4, 5, ..)
2. Counting numbers/natural numbers e.g (1, 2, 3, 4, 5, ...)
3. Odd numbers- These are numbers that give a remainder when divided by 2. e.g, 1, 3, 5, 7, ...
4. Even numbers: These are numbers that are exactly divisible by two e.g, 0, 2, 4, 6, 8, ...
5. Prime numbers: These are numbers with more than two factors.
6. Composite numbers - These are numbers with more than two factors e.g, 4, 6, 8, 9, 10, 12, ...
7. Square numbers: The are numbers got by multiplying a number by itself. e.g, 1, 4, 9, 16, 25, 36, ...
8. Cube numbers: These are numbers got by multiplying the same number thrice e.g, 1, 8, 27, 64, ...
9. Triangular numbers: These are numbers got by adding consecutive counting numbers e.g, 1, 3, 6, 10, 15, ...

2. List down all factors of 24
   1 x 24 = 24
   2 x 12 = 24
   3 x 8 = 24
   4 x 6 = 24
   F_{24} = {1, 2, 3, 4, 6, 8, 12, 24}

Greatest Common Factors (G.C.F)

1. Find the G.C.F of 12 and 18
   F_{12} = (1, 2, 3, 4, 6, 12}
   F_{18} = {1, 2, 3, 6, 9, 18}

C.F = (1, 2, 3, 6}

G.C.F of 12 and 18 is 6

2. Find the G.C.F of 15 and 20

F_{15} = {1, 3, 5, 15}

F_{20} = {1, 2, 4, 5, 10, 20}

C.F = {1, 5}

G.C.F = 5

Activity

Find the factors of the numbers below

a) 6 b) 8 c) 15 d) 20 e) 18

Find the G.C.F/H.C.F of the numbers below.

a) 12 and 15

b) 18 and 20

c) 6 and 12

d) 8 and 9

e) 3 and 12

Prime factorization of numbers

Prime factorization means dividing a number by its prime factor. We use prime factors when prime factorizing e.g, {2, 3, 5, 7, 11, 13, 17, …}

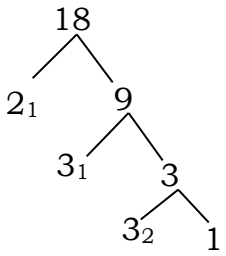
Examples

Prime factorize 18

a) ladder method

2	18	
3	9	
3	3	
	1	

b) Factor tree



We can represent the prime factor as follows:

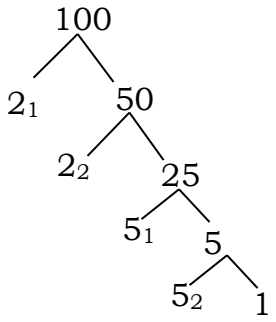
Set notation/ subscript form

F_{18} = {2_1, 3_1, 3_2}

Multiplication form

F_{18} = {2 x 3 x 3}

Prime factorize 100



Subscript form

$F_{100} = \{2_1, 2_2, 5_1, 5_2\}$

Multiplication form

$F_{100} = 2 \times 2 \times 5 \times 5$

Power form

$F_{100} = 2^2 \times 5^2$

Activity

Prime factorize the following:

a) 18 (in power form)

b) 24 (in power form)

c) 9 (in power form)

d) 12 (in subscript form)

e) 8 (in subscript form)

Find the prime factorized numbers below.

a) $(2_1, 2_2, 3_1, 5_1)$

b) $(2_1, 3_1, 3_2, 3_3)$

c) $(2^2 \times 3^3)$

e) $(2_1, 2_2, 2_3)$

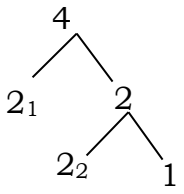
Finding G.C.F by prime factorization

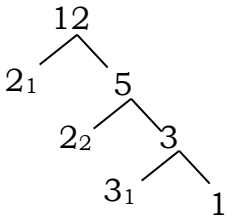
1. Find the G.C.F of 4 and 12 by prime factorization

2	4	12
2	2	6
3	1	3
	1	1

G.C.F = 2 x 2 = 4

OR





Common factors {21, 22}

2 x 2

4

2. Find the G.C.F of 12 and 20.

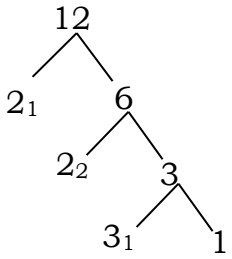
2	12	20
2	6	10
3	3	5
5	1	5
	1	1

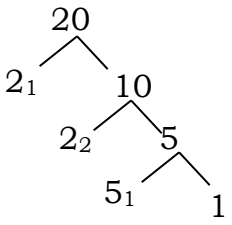
G.C.F

2 x 2

4

OR





G.C.F

2 x 2

4

C.G = (2_1, 2_2)

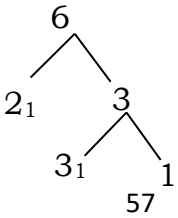
G.C.F = 2 x 2

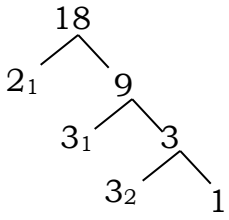
4

Finding LCM by prime factorization

1. Find the L.C.M of 6 and 18

2	6	18
3	3	9
3	1	3
		1





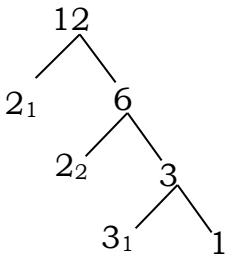
L.C.M
2 x 3 x 3
6 x 3
18

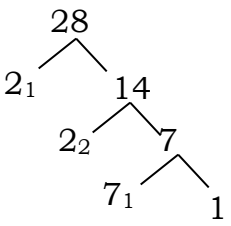
$\{2_1, 3_1, 3_2\}$
= 2 x 3 x 3
= 6 x 3
= 18

2. Find the L.C.M of 12 and 28.

2	12	28
2	6	14
2	3	7
3	3	7
7	1	7
	1	1

OR





L.C.M
2 x 2 x 3 x 7
84

$\{2_1, 2_2, 3_1, 7_1\}$
2 x 2 x 3 x 7
84

Activity

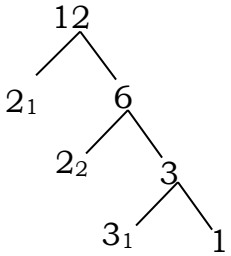
Find the G.C.F and L.C.M f numbers by prime factorization method.

a) 4 and 6
b) 6 and 12
c) 10 and 20
d) 4 and 12
e) 5 and 15
f) 6 and 8
g) 5 and 10

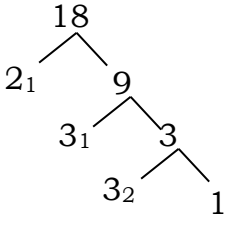
Representing prime factors on venn diagram

Examples

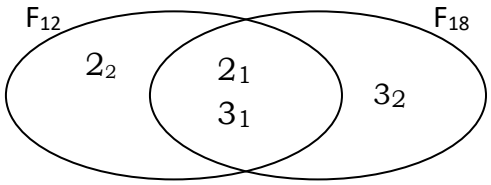
1. Represent the prime factors of 12 and 18 on a venn diagram.



$\{2_1, 2_2, 3_1,\}$



$\{2_1, 3_1, 3_2,\}$



a) Find the GCF of 12 and 18

F12 ∩ F18 = {21, 31}

G.C.F = 2 x 3

= 6

b) Find the LCM of 12 and 18

F12 ∪ F18 = {2_1, 2_2, 3_1, 3_2}

L.C.M = 2 x 3 x 3 x 3

= 36

Activity

1 a) Represent the prime factors of 4 and 8 on a venn diagram.

b) Find the L.C.M of 4 and 8 using the above venn diagram.

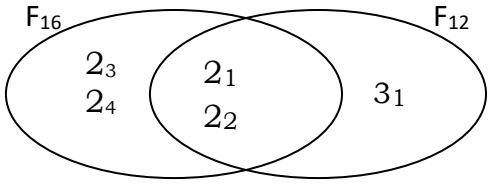
c) Work out the G.C.F of 4 and 8 using the above venn diagram.

2. a) Show the prime factors of 10 and 20 on a venn diagram.

b) Use the above venn diagram to find the G.C.F of 10 and 20.

c) Use the same diagram and find the L.C.M of 10 and 20.

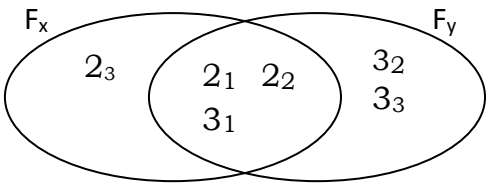
3. Given;



a) Find the L.C.M of 16 and 12.

b) Find the G.C.F of 16 and 12.

4. Given;



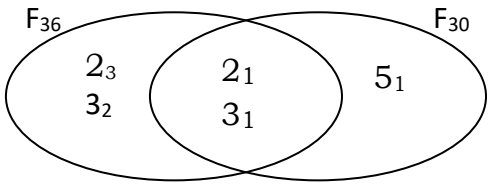
i) Find the value of x.

ii) Find the value of y.

iii) Work out the G.C.F of x and y.

iv) Calculate the L.C.M of x and y.

5. Given;



i) Find $F_{30} \cap F_{36}$

ii) Find G.C.F of 30 and 36

iii) Find F_{30} U F_{36}

iv) Find the L.C.M of 30 and 36

SQUARE ROOTS OF NUMBERS

Review of square numbers.

{1, 4, 9, 16, 25, 36, 47, 64, 81, 100, ...}

A square number is got by multiplying a number by itself.

The symbol for square root is

Examples

1. Find the square root of 36.

2	36
2	18
3	9
3	3
	1

$\sqrt{36} = \sqrt{2 \times 2 \times 3 \times 3}$

$= 2 \times 3$

$= \underline{\underline{6}}$

2. Find the square root of 144.

2	144
2	72
2	36
2	18
3	9
3	3
	1

$\sqrt{144} = \sqrt{2 \times 2 \times 2 \times 2 \times 3}$

$= 2 \times 2 \times 3$

$= 4 \times 3$

$= \underline{\underline{12}}$

Activity

1. Find the squares of the numbers below.

   a) 2 b) 4 c) 6 d) 10

2. Find the square roots of the numbers below using prime factorization method.

   a) 64 b) 16 c) 25 d) 49 e) 225 f) 81

More activity

Find the squares of the fractions below.

a) $^1/_2$ b) $^5/_8$ c) $^1/_3$ d) $^3/_4$ e) 1 ½ f) 0.2

Find the square roots of the following.

a) $^1/_9$ b) 6 ¼ c) 1 $^7/_9$ d) 12 $^1/_4$ e) 0.09

f) 0.44

FRACTIONS

A fraction is a part of a whole.



Shaded fraction $^3/_4$

Un shaded fraction $^1/_4$

Parts of a fraction

The top number is called a numerator.

The bottom number is called a denominator

i.e $\frac{3}{4}$ ___ Numerator
___ Denominator

Types of fractions

a) *Proper fractions*

These are types of fractions where by the numerators are smaller than denominators i.e; $^1/_2$, $^3/_7$, $^7/_{10}$

b) *Improper fractions*

These are fractions with a whole umber and a fractional part e.g, $^3/_2$, $^4/_3$, $^{14}/_5$, $^{15}/_4$

c) *Mixed fractions*

These are fractions with a whole number and a fractional part e.g, $3\ ^1/_3$, $1\ ^1/_4$, $4\ ^1/_5$

Note: For a mixed fraction like $5\ ^2/_3$;

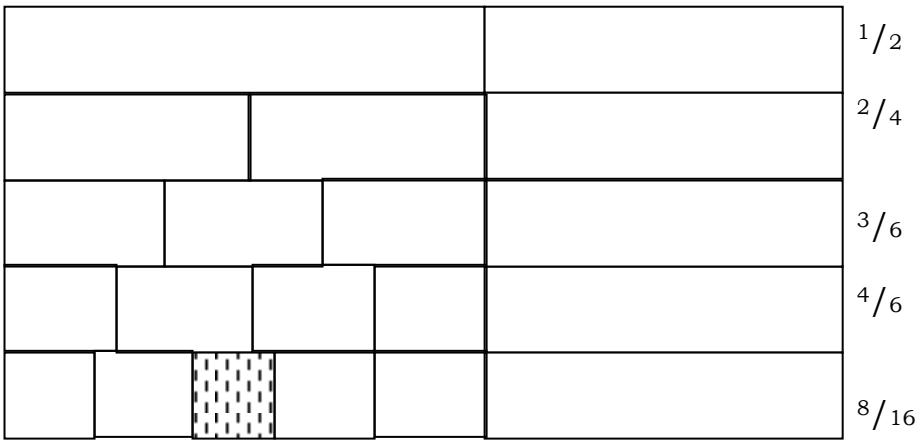
5 is a whole number

2 is a numerator

3 is a denominator

Equivalent fractions

These are fractions with the same value but having different numerators and denominators.



$^1/_2$ = $^2/_4$ = $^3/_6$ = $^4/_8$ = $^8/_{16}$

Writing equivalent fractions

Write the next three equivalent fractions for each of the following.

a) $\frac{2}{7} = \frac{2 \times 2}{7 \times 2} = \frac{2 \times 3}{7 \times 3} = \frac{2 \times 4}{7 \times 4}$

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

$\frac{2}{7} = \frac{4}{14} = \frac{6}{21} = \frac{8}{28}$

b) $\frac{1}{3} = \frac{1 \times 2}{3 \times 2} = \frac{1 \times 3}{3 \times 3} = \frac{1 \times 4}{3 \times 4}$

$\frac{1}{3} = \frac{2}{6} = \frac{3}{9} = \frac{4}{12}$

c) $\frac{2}{5} = \frac{2 \times 2}{5 \times 2} = \frac{2 \times 3}{5 \times 3} = \frac{2 \times 4}{5 \times 4}$

$\frac{2}{5} = \frac{4}{10} = \frac{6}{15} = \frac{8}{20}$

Activity

Write the next two equivalent fractions for each below.

a) $^1/_2$, _____, _____

b) $^2/_3$, _____ , _____

c) $^2/_5$, _____, _____

d) $^1/_3$, _____, _____

Find the unknown below.

a) $^1/_2 = {}^y/_6$

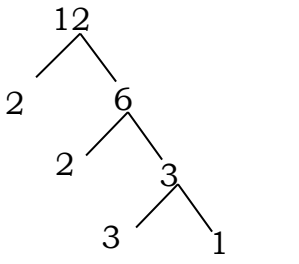
b) $^3/_8 = {}^{15}/_m$

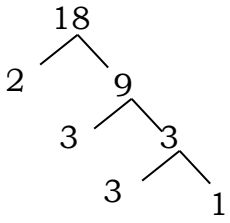
c) $^3/_4 = {}^p/_{16}$

d) $^1/_3 = y/9$

Reducing fractions

1. Reduce $^{12}/_{18}$ to its simplest form.





$\frac{12}{18} = \frac{2 \times 2 \times 3}{2 \times 3 \times 3}$

$= \frac{2}{3}$

OR

$\frac{12}{18} \div 2$

$= \frac{6}{9} \div 3$

$= \frac{2}{3}$

Activity

Reduce the fractions below to their lowest terms.

a) $^{5}/_{10}$ b) $^{8}/_{10}$ c) $^{2}/_{6}$ d) $^{4}/_{16}$

e) $^{6}/_{16}$ f) $^{9}/_{12}$ g) $^{2}/_{16}$ h) $^{8}/_{18}$

Ordering fractions

This involves arranging fractions in either ascending order or descending order.

Examples

Arrange $^{1}/_{3}$, $^{1}/_{2}$ and $^{1}/_{4}$ in ascending order

L.C.M method

M3 = {3, 6, 9, 12, 15, ...}

M2 = {2, 4, 6, 8, 10, 12, 14, ...}

M4 = {4, 8, 12, 16, ...}

L.C.M of 3, 2 and 4 is 12

Therefore $^{1}/_{3}$ x 12, $^{1}/_{2}$ x 12, $^{1}/_{4}$ x 12

Therefore; in ascending order $^{1}/_{4}$, $^{1}/_{3}$, $^{1}/_{2}$

Activity

1. Arrange the fractions below in descending order (decreasing order)
   a) $^{1}/_{3}$, $^{1}/_{2}$ and $^{1}/_{5}$
   b) $^{1}/_{2}$, $^{5}/_{6}$ and $^{1}/_{3}$
   c) $^{1}/_{3}$, $^{2}/_{3}$ and $^{1}/_{6}$
2. Arrange the fractions below in ascending order (increasing order)
   a) $^{3}/_{4}$, $^{1}/_{2}$ and $^{1}/_{3}$
   b) $^{1}/_{8}$, $^{1}/_{5}$ and $^{1}/_{4}$
   c) $^{1}/_{4}$, $^{1}/_{2}$ and $^{1}/_{3}$

Comparing fractions using symbols <, > or =

a) $^{1}/_{3}$ ≥ $^{1}/_{4}$

$^{1}/_{3}$ x 12 $^{1}/_{4}$ x 12

4 **3**

b) $^{5}/_{6}$ ≥ $^{1}/_{2}$

$^{5}/_{6}$ x 6 $^{1}/_{2}$ x 6

5 **3**

c) $^{2}/_{4}$ ≡ $^{8}/_{16}$

$^{2}/_{4}$ x 16 $^{8}/_{16}$ x 16

8 **8**

d) $2\ ^{1}/_{2}$ ≤ $3\ ^{1}/_{4}$

$^{5}/_{2}$ x 4 $^{13}/_{4}$ x 4

10 **13**

Activity

Use >, < or = below correctly

a) $^{1}/_{4}$ _____ $^{1}/_{2}$

b) $^{5}/_{6}$ _____ $^{7}/_{12}$

c) $^{1}/_{4}$ _____ $^{1}/_{6}$

d) $^{2}/_{3}$ _____ $^{5}/_{6}$

e) $^{1}/_{6}$ _____ $^{2}/_{8}$

f) $^{5}/_{12}$ _____ $^{7}/_{8}$

g) 0.4 _____ 0.2

Addition of fractions

1. Add: $^{1}/_{4}$ + ½

$$\frac{1+2}{4}$$

¾

2. John filled $^{1}/_{2}$ of a tank in the morning and $^{2}/_{5}$ in the afternoon, what fraction did he fill altogether?

$$\frac{1}{2} + \frac{2}{5} = \frac{5+4}{10}$$

$$= \frac{9}{10}$$

3. Work out

$2\ ^{1}/_{3}$ + $1\ ^{1}/_{4}$

$$\frac{[(3 \times 2) + 1]}{3} + \frac{[(4 \times 1) + 1]}{4}$$

$$\frac{[(6 + 1)]}{3} + \frac{[(4 + 1)]}{4}$$

$$\frac{7}{3} + \frac{5}{4}$$

$$\frac{28 + 15}{12}$$

$$\frac{43}{12}$$

$= 3\,{}^{7}/_{12}$

OR

$$2 + 1 + \left[\frac{1}{3} + \frac{1}{4}\right]$$

$$3 + \frac{4 + 3}{12}$$

$$3 + \frac{7}{12}$$

$= 3\,{}^{7}/_{12}$

Activity

1. Add the following fractions

   a) ${}^{1}/_{5} + {}^{2}/_{8}$

   b) ${}^{1}/_{6} + {}^{4}/_{6}$

   c) Find the sum of ${}^{2}/_{7}$ and ${}^{3}/_{7}$

   d) John dug ${}^{1}/_{6}$ of the garden and Mary dug ${}^{4}/_{6}$ of the dug. What fraction was dug?

   e) Add: $1\,{}^{1}/_{3} + 4\,{}^{1}/_{3}$

   f) Add: 3 ½ to 4 ½

Subtraction of fractions

1. Subtract: $\frac{4}{5} - \frac{1}{5}$

   $= \frac{4 - 1}{5}$

   $= {}^{3}/_{5}$

2. A baby was given 5/6 of a glass of water, if it drank 7/12, what fraction remained?

   $\frac{5}{6} - \frac{7}{12}$

$= \frac{10 - 7}{12}$

$= \frac{3}{12}$

$= \underline{\underline{1/4}}$

3. Isaac had $3/4$ of a sugarcane. If he gave $3/5$ of it to Peter, what fraction did he remain with?

$\frac{3}{4} - \frac{3}{5}$

$= \frac{15 - 12}{20}$

$= \frac{3}{20}$

Activity

1) Sub tract $3/4 - 1/3$
2) Subtract $7/12 - 1/12$
3) Subtract $2/7$ from $5/7$
4) I read $2/5$ of a mathematics book. What fraction was left?
5) Subtraction $1/3$ from $1/2$
6) John was given $3/4$ of the sugarcane; he gave $1/6$ of to his friend. What fraction of the sugarcane did he remain with?

Multiplication of fractions

1. Work out $\frac{1}{3} \times \frac{2}{5}$

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

$= \underline{\underline{\frac{2}{15}}}$

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

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

$= \underline{\underline{1/4}}$

3. What is 2/5 of 20 books?

   $^2/_5$ x 20 books

   8 books

4. What is 2½ of 2 dozens?

   1 doz ⟶ 12 items

   2 doz ⟶ (2 x 12) items

   24 items

5. 2 ½ ⟶ $^5/_2$

   Therefore; $^5/_2$ x 24 items

   60 items

Activity

Work out the following:

1) Multiply 4 x $^1/_2$
2) Multiply $^1/_3$ x ½
3) Workout $^1/_2$ of $^1/_4$
4) What is $^2/_3$ of 15?
5) What is $^3/_4$ of sh. 400?
6) Multiply $^1/_3$ of 12
7) What is $^1/_{10}$ of 60 min?
8) What is ¾ of 280 grams?

Reciprocal of fractions

Reciprocal of $^3/_5$ is $^5/_3$

A reciprocal is a fractional number multiplied by a given fraction to give answer 1.

Any fraction multiplied by its reciprocal always gives the answer as 1.

Examples

Find the reciprocal of ¾

Let the reciprocal be m.

¾ x m = 1

¾ m = 1

4 x ¾ m = 1 x 4

3m =

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

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

Therefore, the reciprocal of ¾ is 4/3.

Activity

Find the product of the given number and its reciprocal

a) 5 b) $\frac{3}{8}$ c) $3\frac{1}{2}$

Find the reciprocal of each below.

a) $\frac{1}{2}$ b) $\frac{1}{3}$ c) 3 ¼ d) $\frac{5}{8}$ e) 3 ¼

f) 0.4 g) $\frac{4}{9}$

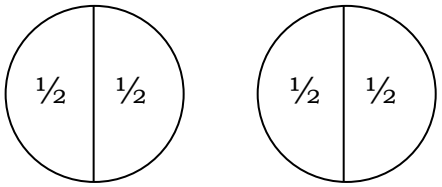
Division of fractions

Division of wholes by fractions

1. 2 ÷ ½

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

= 4

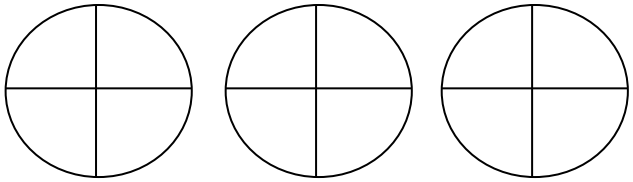


Therefore; 2 ÷ ½ = 4

2. 3 ÷ ¼

3 x $\frac{4}{1}$

= 12



Therefore; 3 ÷ ¼ = 12

3. How many half litre cups are in a 3 litre jerrycan?

3 ÷ ½

3 x 2

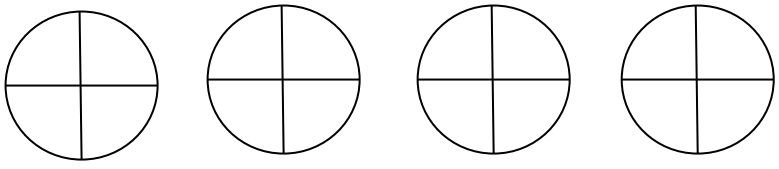
1

6 half litre cups

4. How many ¼ kg packets of sugar can be packed from 4 kgs?

4 ÷ ¼

4 x $\frac{4}{1}$



16 quarter kg packets can be packed from 4k

Division of fractions by fraction

Examples

1. Work out:

$\frac{2}{3} \div \frac{4}{4}$
$\frac{2}{3} \times \frac{5}{4}$
$\frac{10}{12} \div \frac{2}{2}$
$^{5}/_{6}$

2. Divide

$\frac{3}{4} \div \frac{1}{3}$
$3 \div 3$
$4 \quad 1$
$^{9}/_{4}$
$2\ ^{1}/_{4}$

3. Work out
$2\ ^{1}/_{4} \div 1\frac{1}{2}$
$^{9}/_{4} \div {}^{3}/_{2}$
9×2
$4 \quad 3$
$^{3}/_{2}$
$1\ \frac{1}{2}$

Activity

1. Divide $2 \div \frac{1}{2}$
2. Divide $4 \div 1/3$
3. Work out $24 \div 2/3$
4. Simplify $5/6 \div 2/3$
5. Divide $5/9 \div 2/3$
6. Work out $3/4 \div 1/2$
7. Divide 0.12 by 0.3
8. Simplify 0.12 by 0.6
9. How many ½ kg of meat are in 24kg?
10. How many quarter bottles of paraffin can be packed from 8 bottles?

Mixed operations with fractions

Examples

1. Work out

1 + 1 - 1

2 3 4

$\left[\frac{3+2}{6}\right] - \frac{1}{4}$

$\frac{5}{6} - \frac{1}{4}$

$\frac{10-3}{12}$

$\frac{7}{12}$

2. Simplify:

$\frac{5}{6} - \frac{5}{9} + \frac{7}{18}$

$\left[\frac{5}{6} + \frac{7}{18}\right] - \frac{5}{9}$

$\left[\frac{15+7}{18}\right] - \frac{5}{9}$

$\frac{22}{18} - \frac{5}{9}$

$\frac{22-10}{18}$

$\frac{12}{18} = {}^{2}/_{3}$

Activity

1. Work out ${}^{3}/_{4} \times {}^{4}/_{9} \div {}^{6}/_{10}$
2. Simplify $1\frac{1}{2} \div 1\,{}^{1}/_{5} \times 1\,{}^{3}/_{5}$
3. Simplify ${}^{2}/_{3}$ of $({}^{3}/_{4} - {}^{1}/_{3})$
4. Simplify ${}^{1}/_{3}$ of ${}^{1}/_{4} \times {}^{1}/_{2}$
5. Work out ${}^{1}/_{4} - {}^{2}/_{3} \div {}^{1}/_{9}$
6. Work out ${}^{4}/_{6} \div ({}^{3}/_{4}$ of 3)
7. Work out 4.6 - 3.8

Application of fractions

1. In a class of 60 pupils, ${}^{2}/_{3}$ are girls and the rest are boys.

   a) Find the fraction for boys.

   $1 - {}^{2}/_{3}$

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

b) How many boys are in the class?

$^1/_3$ x 60 pupils

20 boys

c) How many girls are in the class?

2 x 60 pupils

3

40 girls

d) How many more girls than boys are in the class?

40 girls

20 boys

\- 20 more girls

DECIMALS

Changing fractions to decimals.

1. $\frac{6}{10}$

$= 10\overline{)6}\ 0.6$

$0x10 - 0$

$6\ 0$

$6x10 = 6\ 0$

$\frac{6}{10} = 0.6$

2. $\frac{2}{5} = 5\overline{)2}\ 0.4$

$0x5 = 0$

20

$4x5 = 20$

$\frac{2}{5} = 0.4$

Changing decimals to fractions

Examples

1. Change 0.6 to a common fraction

0.6 (1 decimal place)

$0.6 = \frac{6 \div 2}{10 \div 2}$

$\frac{3}{5}$

2. Change 0.05 to a common fraction
   0.05 (2 decimal places)
   $0.05 = \frac{5}{100} \div 5$
   $= \frac{1}{20}$

Activity:

1. Write the following decimals as common fractions.
   h) 0.3
   ii) 0.9
   iii) 3042
   iv) 0.64
   v) 0.978
   vi) 23.42

Writing the following decimals in words

a) 0.303

Thousandths
Hundredths
Tenths

0.303 - Three hundred three thousandths

b) 2.15

Hundredths
Tenths
and
Ones

2.15 - Two and fifteen hundredths

c) 1 9. 0 0 4

Thousandths
Hundredths
Tenths
and
Ones
Tens

19.004 - Nineteen and four thousandths

Activity:

1. 0.1
2. 0.22
3. 0.009
4. 3.5
5. 0.019
6. 246.9
7. 0.034
8. 87.5
9. 2.14
10. 14.006
11. 0.625
12. 9.125

Writing decimals in figures

1. Write three tenths in figures

   Three tenths = $\frac{3}{10}$ = 0.3

2. Two and forty five hundredths

   Two and forty five hundredths

   2 and $\frac{45}{100}$

   2 + $\frac{4.5}{100}$

   2 + 0.45

   0.45
   + 2.00
   2.45

3. Sixty nine and nine tenths

   Sixty nine and nine tenths

   69 and $\frac{9}{10}$

   69 + $\frac{9}{10}$

   69 + 0.9

   0 0 .9
   + 6 9 .0
   6 9 .0

Activity

Write the following in figures.

1. Six and five tenths

2. Nine tenths
3. Four thousandths
4. Two and thirty eight hundredths
5. Ninety seven hundredths
6. Ninety two thousandths
7. Forty two and eight hundredths
8. Five hundred twenty four and nine hundred ninety one thousandths
9. Two thousand twelve and eight tenths
10. One hundred twenty one and six tenths

COMPARING DECIMALS

Examples

1. Use ≥, ≤ or = to complete the following statements.
   a) 0.6 ≥ 0.48
   ↓ ↓
   6x10⁰ 48 x10⁰
   10 10⁰
   (6x10) (48x1)
   = 60 ≥ 48

   b) 0.07 ≤ 0.7
   ↓ ↓
   7x1~~00~~ 7x10⁰
   1~~00~~ 1~~0~~
   (7x1) (7x10)
   = 7 ≤ 70

   c) 20.9 ≤ 20.09
   ↓ ↓
   29x10 2009x1~~0~~~~0~~
   1 1~~00~~
   (29x10) 2009
   290 ≤ 2009

Activity:

1. Which is greater?
   a) 0.02 or 0.2
   b) 0.9 or 0.09
   c) 0.08 or 0.3
2. Which is less?
   a) 0.3 or 0.03
   b) 0.08 or 0.4
   c) 0.08 or 0.3

3. Use ≥, ≤ or = to complete the following
   i) 0.1 _____ 0.09
   ii) 0.05 ____ 0.1
   iii) 1.02 ____ 1.2
   iv) 0.04 _____ 0.8

DECIMALS

Place values of decimal

Example

1 4 .1 5 3
- 3 — Thousandths
- 5 — Hundredths
- 1 — Tenths
- 4 — Ones
- 1 — Tens

Activity

Write the place value of each digit in the following decimals.

1. 2.3
2. 701.06
3. 4.25
4. 264.426
5. 15.903
6. 101.2
7. 356.110

Values of decimals

Examples

5 3.1 4 7
- 7 — $7 \times \frac{1}{1000} = \frac{7}{1000} = 0.007$
- 4 — $4 \times \frac{1}{100} = \frac{4}{100} = 0.04$
- 1 — $1 \times \frac{1}{10} = \frac{1}{10} = 0.1$
- 3 — $3 \times 1 = 3$
- 5 — $5 \times 10 = 50$

Activity:

Write the value of each digit in the following decimals.

1. 47.05
2. 265.157
3. 50.314
4. 413.5
5. 614.57
6. 22.740

Expanding decimals using values

Example

1. 43.145

T	O	Tths	Hths	Tths
4	3	1	4	5

$(4X10) + (3X1) + (1X\frac{1}{10}) + (4X\frac{1}{100}) + 5X\frac{1}{100}$

$40 + 3 + \frac{1}{10} + \frac{4}{100} + \frac{5}{1000}$

$40 + 3 + 0.1 + 0.04 + 0.005$

Activity
Expand the following decimals using values

1. 3.4
2. 513.107
3. 86.94
4. 31.247
5. 479.649
6. 72.46
7. 12.13
8. 75.802

Ordering decimals

Arranging decimals in ascending order.

Example

1. 0.101, 0.111, 0.11

$\frac{101}{1000}$, $\frac{111}{1000}$, $\frac{11}{100}$ L.C.M = 1000

$0.101 = \frac{101}{1000} \times 1000 = 101$ (1st)

$0.11 = \frac{11}{100} \times 1000 = 110$ (2nd)

$0.111 = \frac{111}{1000} \times 1000 = 111$ (3rd)

The from smallest

= 0.101, 0.11, 0.111

Arrange the following in ascending order.

1. 0.1, 1.1, 0.11
2. 3.5, 0.35, 0.5
3. 0.9, 0.09, 0.009
4. 0.105, 0.15, 0.015
5. 0.404, 0.044, 0.44
6. 0.3, 0.07, 0.15
7. 0.1, 0.303, 0.33

Ordering decimals in descending form

Example

1. 0.019, 0.19, 0.91

$\frac{19}{1000}$, $\frac{19}{100}$, $\frac{91}{100}$ L.C.M 1000

$0.91 = \frac{91}{100} \times 1000 = 910$ (1st)

$0.19 = \frac{19}{100} \times 1000 = 190$ (2nd)

$0.019 = \frac{19}{1000} \times 1000 = 19$ (3rd)

The order in descending form = 0.91, 0.19, 0.019

Write the following decimals in descending order.

1. 0.22, 0.2, 0.202
2. 0.505, 0.55, 0.555
3. 0.101, 0.111, 0.11
4. 7.7, 0.77, 0.11
5. 0.65, 0.065, 0.605
6. 0.009, 0.09, 0.9

Addition of decimals

Example

1. Add: 0.58 + 5.8 + 58.00

$$\begin{array}{r} {\scriptstyle 1\,1}\\ 0.58\\ 5.8\\ +\ 58.00\\ \hline 64.38 \end{array}$$

2. Add 1.7 + 2.5

$$\begin{array}{r} 1.7\\ +\ 2.5\\ \hline 4.2 \end{array}$$

Work out the following

1. 0.45 + 13.2 + 52.00
2. 3.982 + 4.007 + 9.02
3. 2.7 + 8.92 + 0.37
4. 0.222 + 2.22 + 22.22
5. 8.24 + 22.9
6. 4.375 + 8
7. 17.6 + 35.1
8. 16.25 + 3.95
9. 0.701 + 47.31
10. 10 + 1.46

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Subtraction of decimals

Examples

1. 8.54 – 2.34

   8.54
   - 2.34
   6.20

2. 160 – 93.9

   160.0
   - 93.9
   76.1

Subtract the following decimals

1. 78 – 3.5
2. 97.4 – 13.69
3. 7.2 – 5.369
4. 50.112 – 17.48
5. 14.9 – 3.51
6. 29 – 6.9
7. 73 – 19.5
8. 12 – 9.5
9. 166 – 66.9
10. 35.1 – 17.6

Multiplication of decimals

Examples

1. 0.125 x 10

   125 x 10
   1000

   125
   100

   1.25

2. 15.6 x 100

   156 x 100
   10

   156 x 10

   1560

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Workout the following

1. 7.425 x 10
2. 9.46 x 10
3. 30.729 x 10
4. 0.733 x 100
5. 8.375 x 100
6. 13.489 x 100
7. 8.375 x 1000
8. 0.723 x 1000
9. 15.6 x 1000
10. 9.46 x 1000

Division of decimals

Example

1. 3.6 ÷ 0.4

$\frac{36}{10} \div \frac{4}{10}$

$\frac{\cancel{36}^{\cancel{18}9}}{3_1} \times \frac{\cancel{10}^{1}}{\cancel{4}\cancel{2}_{\cancel{2}1}}$

3.6 ÷ 0.4 = 9

2. 3 ÷ 0.1

$\frac{3}{1} \div \frac{1}{10}$

$\frac{3}{1} \times \frac{10}{1}$

$\frac{30}{1}$

Therefore 3 ÷ 0.1 = 30

Work out the following

1. 0.12 ÷ 6
2. 8 ÷ 0.1
3. 0.04 ÷ 0.2
4. 0.45 ÷ 9

5. 4.2 ÷ 0.6
6. 0.84 ÷ 0.7
7. 0.91 ÷ 1.3
8. 0.11 ÷ 2.2
9. 1.48 ÷ 0.22
10. 0.3 ÷ 0.15

Working out decimals involving mixed operation.

Example

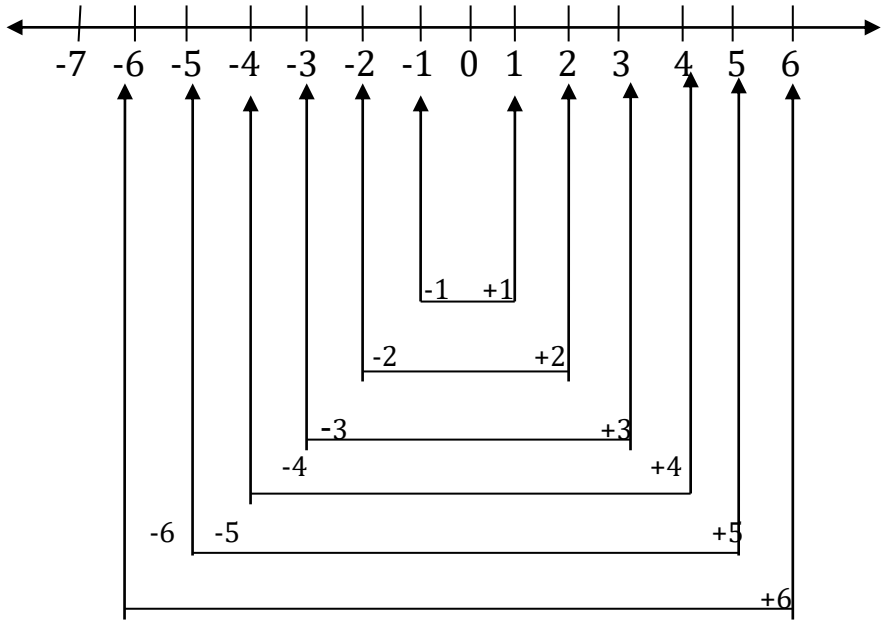
1. 35.1 – 44.3 + 17.6

   35.1
   + 17.6
   52.7
   - 44.3
   08.4

Workout the following

1. 12 - 0.75 + 0.75
2. 5.625 – 8+4.375
3. 2.76 - 2.85 + 169
4. 23.7 – 65.9 + 82.6
5. 7.982 – 9.082 + 4.007
6. 8.24 + 22.9 – 7.8
7. 4.000 – 2.625 + 33.000
8. 13.75 – 27 + 91.25
9. 52.00 – 13.2 + 0.45
10. 58.00 – 5.8 + 0.58

Inverses of integers or opposites of integers



Note: When a number is added to its inverse the result is zero.

Examples

1. The inverse of -1 is +1
2. The inverse of +1 is -1
3. The inverse of -5 is +5
4. The inverse of +3 is -3
5. What is the additive inverse of 2?
   Let the inverse be y
   $2 + y = 0$
   $2 - 2 + y = 0$
   $y = -2$

Exercise

Name the inverse or opposite of the following integers

1. +5
2. -9
3. +10
4. +5x
5. -30

6. -7
7. +31
8. -14
9. +25
10. -56
11. +100
12. -200
13. -500
14. +60y
15. -42m

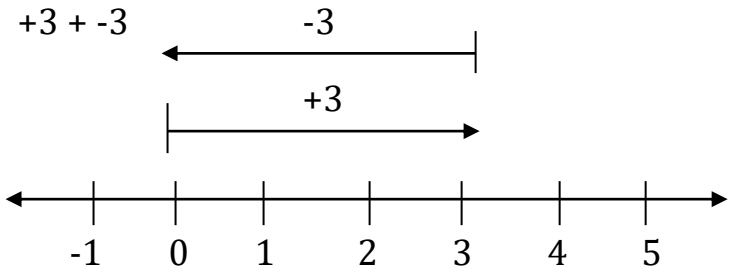
Additive inverse

Additive inverse is a number which gives zero when added to another number.

Inverse property: Any number added to its inverse or opposite gives zero

Examples

1. +3 + -3



+3 + -3 = 0

2. -4 + +4 =

-4 + +4 = 0

Exercise

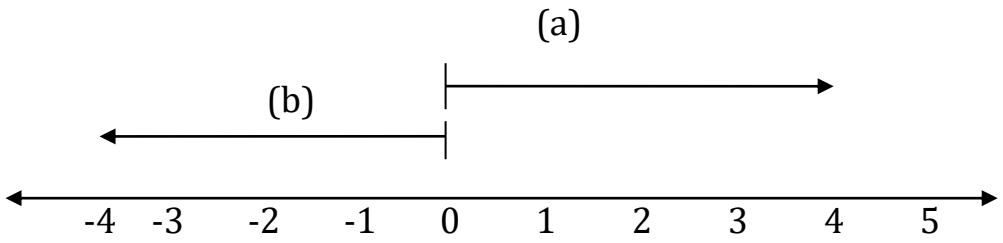
1. Work out the following without a number line.

-11 + + 11 =

2. -56 + +56 =

3. _88 + -88 =
4. -20 + ⁺20 =
5. +21 + -21 =
6. -34 + ⁺34 =
7. -150 + ⁺150 =
8. -6f + +6f =
9. -152 + ⁺152 =
10. - 40+ ⁺ 40 =

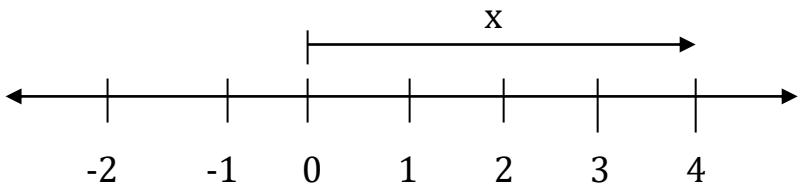
Arrows on number lines / showing integers on a number line.



NB
Any arrow running in the direction of arrow (a) is a positive arrow.
Any arrow running in the direction of arrow (b) is a negative arrow.

Examples

1. What integers are represented by the arrows on the number lines below.



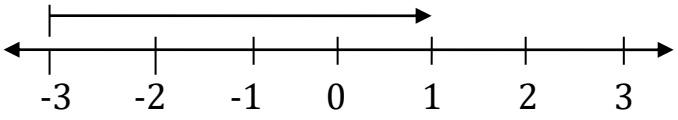
x = 4

2.

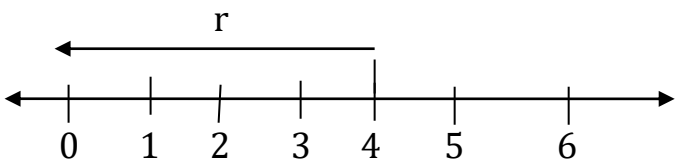


y= -5

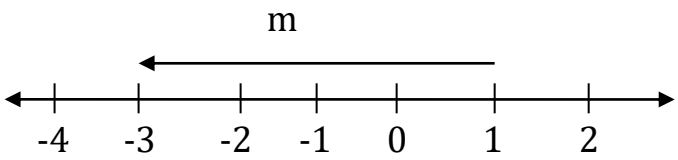
3. Z



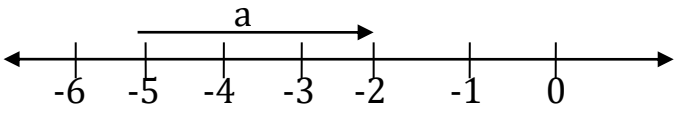
Z= 4

4. 

r=_____

5. 

m=_____

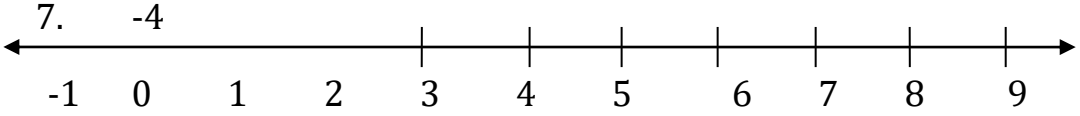
6. 

a=

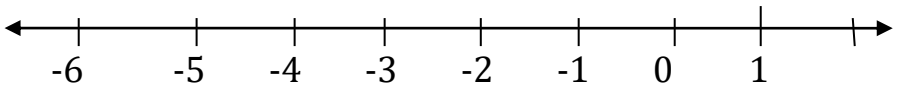
Representing integers on a number line

Represent the following integers on the number lines below.

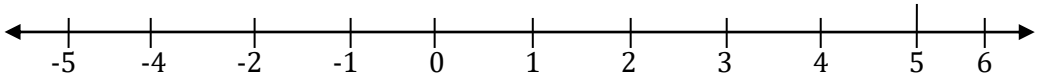
7. -4



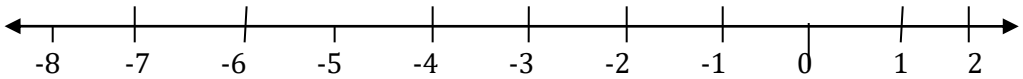
8. +6

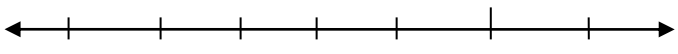


9. +10



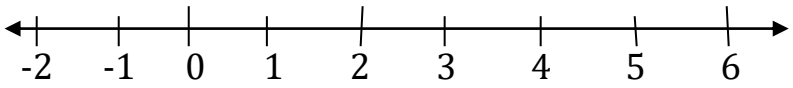
10. -9





11. -5 -3 -2 -1 0 1 2 3

12. -7

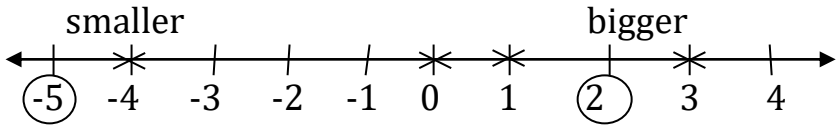


Ordering integers

Ordering integers using a number lie

Examples

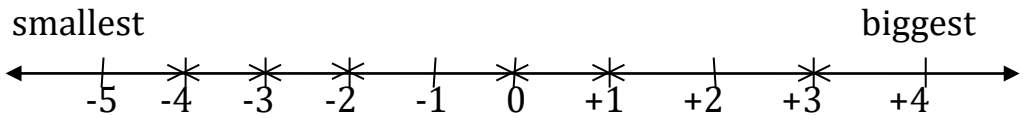
1. Which is smaller -5 or +2



-5 is smaller

.. -5 ≤ 2

2. Arrange +1, -3, 0, -2, +3, -4 starting with the smallest



-4, -3, 0, +1, +3

Exercise

Arrange the following as instructed in brackets

1. _1, 2, -3, 4, -5, (from the smallest)
2. -2, +2, -3, +3 (in descending order)
3. +1, -2, +3, -4, +5 (from the biggest)
4. -10, +1, -3, +5 (from the smallest)

5. -4, +4, 0, -3, +6 (in ascending order)
6. Which is bigger -2 or 0?
7. Which is smaller -10, pr +3?
8. Which is bigger 0 or -4
9. Which is smaller +7 0r -3?
10. Which is bigger +4 0r 0?

Addition of integers without a number line

Tips

a) If both integers are positive the result is +ve
b) If both integers are negative the result is –ve
c) If the positive numeral is bigger the result is +ve
d) If the negative numeral is bigger the result is –ve
e) If a number is added to its inverse/opposite the result is zero.

Examples

1. +4 + +6

   +4(++)6 +x+=+

   +4 + 6

   =+10

2. +8 + -5

   +9(+-) +x - = -

   +8 – 5

   +3

3. -3 + +7

   -3(++) 7

   -3 + 7

   = +4

4. -5+ -5

-5(+-)5 +x- = -

-5 – 5

-10

Exercise

Add the following without using a number line.

1. +8 + +5
2. -8 + +4
3. +12 + +4
4. -10 + -5
5. -6 + +9
6. -11 + +4
7. -20 + -25
8. -12 + +8
9. +8 + -8
10. -6 + -6
11. +6 + -6
12. -16 + +6

Addition of integers using a number line

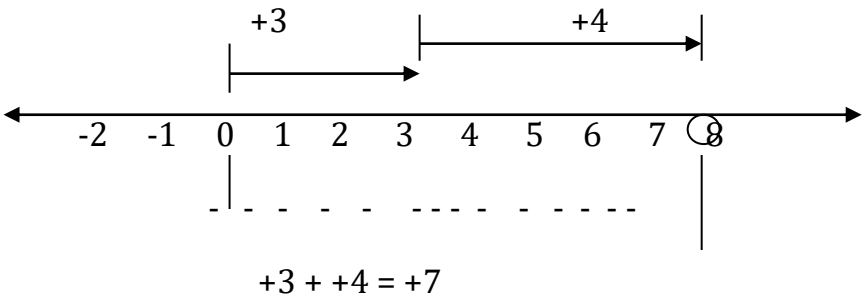
Note

1. Your face is your +ve
2. Your back is your –ve
3. Always start facing the direction of the +ve arrow
4. An addition operation means face the direction of the positive arrow.
5. A subtraction operation means face the direction of the –ve arrow
6. For positive integers move using your face (move forward)

7. For negative integers move using your back. (move backwards)

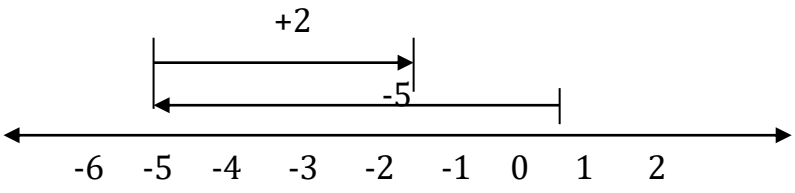
Examples

1. Add +3 + +4 using a number line



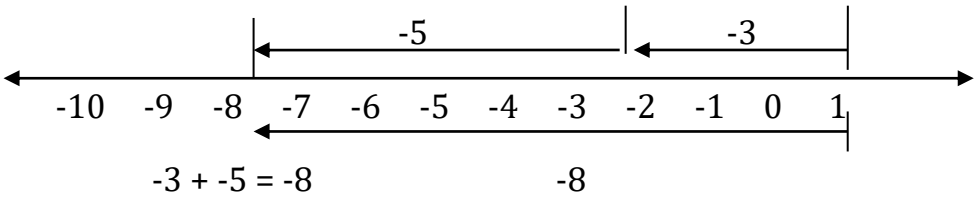
+3 + +4 = +7

2. Add -5 + + 2 using a number line.



-5+ +2 = -3

3. -3 + -5. Add using a number line



-3 + -5 = -8 -8

Exercise

Add the following using a number line

1. +3 + +2
2. +4 + +3
3. -1 + +5
4. -6 + +7
5. +6 + +3
6. -7 + +5

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7. +9 + -3

8. -6 + -5

9. -8 + +8

10. +9 +-9

Add the following additive inverses on a number line.

11. +4 + -4 =

12. -7 + +7 =

13. +5+ -5 =

14. -9 + +9 =

15. +8 + -8 =

Addition of integers without a number line

Tips

a) If both integers are positive the result is +ve

b) If both integers are negative the result is –ve

c) If the positive numeral is bigger the result is +ve

d) If the negative numeral is bigger the result is –ve

e) If a number is added to its inverse/opposite the result is zero.

Examples

1. +4 + +6

+4(++)6 +x+=+

+4 + 6

=+10

2. +8 + -5

+9(+-) +x - = -

+8 – 5

+3

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3. -3 + +7

   -3(++) 7

   -3 + 7

   = +4

4. -5+ -5

   -5(+-)5 +x- = -

   -5 – 5

   -10

Exercise

Add the following without using a number line.

1. +8 + +5
2. -8 + +4
3. +12 + +4
4. -10 + -5
5. -6 + +9
6. -11 + +4
7. -20 + -25
8. -12 + +8
9. +8 + -8
10. -6 + -6
11. +6 + -6
12. -16 + +6

Addition of integers using a number line

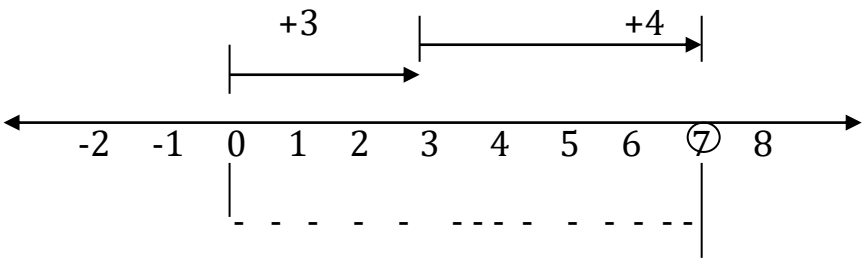
Note

1. Your face is your +ve

2. Your back is your –ve
3. Always start facing the direction of the +ve arrow
4. An addition operation means face the direction of the positive arrow.
5. A subtraction operation means face the direction of the –ve arrow
6. For positive integers move using your face (move forward)
7. For negative integers move using your back. (move backwards)

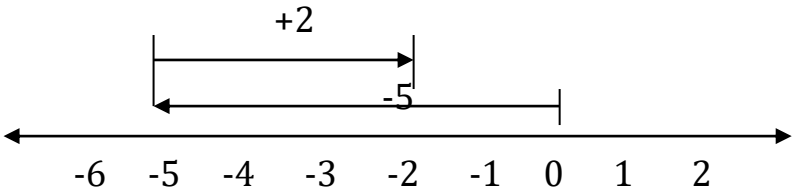
Examples

1. Add +3 + +4 using a number line



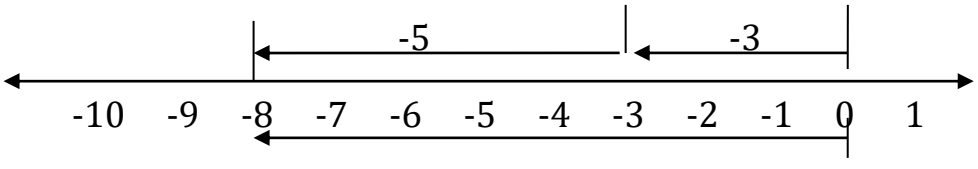
+3 + +4 = +7

2. Add -5 + + 2 using a number line.



-5+ +2 = -3

3. -3 + -5. Add using a number line



-3 + -5 = -8 -8

Exercise

Add the following using a number line

1. +3 + +2

2. +4 + +3
3. -1 + +5
4. -6 + +7
5. +6 + +3
6. -7 + +5
7. +9 + -3
8. -6 + -5
9. -8 + +8
10. +9 +-9

Subtraction of integers without using a number line

Examples

1. +7 - +3

   +7(-+)3 -x + = -

   +7 – 3

   = +4

2. +6- -2

   +6(- -)2

   +6 + 2

   +8

3. -7 - -9

   -7(- -) 9 – x - = +

   -7 +9

   +2

Exercise

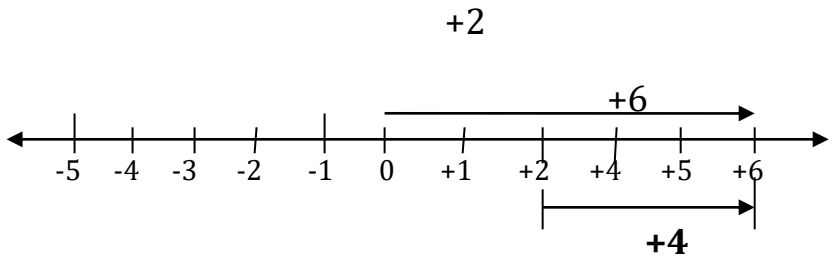
Subtract the following without using a number line

1. +6 - +4
2. -2 - +2
3. +9 -+12
4. -6 - +3
5. +8 - +5
6. -1 - -1
7. +5 - +5
8. +6 - -6
9. +6 - +6
10. +12 - -4
11. +12 - -3
12. -12 - -18

Subtracting integers using a number line

Example

+6 - +2



Note

In subtraction of integers, maintain the integers and their sings on the number line and always all the arrow start from the same origin.

Activity

Subtract the following using number line

1. +7 - +2

2. +6 - ⁺1

3. -3 - ⁺2

4. -3 - ⁺7

5. -10 - ⁻6

6. -2 - ⁻8

7. +4 - ⁻8

8. +6 - ⁻4

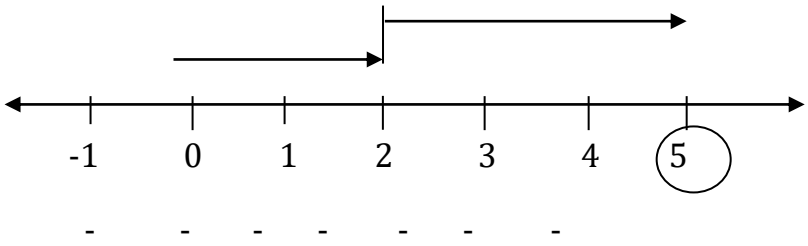
9. -4 - ⁺2

10. +1 - ⁻1

Formation of mathematical statements from number lines

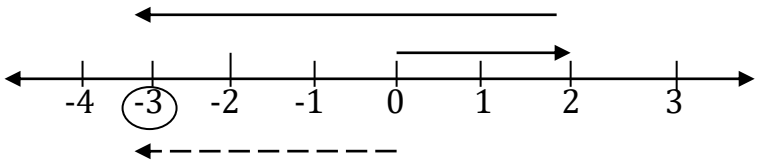
Example

1.



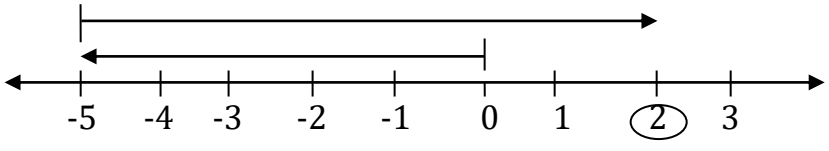
Statement - +2 + +3 = +5

2.



+2 + -5 = -3

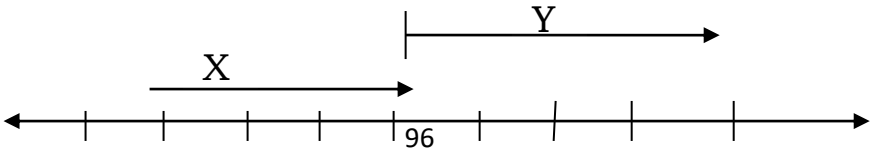
3.

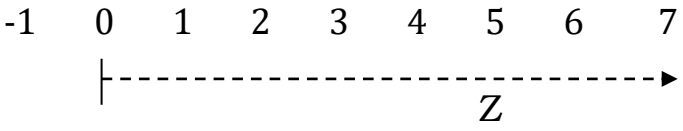


-5 + ⁺7 = ⁺2

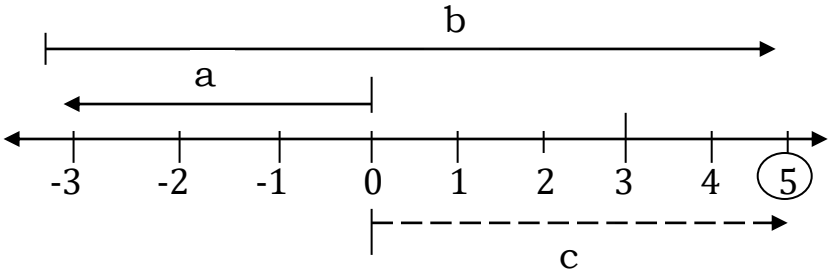
Exercise

1. Write mathematical statements for the number lines below.

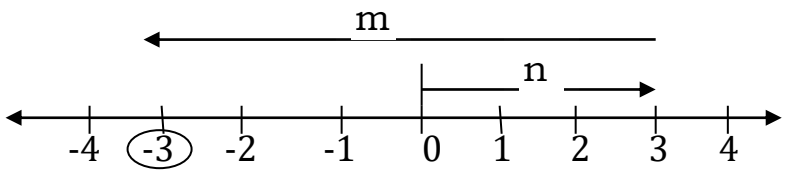




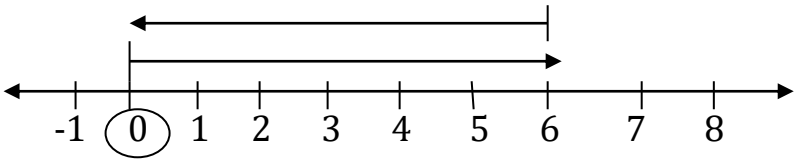
2.



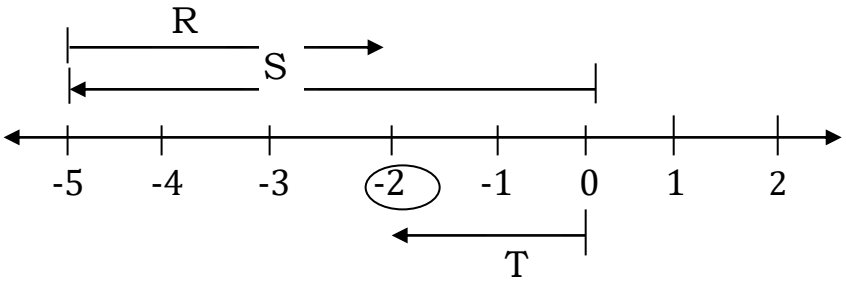
3.



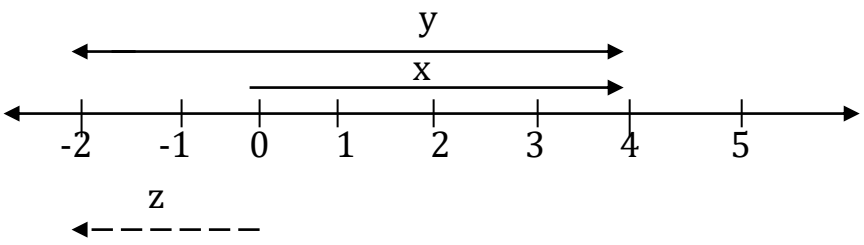
4.



5.



6. Study the number line below and answer questions that follow.

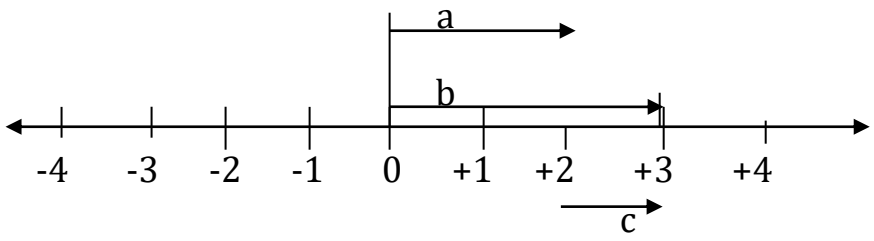


a) Find the value of; (i) x =

(ii) y =

(iii) z =

b) Write a mathematical statement for the above number line.

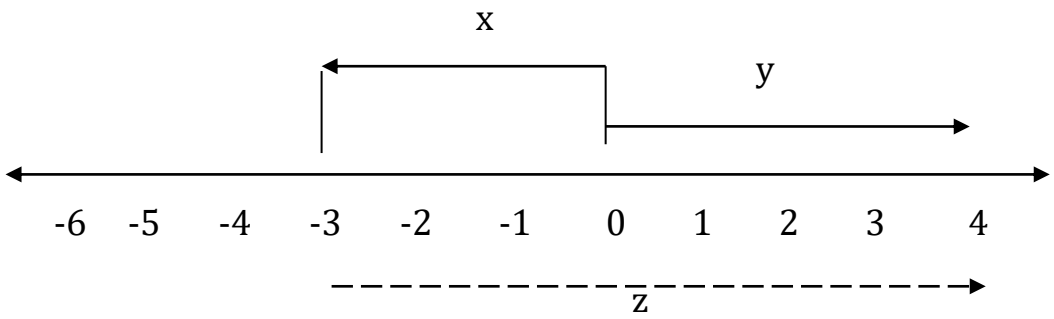


7. Write down the integers represented by letters

a=

b=

c=



a) X =

b) Y =

c) Z =

b) Write down the mathematical statement

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TERM III

ALGEBRA

Lesson 1

Sub topic: forming algebraic expressions

Content

Example

1. 4 boys visited my home and later other 2 boys. Later 5 of them left. Form an algebraic equation and simplify it
   2 boys + 4 boys – 5 boys
   2b + 4b – 5b
   6b – 5b
   = b
2. A number multiplied by 3 gives 15 let the number be represented by x
   3x = 15

Ref

New MK pp 267-270

Lesson 2

Sub topic: simplifying algebraic expressions

Content

Examples

Write in short

q+ 7q + 4q = 12q

4b + 3b – t = 7b-t

10x – 3x + x
10x + x – 3x
11x – 3x = 8x

Ref: New MK pp 268

Lesson 3

Sub topic: collecting like terms and simplifying

Content:

Example : collect like terms and simplify

1. 4b – 3b + 3t + t
   4b – 3b + 3t + t
   b + 4t

2) 7y – 8m + y + 10m – 6
   7y + y + 10m – 8m – 6
   8y + 2m – 6

Ref

New mk bk 5 pg 269 exercise 12.4

Old Mk pp 174-175

Remarks: .....

Lesson 4

Sub topic: substitution

Example

If a = 1, b = 3 , c = 5

Find the value of 5c + 4b – 8a find the value of $\frac{2b}{a+c} = \frac{2xb}{a+c} = \frac{2x3}{1+5} = \frac{6}{6} = 1$

(5 x 5) + (4 x 3) – (8 – 1)

25 + 12 – 8

37 – 8

29

abc = a x b x c

abc = 1 x 3 x 5

abc = 3 x 5

abc = 15

Ref

Exercise 12.6 pg 271 new mk bk5 new edition

MK old edition bk5 pp 177

Lesson 5

Sub topic: solving equations by subtracting

Content

Example

Find the value of a

16 + a = 20

16 – 16 + a = 20 – 6

0 + a = 4

a= 4

Ref

New Mk pp 272

Old MK pp 178-179

Lesson 6

Sub topic: forming and solving equations

Example

There are 50 pupils in a class 30 are boys. How many girls are there?

Let the number of girls be g

Boys + girls = 50

30 + g = 50

30 – 30 + g = 50 – 30

0 + g = 20

G = 20

Ref

New Mk Bk 5 Pg273 exercise 12.8
Old MK pp 179

Lesson 7

Sub topic: solving equations by adding
Content
Example
Solve n – 5 = 3
N – 5 + 5 = 3 + 5
N – 0 = 8
N = 8

Ref
New MK bk 5 pg 274 exercise 12.9
Remarks: .....

Lesson 8

Sub topic: forming and solving equations by subtracting
Example
A boy used 3 of his exercise books and remained with 4 books
How many books did he have at first?
B – 3 = 4
B – 3 + 3 = 4 + 3
B – 0 = 7
B = 7
He had 7 books

Ref
New mk bk5 pg 275 exercise 12.10
Old MK pp 180
Remarks: .....

Lesson 9

Sub topic: Solving equations by dividing
Content
Example
Solve 5a = 20
$5a/5 = 20/5 = 4$
Word problem
The length of a rectangle is 9cm. the width is Ycm. If its area is $72cm^2$ find its width.
L x W = area
9cm x y = $72cm^2$
Y = 8cm

Ref
New Mk Bk5 Pg276 exercise 12.11, 12.12
Old Mk pp 181
Remarks: .....

Lesson 10

Sub topic: more equations involving dividing

Content

Solve x + x + x = 24

3x = 24

$\frac{3x}{3} = \frac{24}{3}$

X = 8

solve 2p + 5p = 14

7p = 14

$\frac{7p}{7} = \frac{14}{7}$

p = 2

Ref
New mk bk5 pg 277 exercise 12.13
Old MK pp 182-183
Remarks: .....

Lesson 11

Sub topic: Solving equations involving mixed equations

Content

Example

Solve

4a + 2a + 5 = 23
6a + 5 – 5 = 23 – 5
6a + 0 = 18
6a = 18
6 6
a = 3

2x + 5 = 17
2x + 0 = 17 – 5
2x + 0 = 12
2x = 12
2 2
x = 6

Ref
New mk bk5 pg 278 exercise 12.14
Remarks: .....

Lesson 12

SUB TOPIC: MORE MIXED EQUATIONS

Content

Example

Solve

5a – 2a – 3 – 12 = 0
5a – 2a – 3 – 12 = 0
3a – 15 + 15 = 0 + 15
3a + 0 = 15
3a = 15
3a = 15
3 3
A = 5

3x – 8 = x
3x – 8 + 8 = x + 8
3x + 0 = x + 8
3x – x = x – x + 8
2x = 8
2x = 8
2 2
x = 4

Ref
New mk bk 5 pg 279 exercise 12.15
Old MK pp 187
Remarks: .....

Lesson 13
Sub topic: equations involving squares
Content
Example
Solve $b^2 = 4$
$\sqrt{b^2} = \sqrt{4}$
$\sqrt{bxb} = \sqrt{2x2}$
B = 2

Ref
New mk bk 5 pg 280 exercise 12.16
Old MK pp 187
Remarks: .....

Lesson 14:
SUB TOPIC: **EQUATIONS WITH FRACTIONS**
Content:
Example
What number when divided by 4 gives 3?
Let the number be x
$\frac{x}{3} = 4$
$\frac{x}{3} = 4x3$
X = 4 x 3
X = 12

Ref
New mk bk5 pg 282 exercise 12:18
Old MK pp 190
Remarks: .....

Lesson 15
Sub topic: **Equations with fractions (word problems)**
Content:
Example
A man divided his money among his three children and each got 450/=. How much money did he give out?
Let the amount of money be represented by m

$\frac{m}{3} = 450 \neq$

$3x\frac{m}{3} = 450x3$

$m = 1350 \neq$

Ref
New MK pp 282-283

Lesson 16
Sub topic: **Equations involving two fractions**
Content:
Example (involving use of LCM)
Find the value of the unknown

$\frac{3}{5} = \frac{a}{10} LCM = 10$

$\frac{3}{5}x10 = \frac{a}{10}x10$

$3x2 = a$

$a = 6$

$\frac{8}{n} = \frac{1}{2} LCM = 2n$

$\frac{8}{n}x2n = \frac{1}{2}x2n$

$8x2 = n$

$n = 16$

Ref
Exercise 7q pg 185 old mk edition bk5
Remarks: .....

Lesson 17
Sub topic: **Finding unknown using square roots**
Content
Example
If $a^2 = 4$. Find the value of a

$\sqrt{a^2} = \sqrt{4}$

$a = \sqrt{2x2}$

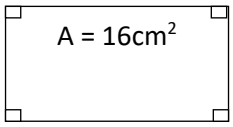
$a = 2$

2	4
~~2~~	2
	1

Ref
Exercise 7t pg 187 old edition mk bk5
Remarks: .....

Lesson 18
Sub topic: **Application of square roots in algebra**
Content
Example (Word problems)

The area of a square is $16cm^2$. Find its side



$sxs = 16cm^2$
$s^2 = 16cm^2$
$\sqrt{s^2} = \sqrt{16cm}$
$s = \sqrt{2x2x2x2}$
$s = 2x2cm$
$\underline{s = 4cm}$

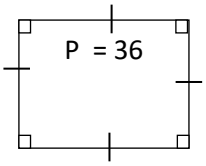
2	16
2	8
2	4
2	2
	1

Ref
Exercise 12.17 pg 281 new edition mk bk 5
Exercise 7x pg 191 old edition mk bk65
Remarks: .....

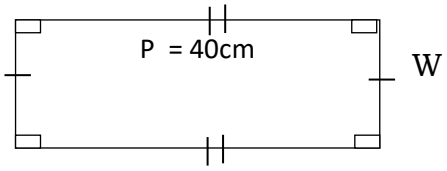
Lesson 18
Sub topic: **Forming and solving equations**
Content
Example
I think of a number add 5 to it and my answer is 12. What is the number?
Let the number be represented by x
X + 5 = 12
X + 5 – 5 = 12 – 5
X + 0 = 7
x = 7

When 3 is subtracted from a number, the answer is 10 find the number
Let the number be represented by y
Y – 3 = 10
Y – 3 + 3 = 10 + 3
Y – 0 = 13
Y = 13
Ref
Exercise 7v Pg 180 Old Edition Mk Bk5

Lesson 19
Sub topic: **Application of algebra (perimeter)**
Content
Find the unknown side of a figure when perimeter is given
Example
The perimeter of a square is 36cm find its side in cm
Let side be s
s + s + s + s = 36cm
4s = 36cm
$\frac{4s}{4} = \frac{36}{4}$
$\underline{s = 9cm}$



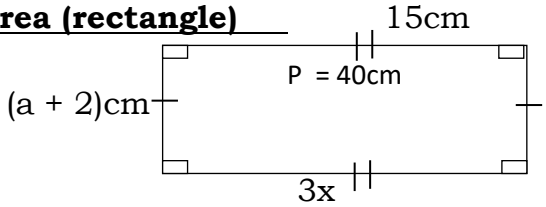
The perimeter of a rectangle is 4cm. if its length is 15cm. calculate its width
Let the width be represented by w
2(L x W) = P
2(15cm + W) = 40cm
(2 x 15cm) + (2 + W) = 40cm
30cm + 2W = 40
30 – 30 + 2W = 40 - 30cm
0 + 2W = 10cm
$\frac{2W}{2} = \frac{10cm}{2}$
W = 5



Ref
Exercise 12.20 page 284 / 285 New Edition Mk Bk 5
Exercise 7z (ii) page 195 old edition mk bk5

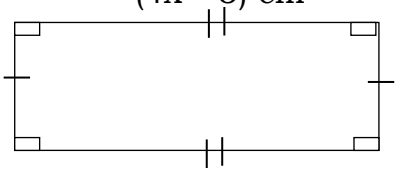
Lesson 20

Sub topic: **Finding unknown side when given area (rectangle)**
Content: rectangle
A long the length
7cm
3x = 15cm (opposite sides of rectangle are equal)



$\frac{3x}{3} = \frac{15^{5}cm}{3}$
X = 5cm
Along the width
A + 2 = 7cm (2 opposite sides of a rectangle are equal)
A + 2 – 2 = 7 – 5
A + 0 = 5
A = 5cm

Find (i) x (ii) length (4x – 3) cm



Ref
Teacher's collections

Lesson 21

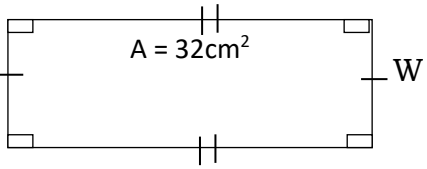
Sub topic: **finding unknown sides when given area**
Content

Example
The area of a rectangle is $32cm^2$ its length is 8cm. what is its width?

Let the width be represented by w
L x w = area
8cm x w = $32cm^2$

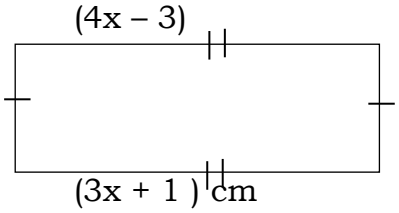
$\frac{8cmW}{8cm} = \frac{32cm}{8cm}$

W = 4cm



Ref
Exercise 12.21 pg 286 new edition mk bk5

Lesson 22
Sub topic: finding the unknown when given two equal sides
Content: example
Find (i) x (ii) length
Length = length
4x – 3 = 3x + 1
4x – 3 + 3 = 3x + 1 + 3
4x – 0 = 3x + 4
4x – 3x = 3x – 3x + 4
X = 0 + 4
X = 4
Length = 3x + 1
= (3x X) + 1
= (3 x 4) + 1
= 12 + 1
= 13cm



Ref
Exercise 7y pg 192 to 193 Old Edition Mk Bk 5

Topic: Data Handling
Lesion one
Sub topic: **Pictograph interpretation**
Content: Pupils will study the given pictograph and workout numbers about the graphs

Musa	
Mark	
Jack	

Key represents 20 oranges

(i) How many oranges did Musa get?
1 picture represents 20 oranges
3 pictures represent 20 x 3 = 60 oranges

(ii) How many more oranges did Jack get than Mark?
Jack got 4 x 20 = 80 oranges
80 oranges – 40 oranges = 40 oranges
Jack got 40 more oranges than Mark

Ref
New Mk: Maths book 5 pg 214-215
Old MK pg 255-257

Lesson 2:
Sub topic: drawing pictographs
Content: drawing pictographs using the given information and scale
Example
If  represents 10 balls. Draw similar pictures to represent 30 balls

Ref
Teacher's collection

Lesson 3:
Sub topic: **Reading and interpretation of tables**
Content: pupils will read and interpret given information then answer questions that follow
Example: Draw the table)

(i) How many eggs were collected on Tuesday?

(ii) How many eggs were collected in a week?
40 + 10 + 25 + 17 + 53 = 78 + 67 = 145 eggs

(iii) Find the average number of collected eggs.

$$\frac{Total}{No\ of\ eggs} = \frac{145}{5} = 29eggs$$

(iv) Range
Range = highest – lowest
Range = 53 – 10 = 43 eggs

(v) Median

10 17 25 40 53

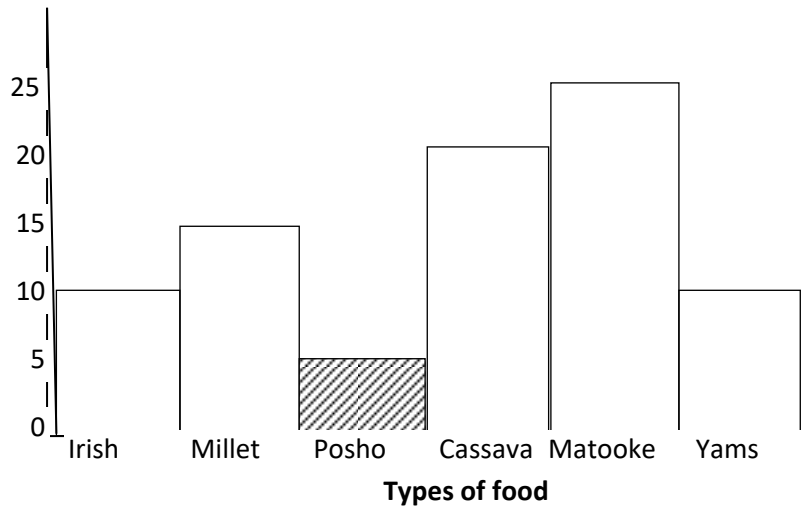
25

Ref
New Mk Maths Bk 5 pg 218-219
Remarks: .....

Lesson 5
Sub topic: **Bar graphs – interpretation**
Content: pupils will study given bar graphs and answer the questions that follow
Evaluation activity
New mk maths bk 5 page 228

Lesson 6:
Sub topic: **Drawing bar graphs from tables**
Content: pupils will use given tables and scale to draw bar graphs and answer questions that follow

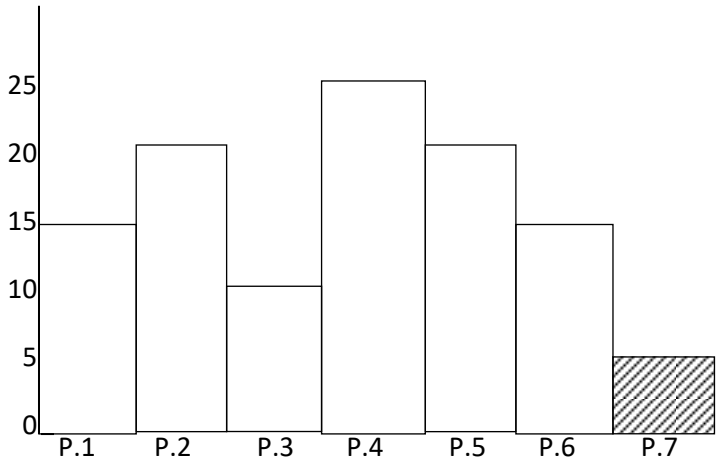
Number of pupils	10	15	5	20	25	10
Types of food	Irish	Millet	Posho	Cassava	Matooke	Yams



Ref
New MK maths bk 5 pg 224-225
Remarks: .....

Lesson
Sub topic: **Recording information from a bar graph to a table**
Content: pupils will study given bar graphs and record given information on a table

Class	P.1	P.2	P.3	P.4	P.5	P.6	P.7
Number of pupils	15	20	10	25	20	15	5



Ref
New Mk Maths Bk 5 Pg 227-228
Teacher guides pupils through example on page 230 and evaluate them
Remarks:

Lesson 8
Sub topic: **Bar line graphs (interpretation)**
Content: pupils will study given bar line graphs and answer the questions that follow
Evaluation activity
New Mk Bk 5 Pg 230 exercise 10:8
Remarks: .....

Lesson 9
Sub topic: **Drawing bar line graphs**
Content: pupils will study given tables and use information to draw bar line graphs
Evaluation activity
Teacher's guidance (do as in bar graph) as in lesson 6 and 7
New Mk Maths bk 5pg 230 exercise 10:8
Remarks

TOPIC: MONEY
Lesson 1
Sub topic: **Money**
Content: Denominations
Types of money
Coins, e.g. 50, 100, 200, 500
Notes e.g. 1000, 2000, 5000, 10000, 20000, 50000

Examples
Peter had 3notes of 1000/= each. How much money did he have?
1 note = 1000/=
3 notes = (3 x 1000)/=
3notes = 3000/=

NB: do also calculations on a number of coins and notes of different denominations
REF
Teacher's collections

Lesson 2
Sub topic: **Buying and selling**
Content: using price list
Example
1 book costs 200/= what is the cost of 5 similar books?
1book = 200/=
5books = (5 x 200)/=
5books = 1000/=

Ref
New MK maths bk 5 pg 238
Old Mk pp 222

Lesson 3
Sub topic: **Buying and selling**
Content: more simple rates
Examples
Find the cost of 12 similar books
5books cost 1000/=
1bk costs $\frac{1000}{5}$
1bk = 200/=
12bks costs (200 x 12)
12bks costs 2400/=

Ref
New MK pg 239
Old MK pg 222

Lesson 4

Sub topic: **Shopping bills and balances**

Content:

Examples

Kiyaga had 10,000/= he bought 2kg of sugar at shs.1600 per kg, 3bars of soap at 1000/= each bar, ½ kg of salt at 400/= @ kg

(a) How much did he spend altogether?

(b) How much did he spend altogether?

(c) What was his balance

10,000
- 6,400
3,600/=

Item	Method	Amount
2kg of sugar at 1600/= @	2 x 1600/=	3200/=
3bars of soap at 1000/=@	3 x 1000/=	3000/=
½ kg of salt at 400/=@	½ x 400/=	200/=
Total		6400/=

Ref

New mk maths bk5 pg 240

Old MK pg 223

Lesson 5

Sub topic: **Completing bill tables**

Content:

Examples

A father gave the shopping list below to his children

Item	Quantity	Unit cost	Total
Blue band	½ kg	Shs. 4600 each kg	Shs.2300
Bread	.....loaves	Shs. 800 each loaf	Shs.2400
Tea leaves	¼ kg	Shs.....@kg	Shs.1500
Sugar	4kg	Shs.1800 @ kg	Shs.....
		Total	Shs.....

Complete the shopping bill

Show all the calculations and fill in later and add

Bread	Tea leaves	Sugar
800/= can buy 1 loaf	¼ kg cost 1500/=	1kg cost 1800/=
1/= buys 1/800 x 2400/=	1kg costs 1500 ÷ ¼	4kg = 1800/=
2400/= buy 3 loaves	1kg cost 1500 x 4	x 4
	= 6000/=	7200/=

Ref
New mk maths bk 5 pg 241
Old MK pg 224
Remarks: .....

Lesson 6

Sub topic: **Transport charges**

Content:

Example

A taxi driver charges shs5000 for a trip from Kampala to Jinja per person
How much will 7 people pay for the trip?
1person pays shs.5000/=
7 people pay = 5000 x 7
= 35000/=

Ref
New MK pg 243
Old Mk pg 225-226

Lesson 7

Content: **Profit and loss**

Examples

Andrew bought a goat at 20,000/= and sold it at shs.25000/=. What profit did he make?
Profit = selling price – cost price
Profit = 25000 – 20000
Profit = 5000/=
Matovu bought a goat at 30,000/= and sold it at shs20000/= how much was his loss?
Loss = buying price – selling price
Loss = 30000 – 20000
Loss = 10000/=

Ref
New mk maths bk5 pg 245

Lesson 8
Sub topic: **Finding cost price using profit and selling price**
Content:
Examples
Nambi sold a radio set at 50000/= she made a profit of 10000/=. What was his cost price?
Selling price = 50000/=
Profit = 10000
Cost price = selling price – profit
Cost price = 50000 – 10000
Cost price = 40000/=

Ref
New MK maths bk 5 pg 246

Lesson 9
Sub topic: **Finding cost price using loss**
Content:
Examples
Oketch sold a goat at 15,000 and made a loss of 3000. How much did he buy the goat?
Selling price = 15000
Loss = 3000
Buying price = selling price + loss
Buying price = 15000 + 3000
Buying price = 18000/=

Ref
New mk maths bk 5 pg 247
Remarks:.....

Lesson 10
Sub topic: **Finding selling using profit and cost price**
Content
Examples

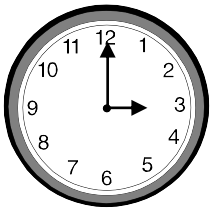
A trader bought a shirt at 7500/= and sold it making a profit of shs.3500. what was his selling price?
Buying price shs.7500
Profit = 3500
Selling price = buying price + profit
Selling = 7500 + 3500
Selling price = 11000/=

Ref
New MK maths bk5 pg 248
Remarks: .....

Lesson 11
Sub topic: **Finding selling price using loss**
Content:
Examples
A pupil bought a ball at 15000/= and sold it at a loss of 3000/=. What was the selling price of the ball?
Buying price = 15000/=
Loss = 3000/=
Selling price = buying price – loss
Selling price = 15000 – 3000
Selling price = 12000/=

Ref
New MK maths bk 5 pg 249
Remarks:.....

TOPIC: TIME
Lesson 1
Sub topic: Telling time using am and pm
Content:
Example
What is the time in;
(a) The morning 3.00am
(b) The afternoon 3.00pm



Ref
New MK maths bk5 pg 250-251
Remarks:.....

Lesson 2

Sub topic: **Addition and subtraction of time**

Content:

Examples

Add	hrs	min	side work	
	6	25	25	65 = 1.05
	+2	40	40	60
	9	05	65	

Subtract	hr	min		
	34	10	60 + 10 =	70
	- 22	55		- 55
	11	15		15

11hours and 15mins

Ref

Tr's collection

Understanding mtc pg 228-229

Lesson 3

Sub topic: **Finding duration of time**

Content

Mugole started walking from home at 7.15am and reached town at 9:15am. How long did it take him?

Reached	9	15am
Started	-7	15am
He took	2	00

Namata started crying at 7.15am and stopped at 8.00am. How long did it take her?

8	00am	60	
-7	15am	-15	
	:45	45	She took 45 minutes

Ref

New mk maths bk5 pg 252

Old mk maths bk5 pg 219

Remarks:.....

Lesson 4

Content:

Pupils will study the time table given and answer the questions about it under the guidance of the teacher.

Ref

New MK Maths bk5 pg 253

Remarks:.....

Lesson 5

Sub topic: **Finding distance**

Content:

Example

Find the distance a driver covers in 2hours at a speed of 90km/hr

Distance = speed x time

Distance = 90km/hr x 2hrs

Distance = 180km

Ref

New MK maths bk5 pg 255

Remarks:.....

Lesson 6

Sub topic: **Finding time**

Content: time = $\frac{\text{distance}}{\text{Speed}}$

Example

Calculate the time taken by a car travelling at 60km/hr to cover a distance of 480km

$$T = \frac{D}{S} = \frac{480km}{\frac{60km}{hr}} = 8hrs$$

Ref

New MK maths bk5 pg 256

Remarks:.....

Lesson 7

Sub topic: **Finding speed**

Content

Example

What is the average speed of a cyclist travelling a distance of 150km in 3hours?

$S = \frac{D}{T} = \frac{150km}{3hrs} = 50km/hr$

Ref

New MK maths bk5 pg 257-258

Remarks:

Lesson 8

Sub topic: **Temperature**

Content: definition

(a) Temperature
(b) Instrument used to measure temperature
(c) Units used to measure temperature
(d) Finding difference between temperature

Example

What is the difference in temperature between?

10^0 C and 5^0C	-4 and 20^0C
10^0C – 5^0C	20^0C - $^-4^0$C
5^0C	20^0C + 4^0C
	24^0C

Ref

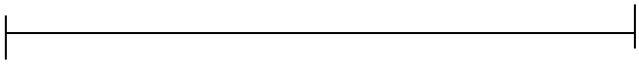
New MK maths bk5 pg 233 – 236

Remarks:

Theme : MEASUREMENT

Topic: LENGTH, MASS , CAPACITY

Sub topic: length (distance from one point to another



$\overline{AB}=3cm$

Content

Estimate in cm and mm

Pupils will measure objects / lines in centimetres and milimetres and record the answers (group activity)

Ref

New MK maths bk 5 151 and 152

Old MK pg 198

Remarks:

Lesson 2

Subtopic: **Conversion of metric units**

Content: expressing cm to mm and vice versa

Examples

How many mm are 8cm

1cm = 10mm

8cm = (8 x 10)mm

8cm = 80mm

Convert 120mm to cm

10mm = 1cm

$1mm = \left(\frac{1}{10}\right) cm$

$120mm = \left(\frac{1}{10} x120\right) cm$

$120mm = 12cm$

Ref

New MK maths bk pg 153

Remarks: .....

Lesson 3

Sub topic: **Conversion of metres to cm and vice versa**

Examples 1

Change 5m to cm

5m = 100cm

5m = (5 x 100)cm

5m = 500cm

Example 2: Express 1.5m to cm

1m = 100cm

$1.5m = \left(\frac{15}{10} x100\right) cm$

$1.5m = 150cm$

Example 3:

Change 200cm to m

100cm = 1m

1 cm =(1) m
100

$200cm \left(\frac{1}{100} x200\right) m$

200cm = 2m

Ref
New MK maths bk 5 pg 154
Okd Mk pp 198
Remarks:

Lesson 4

Sub topic: **Addition of m and cm**

Content

Examples

Add

a)

	m	cm
	8	45
+	1	55

b)

	M	cm
	2	73
+	3	13

Ref:
Understanding MTC bk 5 pg 144-145
Trs' collection

Lesson 5

Subtopic: **Subtraction of m and cm**

Content :

Examples: subtract

a)

	M	cm
	4	93
-	2	22

b)

	M	cm
	9	45
-	3	65

Ref:
Understanding mtc bk 5 pg 142-146

Lesson 6

Sub topic: **Expressing km to m**

Content

Example

Express 2km as metres

1km = 1000m

2km = (2 x 1000)m

2km = 2000m

Change 15km to m
1km = 1000m
15km = (15 x 1000)m
15km = 15000m

Convert 0.5km to m
1km = 1000m
$0.5km = \left(\frac{5}{10} x 1000\right) m$
= 5 x 100m
= 500m

Ref
New mk maths bk 5 pg 155 / Old Mk pp 199

Lesson 7
Sub topic: **Converting metres to km**
Content:
Examples
Change 5000m to km
1000m = 1km
$1m = \frac{1}{10} km$
$5000m = \frac{1}{1000} kmx5000$
$5000m = 5km$

Change 16500m to km
$1m = \frac{1}{1000} km$
$16500m = \left(\frac{1}{1000} x 16500\right) km$
$16500m = \left(\frac{165}{10}\right) km$
$16500m = 16.5km$

Ref
New mk maths bk 5 pg 156
Old MK pp 199
Remarks:

Lesson 8

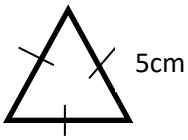
Sub topic: **Comparing units of measures**
Content: using >, < or =
Examples
60mm____20cm
1cm = 10mm
20cm = (20 x 10)mm
20cm = 200mm
60mm < 200mm
60mm < 20cm

Do comparison examples with m and cm and vice versa, km and m and vice versa

Ref
New Mk Maths Bk 5 Pg 156

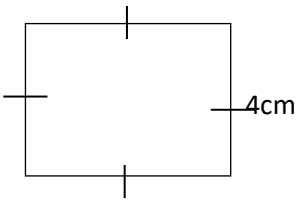
Lesson 9
Sub topic: **Perimeter**
Content: Finding perimeter of polygons
Regular figures are polygons with all sides equal
Perimeter is the distance around the figure

Example
Find the perimeter of the equilateral triangle below



P = s + s + s
P = 5 + 5 + 5
P = 15cm

Do examples of squares, pentagon, octagons, heptagons etc
Square



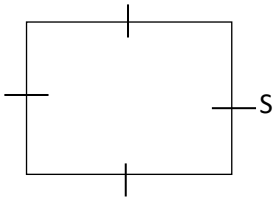
P = s + s + s + s
P = 4 + 4 + 4 + 4
P = 8cm + 8cm
P = 16cm

Ref
New Mk maths bk 5 pg 157 – 158
Old edition Mk pp 203-204

Lesson 10:
Sub topic: **Finding sides using perimeter**
Content:

The perimeter of a square is 12cm. what is the length of each side?

A square has 4sides



$\frac{4s}{4} = \frac{12}{4} cm$

$s = 3cm$

Each side = 3cm

The perimeter of a square is 40cm find the length of each side

A square has four sides

P = s + s + s + s

P = 4s

$\frac{40cm}{4} = \frac{4s}{4}$

$10cm = s$

S = 10cm

The perimeter of a regular pentagon is 20cm. how long is one of its sides?

A pentagon has 5 sides

P = s + s + s + s + s

$\frac{20cm}{5} = \frac{5s}{5}$

4cm = s

One side = 4cm

Ref

Old MK pp 205-206

New MK pp 284

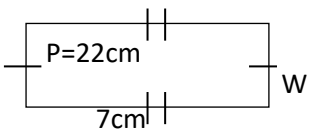
Lesson 11

Sub topic: **Finding one side of a rectangle using perimeter**

Content:

Examples

The perimeter of a rectangle is 22cm and its length is 7cm find its width.



P= 2(L + W)

22=2(7 + W)

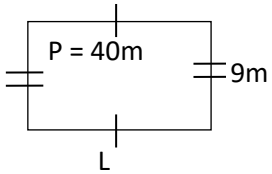
22 = 14+2w

22 – 14 = 14 – 14 + 2W

8 = 0 + 2W

$\frac{8}{2} = \frac{2W}{2} = 4cm$

The perimeter of a rectangle is 40m if its width is 9m find its length



P = L + W + L + W

40 = L + 9 + L + 9

40 = L + L + 9 + 9

40 = 2L + 18

40 – 18 = 2L + 18 - 18

22 = 2L + 0

$\frac{22}{2} = \frac{2L}{2} = 11m$

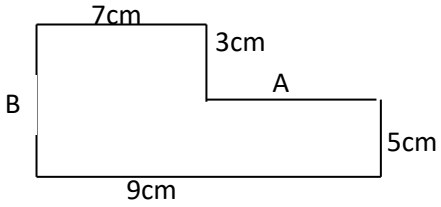
Ref
New MK pg 284
Old Mk pg 205-206
Remarks: .....

Lesson 12

Sub topic: **Perimeter of irregular shapes**

Content:

Examples



Find the missing sides

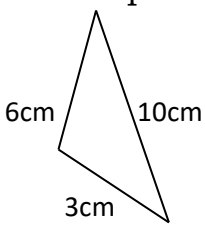
Side A
A = (9 – 7)cm
A = 2cm

Side B
B = 5cm + 3cm
B = 8cm

Find the perimeter of the figure

P = S + S + S +S + S + S
P = 7cm + 3cm + 2cm + 5cm + 9cm + 8cm
P = 34cm

Find the perimeter of the scalene triangle below



P = S + S + S
P = 6cm + 3cm + 10cm
P = 19cm

Example 3

Consider

Trapezium

Pentagons

Hexagons

Ref

Teacher's collections and refer to Bk 4

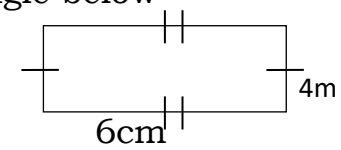
Lesson 13

Sub topic: **Area of a rectangle**

Content

Example

Find the area of the rectangle below



A = L x W

A = 6m x 4m

A = 24m^2.

The area of a rectangle is 40dm^2 and its width is 8dm. find the length

L x W = 40dm^2

8 x L = 40dm^2

$$\frac{8xL}{8} = \frac{40dm^2}{8} = 5dm^2$$

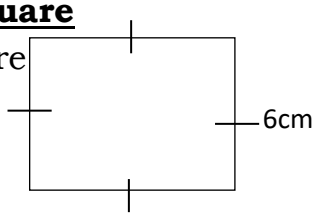
Ref

Exercise 7:8pg 159 Mk new edition / Exercise 8h pg 208 old edition

Lesson 14

Sub topic: **Area of a square**

Find the area of a square



A = S x S

A = 6 x 6

A = 36cm^2.

The area of a square is 36cm^2 find its sides

S x S = A

S^2 = A

$$\sqrt{S^2} = \sqrt{36cm^2} = 6cm$$

Ref

New Mk maths Bk 5 pg 160 7.9 and pg 281 exercise 12.17

Old MK pg 207

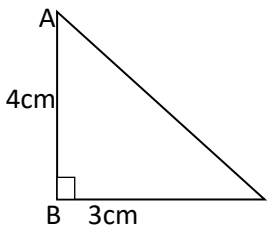
Lesson 15

Sub topic: **Area of a triangle**

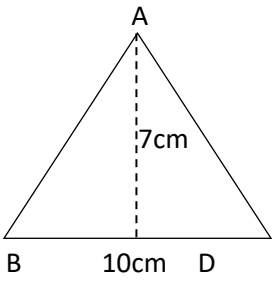
Content:

Examples

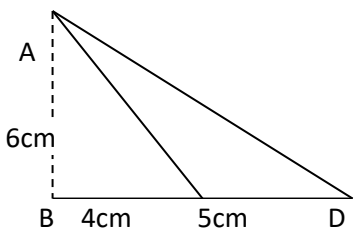
Find the area of the triangles below



$A = \frac{1}{2}xbxh$



$A = \frac{1}{2}xbxh$



$A = \frac{1}{2}xbxh$

$A = \frac{1}{2} x 3cm x 4cm$ | $A = \frac{1}{2} x 10cm x 7cm$ | $A = \frac{1}{2} x 9cm x 6cm$

$A = 3cm x 2cm$ | $A = 5cm x 7cm$ | $A = 9cm x 3cm$

$\underline{A = 6cm^2}$ | $\underline{A = 35cm^2}$ | $\underline{A = 27cm^2}$

Ref
New MK maths bk5 pg 161-162
Old mk bk5 page 209-210

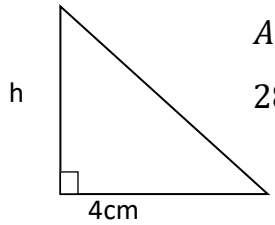
Lesson 16

Sub topic: **Word problems involving area of triangles**

Content:

Examples

The base of a triangle is 4cm and its area is 28cm². Find its height



$A = \frac{1}{2} x b x h$

$28cm = \frac{1}{2} x 4cm x h$

$\frac{28}{2} = \frac{2h}{2} = 14$

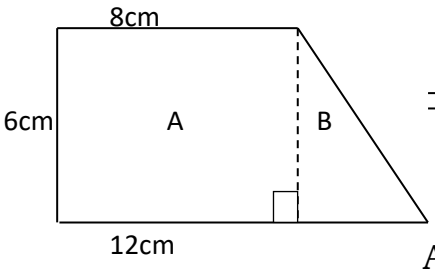
Ref
New mk math bk5 pg 163

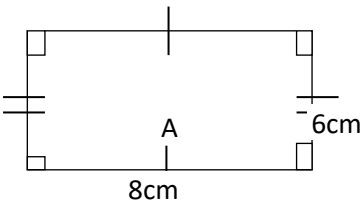
Lesson 17

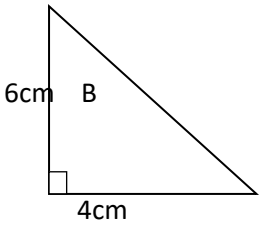
Sub topic: **Area of combined figures**

Content:

Find the area of the figures below







A = L x W

A = 8cm x 6cm

A = 48cm²

Total area = 48cm² + 12cm²

Total area = $\underline{60cm^2}$

$A = \frac{1}{2} x b x h$

$A = \frac{1}{2} x 4 x 3$

$A = 4cm x 3cm$

$\underline{A = 12cm^2}$

Ref

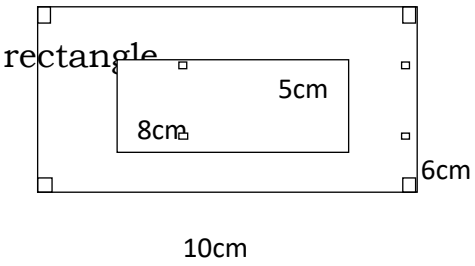
New mk maths bk5 pg 164-165
Old Mk pp 210-211

Lesson 18

Sub topic: **Area of shaded and unshaded regions**

Content

Examples



Area of big rectangle – area of small rectangle

= (L x W) – (L x W)
= (10x 6)cm^2 – (8 x 5)cm^2
= 60cm^2 – 40cm^2
=<u>20cm^2</u>

Ref

Old mk maths bk5 pg 212 to 213 exercise 8k

New MK pp 166-167

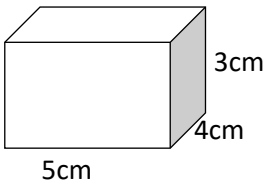
Lesson 19

Sub topic: **Volume**

Content: definition (volume) amount of space inside a container, cubes and cuboids

Examples

Find the volume of the cuboid



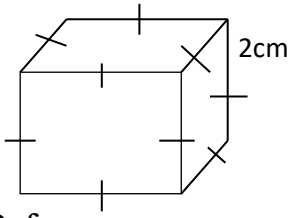
Volume

V = L x W x H
V = (5 x 4 x 3)cm^3
<u>V = 60cm^3</u>

shaded area

A = L x W
A= (4 x 3)cm^2
<u>A = 12cm^2</u>

Find the volume of the cube below



V = S x S x S
V = 2 x 2 x 2
<u>V = 8cm^3</u>

Ref

New MK pp 168-171

Trs' collection

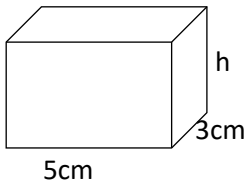
Lesson 20

Sub topic: **Application of volume**

Content:

Examples

Find the missing side of the cuboid given the volume = 50cm³.



V = L x W x h

60cm³ = 5cm x 3cm x h

$\frac{60cm^3}{15} = \frac{15cm^2h}{15cm^2}$

$\underline{4cm = h}$

Ref

New mk bk5 pg 287 exercise 12.22

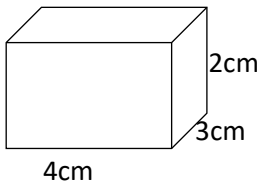
Lesson 21

Sub topic: **Total surface area**

Content:

Example

A cuboid has faces



TSA = 2(L x W) + 2(L x h) + 2(h x W)

TSA= 2(4 x 3) + 2(4 x 2) + 2(2 x 3)

TSA = 2 x 12cm² + 2 x 8cm² + 2 x 6cm²

TSA = 24cm² + 16cm² + 12cm²

TSA = 52cm²

Ref

Teacher's collection

Lesson 22

Sub topic: **Capacity**

Content: measuring in litres and millilitres

1L = 1000cm³ or 1000Ml

Examples

Express 5litres of water as

(a) Cubic centimetres

1L = 1000cm³

5L = (5 x 1000)cm³

5L = 5000cm³

(b) as millilitres

1L = 1000ML

5L = (5 x 1000)ML

5L = 5000ML

Ref

New mk bk 5 page 260 exercise 11.20

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

Lesson 23

Sub topic: **Comparing metric units**

Content: comparing length to weight to capacity

Example

Place value	Kilo	Hector	Deca	Basic	Deci	Centi	Milli
Meaning	1000m	100m	10m	Metre gram litre	$^1/_{10}$of m	$^1/_{100}$ x m	$^1/_{1000}$ x m

Change 3000ML to Litres

1000ML = 1L

$3000ML = \frac{3000}{1000}L$

3000ML = 3Litres

change 3litres to ML

1L = 1000ML

3L = (3 x 1000)ML

3L = 3000ML

Ref

New mk math bk5 pg 263 exercise 11.25

New mk math bk 5 page 263 exercise 11:24

MASS

Lesson 24

Sub topic: **Expressing grams to kilograms vice versa**

Content:

Examples

Change 4000gm to kg

1000g = 1kg

$4000g = \left(\frac{4000}{1000}\right)kg$

4000g = 4kg

Example 2

Change 3kg to g

1kg = 1000g

3kg = (3x1000)g

3kg = 3000g

Ref

New mk maths bk5 pg 262 exercise 11.23

Lesson 25

Subtopic: **Addition of kg and g**

Content

Example 1

a)

	kg	g
	5	456
+	2	204

b)

	kg	g
	4	596
+	2	405

Ref:

New Mk pp 263

Tr's collection

Subtopic: **Subtraction of kg and g**

Example

a)

	kg	g
	8	765
+	3	273

b)

	kg	g
	9	576
+	3	623

Ref:

Tr's collection

GEOMETRY

Lesson one

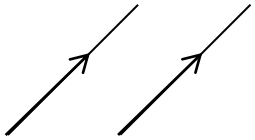
Sub topic: **Parallel lines**

Content: definition

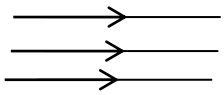
These are lines that are equal distance apart and don't meet when extended in both directions

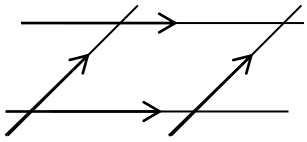
Drawing parallel lines

Using a ruler



Using ruler and set squares





Ref

Old MK pg 228

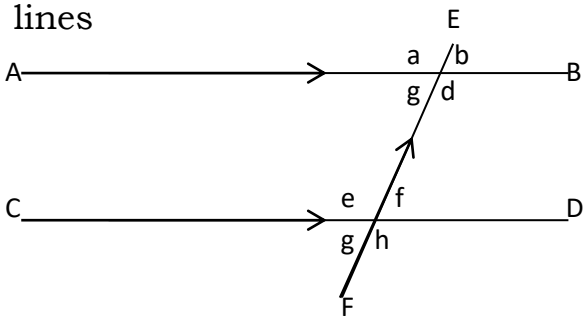
New Mk pg 175

Remarks: .....

Lesson two

Sub topic: **Intersecting and transversal lines**

Content: naming points of intersection lines EF and GH are transversal lines



Ref

New MK pg 179

Old Mk pg 231

Remarks:

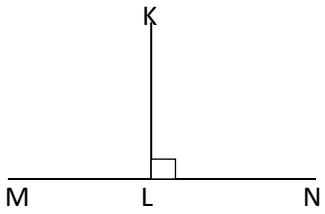
Lesson three

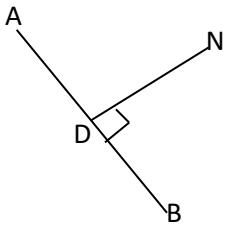
Sub topic: perpendicular lines

Content: definition of perpendicular lines

Naming perpendicular lines from given figures

Drawing or construction of bar lines using pairs of compasses and ruler with pencil only.





KL and ND are perpendicular lines to MN and AB respectively.

Ref

New Mk pg 180-183

Lesson four

Sub topic: **Polygons**

Content: naming polygons

Types of triangles

- Equivalent triangles
- Isosceles triangle
- Right angled triangle

Types of quadrilaterals

- Rectangle
- Square
- Trapezium
- Rhombus
- Kite

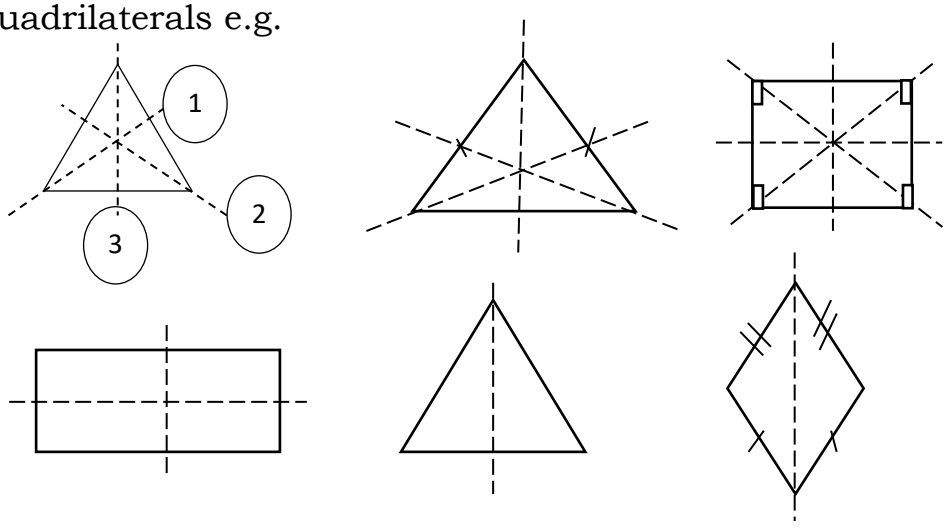
Other regular polygons up to 12 sided polygons
Drawing polygons using ruler and pencils (sketches)

Types of polygons

Name	**No of sides**
Pentagon	5
Hexagon	6
Septagon / heptagon	7
Octagon	8
Nonagon	9
Decagon	10
Nudecagon	11
Dodecagon	12

Ref:
Old mk bk 5 page 202 exercise 8d
Remarks: .....

Lesson five
Subtopic: **Lines of symmetry**
Content: defining
Lines of symmetry divide figure into two equal or congruent parts
Drawing and counting the lines of symmetry of i.e. triangles, quadrilaterals e.g.



NB: A child draws and labels

Ref
Old MK pg 231
New mk math bk 5 page 184-185
Remarks: .....

Lesson six
Sub topic: **Construction of circles**
Content: parts of a circle of different radii and diameter
Drawing circles of radius 3cm

Sub topic: **Constructing and equilateral triangle in a circle**
Content: pupils will use a pair of compasses and a pencil to construct circles equilateral triangles and inscribe
Ref
New Mk pg 186-187
Old Mk pg 250

Lesson seven
Sub topic: **Constructing an equilateral triangle without a circle**
Example:
Construct an equilateral triangle of side 4cm

Lesson Eight
Sub topic: **Constructing a regular hexagon**
Content: pupil will use a pair of compasses and a pencil to construct a regular hexagon in a circle.
Ref
Old Mk pg 251
New MK pg 188

Lesson Nine
Sub topic: **Constructing square in a circle and without a circle**
Content: pupils will construct squares using different radii

Ref
Old MK mtc book 5 pg 252

Lesson Ten
Subtopic **Constructing a rectangle**

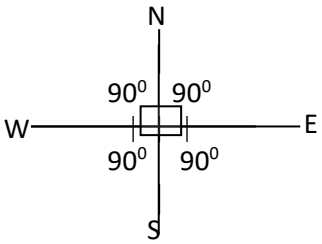
Content: construction of a rectangle using a pair of compasses
Ref:
Trs' collection

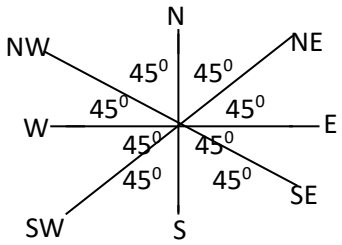
Lesson 11
Sub topic: **Angles and rotation**
Content: definition
Angles is the amount of turning, rotation or opening
Rotation (clockwise or anticlockwise turn through 360^0)
Turn clockwise / anticlockwise more through a given angle
Pupils will find the angles that make up turns, half a turn, and a quarter of a turn.
Revolution (a complete turn throughout 360^0)

Ref
New MK pg 180-190
Old Mk pg 245-246
Remarks: .....

Lesson 12
Sub topic: **Angles on a compass**
Content: pupils will find the different angles between the compass directions

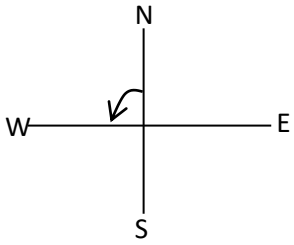
Pupils draw a compass direction



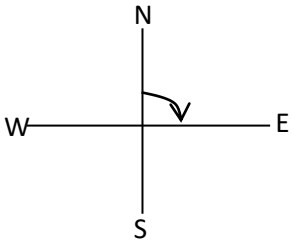


Ref
New MK pg 191
Old MK pg 247

Lesson 13
Sub topic: **The clockwise and anticlockwise turns**
Content: pupils will find the angles made when one turn clockwise and anticlockwise from the given direction



Clockwise turn



anticlockwise turn

Examples

Through what angle does Sara turn from North to North East direction in a clockwise direction.

Ref

New MK pg 192

Remarks: .....

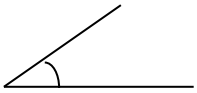
Lesson 14

Sub topic: **Types of angles**

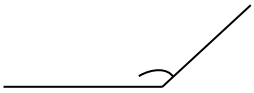
Content: pupils will be guided to name the different types of angles and give examples of such angles

Acute angle, right angle, obtuse angle, straight angle, reflex angle

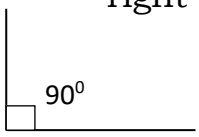
Acute angle



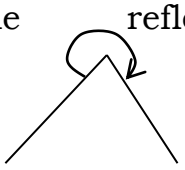
obtuse angles



right angle



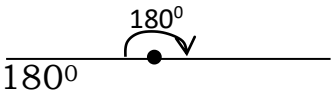
reflex angle



$0^0<A<90^0$ $90^0<c<180^0$ $<90^0$

$180^0<d<360^0$

Straight angles



$<180^0$

Example

Name the types of angles written below

a) 45^0 Acute angle

b) 200^0 reflex angle

Ref

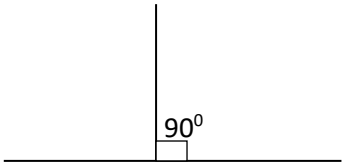
New Mk bk 5 pg 193

Remarks:

Lesson 15
Sub topic: **Measuring angles using a protractor**
Content: pupils will measure different angles using outer scale and inner scale on a protractor with the guidance of the teacher.

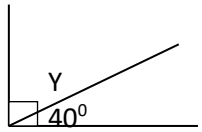
Ref
New Mk pg 195
Old MK pg 237
Remarks: .....

Lesson 16
Sub topic: Drawing angles using a protractor
Content: pupils will draw different angles using a protractor, pencil e.g. using a protractor to draw an angle of 90^0.



Ref:
New mk math bk 5 pg 195
Old MK pg 237

Lesson 17
Sub topic: **Supplementary angles and complementary angles**
Example: what is the supplement of 45^0
Let the sup< be m
$M + 45^0 = 180^0$
$M + 45 - 45 = 180 - 45$
$M + 0 = 135^0$
$M = 135^0$
Complementary angles
Examples: find the complement of 40^0



Let the comp < be Y
$Y + 40 = 90$
$Y + 40 - 40 = 90 - 40$
$Y + 0 = 50$
$Y = 50^0$

Ref

New MK pg 200
Old Mk pg 240

Lesson 18

Sub topic: **Application of complementary and supplementary angles**

Content: find complement of 30^0

Let the complement be N

N + 30 = 90

N + 30 – 30 = 90 – 30

N + 0 = 60^0

N = 60^0

The complement of x is 50^0. Find the value of x

X + 50 = 90

X + 50 – 50 = 90 – 50

X + 0 = 40

X = 40^0

The supplement of an angle is 72^0. What is the angle

let the angle be x

X + 72 = 180

X + 72 – 72 = 180 – 72

X + 0 = 108

X = 108^0

Ref

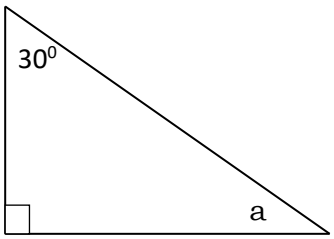
New Mk pg 200-201

Remarks:

Lesson 19

Sub topic: **Finding angles marked with letters on a triangle**

Content: examples find the value of a



a + 30 + 90 = 180

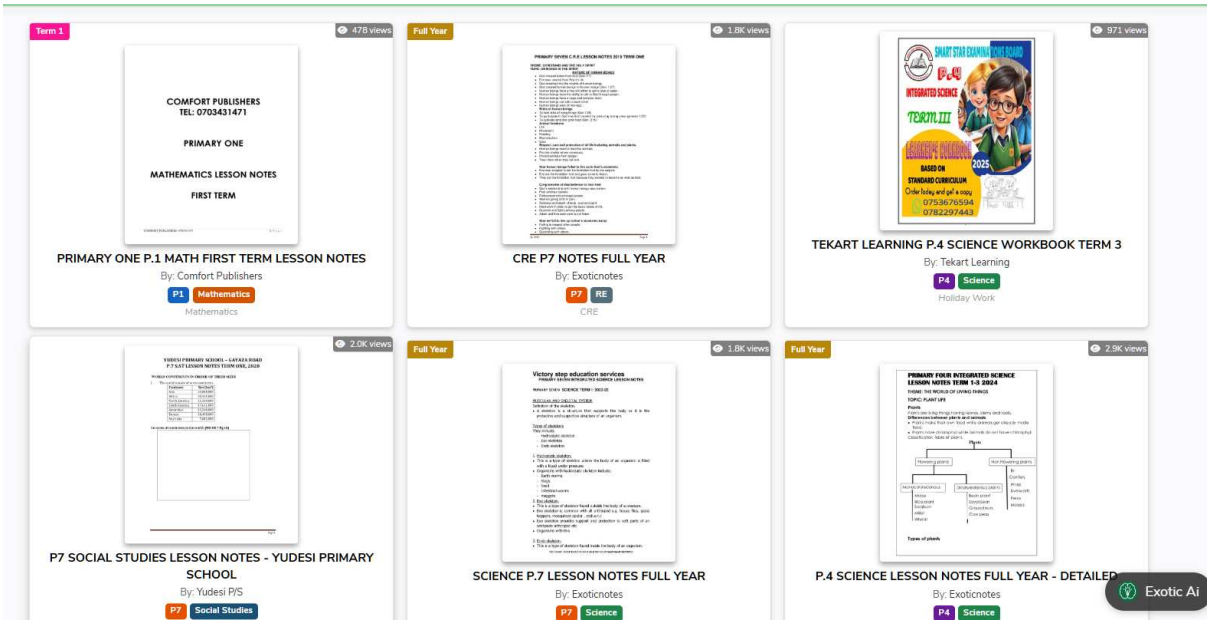
a + 120 = 180

a + 120 – 120 = 180 – 120

a + 0 = 60

a = 60^0

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