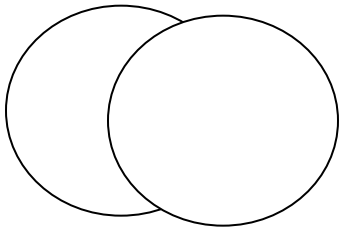
TOPIC SETS

APPLICATION OF SETS

Examples

1. In a class of 30 pupils 18 like music (M), 21 like Art (A) and some like both.

(a) Represent the above information on a Venn diagram.



(b) How many pupils like both subjects.

Solution

$18-x + x + 21 - x = 30$

$18+21-x = 30$

$39-x=30$

$39-39-x = 30-39$

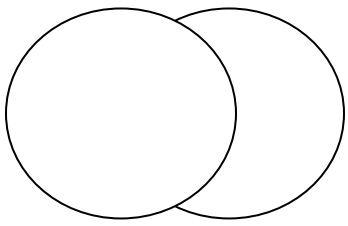
$-x = -9$

$\frac{-x}{-1} = \frac{-9}{-1}$

X = 9

:. 9 Pupils like both subjects

2. In a class of 40 pupils, 20 like mathematics (M), 17 like science (S), 'x' like both subjects while 8 do not like any of the subjects.
   (a) Represent the above information on a Venn diagram.
   Solution



(b) How many pupils like both subjects?

Solution

8+20-x+ x +17- x = 40

28+17-x = 40

45-x = 40

45-45-x = 40-45

-x = -5

- x = - 5

- 1 = -1

X = 5

:. 5 Pupils like both subjects

(c) What is the probability of selecting a pupil who likes only one subject?

Solution

(20 –x) + (17 – x)

(20-5) + (17-5)

15 +12

= 27

Prob (only one subject) = 27/40

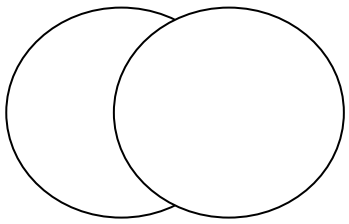
SOLVING PROBLEMS USING VENN DIAGRAMS GIVEN THE UNKNOWN IN THE "DIFFERENCE" REGION

Example 1

In a family of 10 members, 6 members eat meat (M), 5 members eat both meat and fish (F) while 'Y' members eat only fish.

(a) Represent the above information on a Venn diagram

Solution



(b) How many members eat only fish?

Solution

y + 5 + 6 – 5 = 10

y + 6 + 5 – 5 = 10

Y + 6 = 10

y + 6 – 6 = 10 – 6

Y = 4

y + 6 = 10

y + 6 – 6 = 10 – 6

Y = 4

(c) Find the number of pupils who eat fish.

Solution

(y + 5) Pupils

4 + 5

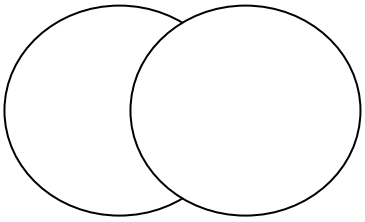
9 Pupils

Examples 2

In a class of 60 pupils, 25 like swimming (s), x pupils like music (m) only, 20 like both swimming and music and 5 like none of these.

(a) Represent this information on the Venn diagram.

Solution



(b) Find the value of x.

Solution

x + 5 + 20 + (25 – 20) = 60

x + 25 + 5 = 60

x + 30 = 60

x + 30 – 30 = 60 – 30

x = 30

(c) How many pupils like only one type of the activities?

Solution

x + (25 – 20)

30 + 5

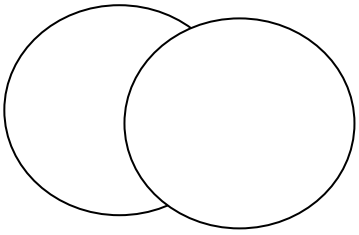
35 pupils

SOLVING PROBLEMS USING VENN DIAGRAMS GIVEN ONE OF THE SETS AS UNKNOWN

In a class of 35 pupils, y like mathematics (M), 20 like English (E) while 13 like both subjects.

(a) Using a Venn diagram, show the above information

Solution



(b) Find the number of pupils who like mathematics.

Solution

y – 13 + 13 + 20 – 13 = 35 **OR**

y + 7 = 35

y + 7 - 7 = 35 – 7

y =28

y + 20 – 13 = 35

y + 7 = 35

y + 7 – 7 = 35 – 7

y = 28

OR

y – 13 + 20 = 35

y + 7 = 35

y + 7 – 7 =35 -7

y = 28

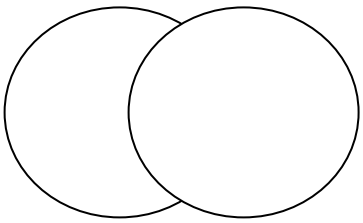
28 Pupils like mathematics

SOLVING PROBLEMS USING VENN DIAGRAMS.
WHEN THE COMPLEMENT OF THE UNION IS NOT GIVEN
Example 1

In a village with 60 farmers, 26 grow rice, 24 grow beans, 10 grow both crops while t grow none of the above.

(a) Represent the above information on a Venn diagram.

Solution



(b) Find the value of t .

Solution

t + 16 + 10 + 14 = 60

t + 40 = 60

t + 40 – 40 = 60 – 40

t = 20

SOLVING PROBLEMS USING VENN DIAGRAMS WHEN ONE OF THE SETS IS THE UNIVERSAL

In a group of 40 peoples, they all football, 9 play football only, 15 play tennis, 25 swim and some enjoy all the three games.

(a) Draw a Venn diagram to represent the above information

Solution

(b) How many people participate in all the three activities?

Solution

$15 - p + p + 25 - p + 9 = 40$

$15 + 25 - p + 9 = 40$

$49 - p = 40$

$49 - 49 - p = 40 - 49$

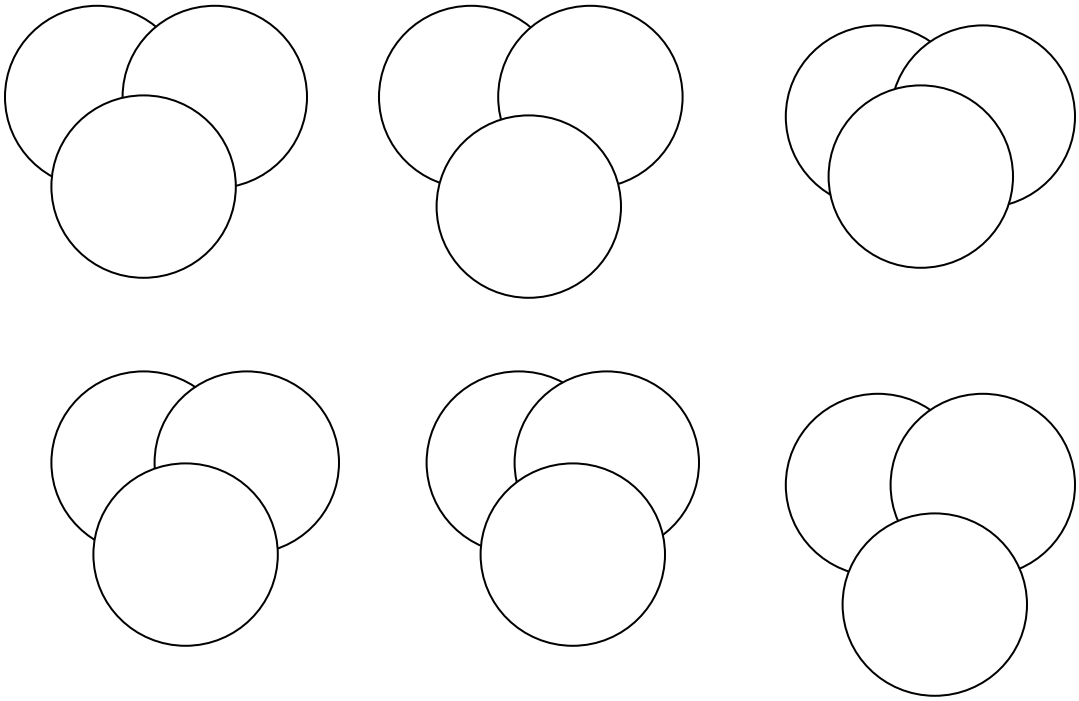
$-p = -9$

$\frac{-p}{-1} = \frac{-9}{-1}$

P = 9

9 people participate in the three activities

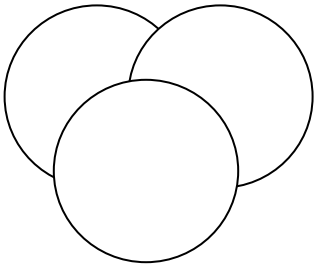
SETS IN THREE VENN DIAGRAMS DESCRIBING THE SHADED PARTS.



INTERPRETING THREE VENN DIAGRAM SETS

EXAMPLE

The Venn diagram shows the number of pupils who play different games.



Find the number of pupils who play
(a) all the three games.

2 pupils

(b) both volleyball and football.

4 + 2 = 6 pupils

(c) volleyball and hockey only.

5 pupils

(d) only one game.

3 + 8 + 6 = 17 pupils

(e) Hockey.

5 + 2 + 1 + 8 = 16 pupils

(f) Football only.

6 pupils

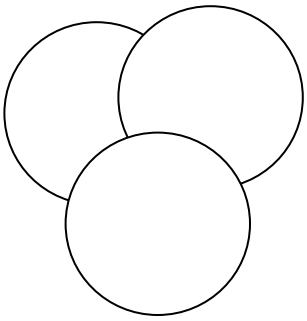
(g) Football and hockey but not volleyball.

1 pupil

COMPLETING 3 VENN DIAGRAM SETS WITH MISSING INFORMATION

EXAMPLE

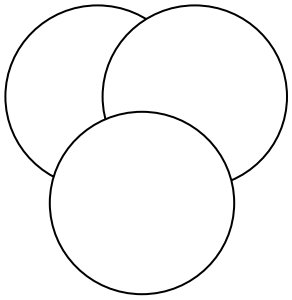
In the Venn diagram below, 20 pupils like mathematic (M), 16 pupils like English (E), 30 pupils like science (S) .complete the Venn diagram with missing information.



n(M) only	**n(E) only**	**n(S) only**	**n(MUSUE) ´**
20 – (3 + 2 + 6)	16 – (3 + 2 + 5)	30 – (6 + 2 + 5)	55 – (20 + 6 + 17 + 5)
20 -11	16 – 10	30 – 13	55- 48
9	**6**	**17**	**7**

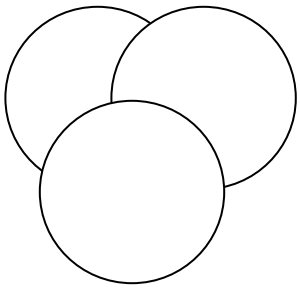
REPRESENTING INFORMATION ON A VENN DIAGRAM OF THREE SETS
EXAMPLE

At a birthday party, 11 people took Fanta (F), 13people took Mirinda (M) and 15 people took pepsicola. Given also that 2 people took all the three types of drinks, 1 person took both Fanta and Mirinda only, 3 people took both Fanta and Pepsi only ,6 people took both Pepsi and Mirinda only.
Represent the above information on Venn diagram and complete the Venn diagram with missing information.



n(F) only	**n(P) only**	**n(M) only**
11 - (3 + 2 + 1)	15 – (3 + 2 + 6)	13 – (6+ 2+ 1)
11 – 6	15 -11	13 -9
5	**4**	**4**

Example 2
In a class of 35 pupils, 20 like mathematics (M), 19 like science (S) and 19 like English (E) if; 10pupils like both mathematics and science,
11 like both science and English
9 like both English and mathematics
7 like all the three subjects.
Represent the above information on a Venn
Diagram
Solution



n (∑) = 35
n (M) = 20
n (S) = 19

n (MnS) only = 10 – 7
= 3
n(SnE) only = 11 – 7

n (E) = 19
n (MnSnE) = 7
n (MnS) = 10
n (SnE) = 11
n (EnM) = 9

= 4
n(EnM) only = 9 – 7
= 2
n(M) only = 20 – 12
= 8
n(S) only = 19 – 14
= 5
n(E) only 19 – 13
= 6

n(MnS) only	n(SnE) only	n(EnM) only	n(M) only	n(S) only	n(E) only
10 -7	11 – 7	9 – 7	20 – 12	19 -14	19 -13
3	**4**	**2**	**8**	**5**	**6**

SHARING IN RATIOS GIVEN TOTAL SHARE

Example 1

Share 18 mangoes in the ratio of 4:5.

Solution	1st share	2nd share
Total ratio	(4 x $\frac{18^2}{9_1}$) mangoes	(5 x $\frac{18^2}{9_1}$) mangoes
4 + 5		
9	(4 x 2) mangoes	(5 x 2) mangoes
	8 mangoes	**10 mangoes**

Example 2

Sh. 60,000 was shared among three sisters, Anne, Betty and Claire in the ratio 1:2:3 respectively.

How much did each get?

Solution	Anne's share	Betty share	Claries share
Total ratio.	10000	10000	10000
1 + 2 + 3	1 x $\frac{60000}{6_1}$/=	2 x $\frac{60000}{6_1}$/=	3 x $\frac{60000}{6_1}$/=
6	1 x 10000/=	2 x 10000/=	3 x 10000/=
	10000/=	***20000/=***	***30000/=***

SHARING IN RATIOS GIVEN THE SHARE OF ONE PERSON.

Example 1

Paul and James shared some money in the ratio of 3:5 respectively. If James got 3000/= ,

(a) Find Paul's share

Solution

Paul : James — 5 parts represent 3000/=

3 : 5 — 1 part represent $\frac{3000}{5}$/= x 3

? : **3000/=** — 3 part represent $\frac{3000}{5}$/= x 3

= 600/= x 3

= 1800/=

(b) What was their total share?

Solution

Pupils share = 1800/=

James' share = 3000/=

Total share = 4800/=

OR Let x represent total share

$\frac{5}{8} \times X = 3000/= \times 8$

$8 \times \frac{5x}{8} = 3000/= \times 8$

$5x = \frac{3000}{5}/= x8$

X = 600 x 8

X = 4800/=

SHARING IN RATIOS GIVEN DIFFERENCE RATIOS

Example1

A and B shared money in the ratio of 3:7 respectively. If B got shs 4000 more than A,

(a) Find the share of A

Solution

A: B — Difference in ratio

3:7 — 7 – 3

4

4 parts represent 4000/=

1 part represents $\frac{4000/=}{4}$ = 1000/=

3 parts represent 3 x 1000/=

3000/=

(b) Find their total share.

Solution

Total = 3 + 7

= 10

4 parts represent 4000/=

1 parts represent $\frac{4000/=}{4}$

10 parts represent 10 x 1000/=

= 10000/=

Example 2

Lucy and Danny shared some money in the ratio of 2:5 respectively. If Lucy got 1500/= less than Danny, how much did Danny get?

Solution

Lucy : Danny

2 : 5

Difference in ratio = 5 – 2

= 3

3parts represent 1500/=

1part represents $\frac{1500/=}{3}$

5parts represent 5 x 500/=

= 2500/=

SHARING IN RATIOS, APPLICATION IN PERIMETER OF RECTANGLES

Examples

The ratio of the length to the width of a rectangle is 3:2 respectively. If the perimeter of the rectangle is 40cm.

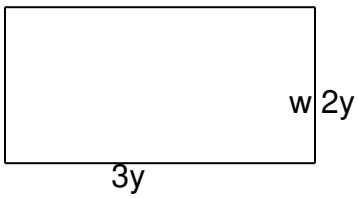
(a) Find the actual length and width of the rectangle

Solution

Let y represent 1 part

Length = 3y

Width = 2y



$2l + 2w = p$

$(2 \times 3y) + (2 \times 2y) = 40cm$

$6y + 4y = 40cm$

$10y = 40cm$

$\frac{10y}{10} = \frac{40cm}{10}$

Y = 4cm

Length = 3 x y

= 3 x 4cm

= ***12cm***

width = 2 x y

= 2 x 4cm

= ***8cm***

(b) Find the area of the rectangle

Solution

Area = L x W

= 12cm X 8cm

= *96cm²*

ADDITION AND SUBTRACTION OF DECIMALS

a. Simplify 2.62 + 14 + 6.4

Solution

$$\begin{array}{r} 2.62 \\ +\ 14.00 \\ 6.40 \\ \hline \mathbf{23.02} \end{array}$$

b. Subtract 0.99 from 2

solution

$$\begin{array}{r} 2.00 \\ 0.99 \\ \hline 1.01 \end{array}$$

MULTIPLICATION OF DECIMALS

a. Multiply: 1.3 x 1.2

Solution

$= \frac{13}{10} \times \frac{12}{10} = \frac{156}{100}$

$= \boldsymbol{1.56}$

b. Work out: 2.45 x 0.25

solution

$= \frac{245}{100} \times \frac{25}{100} = \frac{6125}{10000}$

$= \boldsymbol{0.6125}$

DIVISION OF DECIMALS

Divide 0.72 ÷ 0.9

Solution

$0.72 \div 0.9 = \frac{72}{100} \div \frac{9}{10}$

$= \frac{72}{100} \times \frac{10}{9}$

$= \frac{8}{10}$

$= \boldsymbol{0.8}$

How many 1.5 metre pieces can be cut from a length of 7.5 metres?

Solution

$(7.5)\ m \div 1.5m = \frac{75}{10} \div \frac{15}{10}$

$= \frac{75}{10} \times \frac{10}{15}$

= 5pieces

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COMBINED OPERATIONS ON DECIMALS

Simplify; $\frac{3.2 - 0.08}{0.2 \times 0.3}$

Solution

3.20 0.08 ***3.12***	$= \frac{2}{10} \times \frac{3}{10}$ $= \frac{6}{100}$ $= \mathbf{\underline{0.06}}$	$= \frac{312}{100} \div \frac{6}{100}$ $= \frac{312}{100} \times \frac{100}{6}$ $= \mathbf{\underline{52}}$

Work out: - $\frac{0.28 \times 0.81}{027 \times 4.2}$

Solution

$\frac{28}{100} \times \frac{81}{100} \quad \frac{27}{100} \times \frac{42}{10}$

$\frac{28}{100} \times \frac{81}{100} \times \frac{100}{27} \times \frac{10}{42}$

$\frac{2}{10} \quad \frac{2 \times 1 \times 1 \times 1}{10 \quad x\ 1 \times 1}$

0.2

EXPRESSING FRACTIONS AS RECURRING DECIMALS

Express $\frac{2}{3}$ as a decimal

Solution

Expressing recurring decimals as fractions

Change 0.33----to a fraction

Solution

M = 0.33 ---------- (i)

10m = 0.333 --- x 10

10m = 3.333 ----- (ii)

-10m = 3.333 ---

M =0.333 ----

9m = 3

$\frac{9m}{9} = \frac{3}{9}$

M =⅓

Express 0.122 – to a common fraction
Solution
Let x represent the fraction

$X = 0.1222$ ------ (1)

$10 \times X = 0.1222$ ------ x 10

$10x = 1.222$ -------- (ii)

$10 \times 10x = 1.222$ -----x 10

$100x = 12.222$ ------- (iii)

$100x = 12.222$ ------- (iii)

$10x = 1.222$ --------- (ii)

$90x = 11$

$$\frac{90x}{90} = \frac{11}{90}$$

$$\boldsymbol{X = \frac{11}{90}}$$

ADDITION AND SUBTRACTION OF FRACTIONS

Work out: $-\frac{5}{6} - \frac{1}{3} + \frac{1}{2}$

Solution

$$= \frac{5}{6} - \frac{1}{3} + \frac{1}{2} = \frac{5 + 3 - 2}{6}$$

$$= \frac{8 - 2}{6}$$

$$= \frac{4}{6}$$

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

solution

$$= \frac{2}{1} - \frac{1}{3} + \frac{1}{4} \quad = \frac{24 + 3 - 5}{12}$$

$$= \frac{27 - 4}{12}$$

$$= \frac{23}{12}$$

$$\boldsymbol{1\frac{11}{12}}$$

MULTIPLICATION AND DIVISION OF FRACTIONS

1. Multiply: $-2\frac{1}{4} \times 1\frac{1}{5}$

Solution

$$2\frac{1}{4} \times 1\frac{1}{5} = \frac{9}{4} \times \frac{6}{5}$$

$$= \frac{9 \times 3}{2 \times 5}$$

$$= \frac{27}{10}$$

$$= \mathbf{2\frac{7}{10}}$$

2. Work out: $-1\frac{1}{4} \div 1\frac{3}{5}$

solution

$$1\frac{1}{4} \div 1\frac{3}{5} = \frac{5}{4} \div \frac{8}{5}$$

$$= \frac{5}{4} \times \frac{5}{8}$$

$$\mathbf{= \frac{25}{32}}$$

3. How many $1\frac{2}{3}$ are contained in 15

solution

$$15 \div 1\frac{2}{3}$$

$$= 15 \div \frac{5}{3}$$

$$= 15 \times \frac{3}{5}$$

$$= 3 \times 3$$

10 = **9**

COMBINED OPERATIONS

BODMAS

1. Simplify $\frac{1}{3}$ of $(\frac{1}{2} - \frac{1}{4}) + \frac{7}{12}$

Solution

BODMAS

$\frac{1}{3}$ of $(\frac{2}{4} - \frac{1}{4}) + \frac{7}{12}$

1 of $\frac{1}{4} + \frac{7}{12}$

$\frac{1}{3} \times \frac{1}{4} + \frac{7}{12}$

$\frac{1}{12} + \frac{7}{12}$

$\frac{8}{12}$

$\frac{2}{3}$

APPLICATION OF FRACTIONS

2/3 of a class are girls, if there are 20 girls in that class;

(a)Find the total number of pupils in the class.

Solution

Let x represent the total

$\frac{2}{3}$ of x = 20

$\frac{2}{3} \times X = 20$

$3 \times \frac{2X}{3} = 20 \times 3$

$\frac{2X}{2} = \frac{20 \times 3}{2}$

X = 30

(b)Find the number of boys

Solution

Fraction of boys = $1 - \frac{2}{3}$

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

= $\frac{1}{3}$

Number of boys = $\frac{1}{3} \times 30$

$= 1 \times 10$

= 10boys

No of boys = 30 – 20

= 10boys

APPLICATION OF FRATIONS

(1) After covering 2/3 of a journey, a motorist still had 40km to cover. How long was the whole journey?

Solution

Fraction covered	Fraction left	Let whole journey
$\frac{2}{3}$	$1 - \frac{2}{3}$	$\frac{1}{3}$ of y = 40km
	$\frac{3}{3} - \frac{2}{3}$	$\frac{1}{3} \times y = 40km$
	$\frac{1}{3}$	$3 \times \frac{y}{3} = 40km \times 3$
		Y = 120k

2. Ina group, 1/6 are girls and there are 8more boys than girls.

(a)Find the total number of pupils in the group.

Solution

Fraction of boys = $1 - \frac{1}{6}$

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

$= \frac{5}{6}$

Fraction of more boys = $\frac{5}{6} - \frac{1}{6}$

$= \mathbf{\frac{4}{6}}$

Let the total number be x

$4x = 8$

6

$6 \times \frac{4x}{6} = 8 \times 6$

$\frac{4x}{4} = \frac{8 \times 6}{4}$

$x = 2 \times 6$

x = 12

There are 12 pupils in the group.

(b)How many girls are in the group?

Solution

$\frac{1}{6} \times 12$

2girls

APPLICATION OF FRACTIONS.

Finding remainders: - Given one fraction
Given two fractions

1. $\frac{4}{5}$ of the class are boys and the rest are girls.

Find the fraction of girls.

Solution

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

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

$\mathbf{\frac{1}{5}}$

2. $\frac{1}{4}$ of the animals are cows, $\frac{1}{3}$ are bulls and the rest are goats.

Solution

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

$1 - \frac{3+4}{12}$

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

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

$\mathbf{\frac{5}{12}}$

APPLICATION OF FRACTIONS (finding fraction of the remainder)

1. On a farm, $\frac{2}{3}$ of the animals are black, ¼ of the remainder are brown.

(a) Find $\frac{1}{3}$ of the fraction left

Solution

Black	Remainder	Brown	Fraction Left	1 Fraction Left
$\frac{2}{3}$	$1 - \frac{2}{3}$	$\frac{1}{3} \times \frac{1}{4}$	$\frac{1}{3} - \frac{1}{12}$	$\frac{1}{3} \times \frac{1}{4}$
	$\frac{3}{3} - \frac{2}{3}$	$\frac{1}{12}$	$\frac{4-1}{12}$	
	$\frac{1}{3}$		$\frac{3}{12}$	$\frac{1}{12}$
			$\mathbf{\frac{1}{4}}$	

(b) Find 1/5 of the fraction left

$\frac{1}{5}$ of $\frac{1}{4}$

$\frac{1}{5} \times \frac{1}{4}$

$\frac{1}{20}$

MORE ABOUT APPLICATION OF FRACTIONS

John spent 1/3 of his money on books and 1/6 of the remaindes on transport.

(a) What fraction of his money was left?

Solution

Books	**remainder**	**transport**	**fraction left**
$\frac{1}{3}$	$1 - \frac{1}{3}$	$\frac{1}{6}$ of $\frac{2}{3}$	$\frac{2}{3} - \frac{1}{9}$ or $1 - (\frac{1}{3} + \frac{1}{9})$
	$\frac{2}{3}$	$\frac{1}{6} \times \frac{1}{3}$	$\frac{6-1}{9}$ $\quad 1 - \frac{3+1}{9}$
		$\frac{1}{9}$	$\frac{5}{9}$ $\quad 1 - \frac{4}{9}$
			$\frac{9}{9} - \frac{4}{9}$
			$\frac{5}{9}$

(b) If he left with sh. 15000 how much did he have at first.

Solution

Let the total be x

$\frac{5}{9} \times X = 15000/=$

$9 \times \frac{5x}{9} = 15000/= \times 9$

$\frac{5x}{5} = \frac{15000/= \times 9}{5}$

$x = 3000/= \times 9$

$x = 27000/=$

TAPS

1. Tap A can fill a tank in 6 minutes and tap B can fill the same tank in 3 minutes. How long will both taps take to fill the tank if they are opened at the same time?

Solution

In one minute

Tap A fills 1/6 of the tank

Tap B fills 1/3 of the tank

Both taps fill (1/6 + 1/3) of the tank

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

$= \frac{3}{6}$

$= \frac{1}{}$

total time taken of fill tank

= (1 ÷½) minutes

= (1 x $\frac{2}{1}$) minutes

= 2minutes

2

2. Tap A takes 3 minutes to fill a tank and tap takes 4 minutes to draw water from the tank.

How many minutes will it take to fill the tank if both taps are left running?

Solution

In 1 minute

Tap A fills $\frac{1}{3}$ of the tank

Tap B empties $\frac{1}{4}$ of the tank

Bothe taps fill $(\frac{1}{3} - \frac{3}{4})$ of the tank

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

$\frac{\mathbf{1}}{\mathbf{12}}$

total time taken to fill the tank

$1 \div \frac{1}{12}$

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

12 minutes

3. Tap A and B are connected to a tank. Tap A can fill the tank in 3 minutes. Ta\p B draws water from the tank. When both taps are running, if takes 12 minutes for the tank to be filled . How long does tap B take to draw water from the tank?

Solution

In 1 minute, tap A fills $\frac{1}{3}$ of the tank

In I minute both taps fill $\frac{1}{12}$ of the tank

In 1 minute tap B empties $\frac{1}{3} - \frac{1}{12}$ of the tank

$\frac{4-1}{12}$

$\frac{3}{12}$

$\frac{\mathbf{1}}{\mathbf{4}}$

Total time taken to draw water from the taken

$(1 \div \frac{1}{4})$

$1 \times \frac{4}{1}$

4 minutes

PERCENTAGES

APPLICATION OF PERCENTAGES

1 Opio has 400 heads of cattle. 80% of them are cows and the rest are bulls.

Find the number of cows.

Solution

$\frac{80}{100} \times 400 = 80 \times 4$

$= 80 \times 4$

= 320 cows

(a) Find the percentage of bulls.

Solution

100% - 80%

20%

(b) What is the total number of bulls?

Solution

$\frac{20}{100} \times 400 = 20 \times 4$

= 80 bulls

OR

400

- 320

80bulls

2. If 30% of my salary is spent on food, 1 save sh. 21000. What is my salary?

%age saved = 100% - 30%

70%

70% represent 21000/=

1% represents $\frac{21000/=}{70}$

100% represents $21000 \times \frac{100}{70}$

$= 300 \times 100$

= 30000/=

$\frac{70}{100} \times y = 21000/=$

$10 \times \frac{7y}{10} = 21000/= \times 10$

$\frac{7y}{7} = \frac{210000}{7}$

y = 30000/=

PERCENTAGE INCREASE AND DECREASE

1. Increase sh,800 by 20%

Solution

New % = 100% + 20%
120%

New amount $\frac{120}{100}$ x 800/=
120 x 8
= 960/=

increase
20% of 800/=
$\frac{20}{100}$ x 800/=
20 x 8
= 160/=

New amount
800/=
+ 160/=
960/=

2. Increase sh.2000 by 10% then by 20%

Solution

Method 1

10% increament	new amount	20% increament	new amount
$\frac{10}{100}$ x 2000	2000	$\frac{20}{100}$ x 2200	2200
10 x 20/=	+ 200	20 x 22	+ 440
200/=	**2200/=**	**440/=**	**2640/=**

Method 2

1st increament = 100% + 10%
= 110%

2nd increament = 100% + 20%
= 120%

New amount = $\frac{110}{100} \times \frac{120}{100} \times 2000$
= 11 x 120 x 2/=
= 1320 x 2/=
= **2640/=**

3. Decrease sh.12000 by 10%

Solution

New % = 100% - 10%
= **90%**

$\frac{90}{100}$ x 1500/=
90 x 15
1350/=

4. Decrease sh. 12000 by 5% then by 10%

Solution

100% - 5% (5% reduction)

100% - 10% (10% reduction)

$\frac{95}{100} \times \frac{90}{100} \times 12000$

95 x 9 x 12/=

10260/=

FINDING ORIGINAL NUMBER AFTER INCREASE

1. What amount when increased by 20% becomes sh.1440?

Solution

After increase the new percentages

Method 1

100% + 20% = 120%

120% rep 1440

1% rep $\frac{1440}{120}$

100% rep $100 \times \frac{1440}{100}$

100 x 12

1200/=

Method 2

Let the amount be x

(100% + 20%) of x = 1440/=

$100 \times \frac{120}{100} \times X = 1440 \times 100$

$\frac{120x}{120} = \frac{144000}{120}$

x = 1200/=

2. When the prices of a radio was increased by 30% it becomes sh.16900. What was the old price?

Method 1

New % = 100% + 30%

= 130%

130% rep sh 16900

1% rep sh $\frac{16900}{130}$

= 130

100% rep 100 x 130/=

= 13000/=

method 2

let the salary be y

100% + 30% = 130%

$\frac{130}{100} \times y = 16900$

$100 \times \frac{130y}{100} = 16900 \times 100$

$\frac{130y}{130} = \frac{16900}{130} \times 100$

Y = 13000/=

FINDING ORIGINAL NUMBER AFTER DECREASE

1. If a man's salary is decreased by 35% it becomes sh.15600. what is his salary?

Solution

Method 1

100% - 35% = 65%

65% rep 15600/=

1% rep $\frac{15600/=}{65}$

100% rep $100 \times \frac{15600}{65}$

100 x 240

24000/=

method 11

100% - 35% = 65%

let the salary be x

$\frac{65}{100}$ of x = 15600/=

$100 \times \frac{65x}{100} = 15600 \times 100$

$65x = \frac{15600}{65} \times 100$

X = 24000/=

2. When the price of a radio is reduced by 25% it becomes sh.67500. what was the old price of the radio?

Solution

Method 1

New % = 100% - 25%

75%

75% rep 67500/=

1% rep 67500/=
75

900/=

100% rep 100 x 900/=

90,000/=

method 2

new % = 100% - 25%

75%

Let the old price be x

75 x X = 67500/=
100

100 x 75x = 67500 x 100
100

75x = 6750000
75 75

X = 90,000/=

FINDING PERCENTAGE OF INCREASE OR DECREASE

1. Where 400kg are increased by p% they become 440kg. Find the value of p.

Solution

Increase = 440kg
-400kg
40kg

(40kg x 100)%
400kg

10%

P = 10%

2. 800 pupils where decreased by y% to 680 pupils. find the value of y.

Solution

Decrease = 800
-680
120

y = (Decrease x 100)
Old no

y = 120 x 100

y = 15%

PERCENTAGE PROFIT AND LOSS

The idea of increase can also give the same meaning as: gain, profit or raise.

1. An article was bought at sh. 100,000 and sold at sh.120000. calculate the percentage profit

Solution

Profit = sp – cp

= 120,000 – 100,000/=

= 20,000/=

% profit = (Profit x 100) %
B.P

= (20000 x 100) %
100000

= 20%

2. Otim bought a shirt at sh. 4000 and sold it at sh.3000. Find his percentage loss.

Solution

Loss = 4000/= - 3000/=
= 1000/=

% loss = $\frac{\text{loss} \times 100}{\text{B.P}}$ %
= $\frac{1000 \times 100}{4000}$ %
= 25%

FINDING SELLING PRICE GIVEN PERCENTAGE PROFIT OR LOSS AND BUYING PRICE

1. Birigwa bought a DVD player at sh. 300,000 and sold it at 10% profit. Find his selling price.

Solution new % = 100% + 10%
= **110%**

$\frac{110}{100}$ x 300000/=

330000/=

2. A fridge bought for sh.600,000 was sold at a loss of 25%. Calculate the selling price.

Solution new % = 100% -25%
= 75%

New amount = $\frac{75}{100}$ x 60000/=
= 75 x 6000/=
= 450000/=

FINDING COST PRICE GIVEN PERCENTAGE PROFIT OR LOSS AND SELLING PRICE

1. By selling a blanket at sh. 36000, a trader made a profit of 20%. Calculate the cost price of the blanket

Solution

New % = 100% + 20%
= 120%

Cost price % = 100%
120% rep 36000/=
1% rep $\frac{36000/=}{120}$
100% rep 100 x $\frac{36000/=}{120}$
= 30000/=

2. A dealer sold a bicycle for sh. 45000 there by losing 10%

(a) Calculate the original price of the bicycle.

Solution

New % = 1000% - 10%

= 90%

Original % = 100%

90% rep = 45000/=

1% rep = $\frac{45000/=}{90}$

100% rep 100 x 500

= 50000/=

(b) How much did he lose

Solution

$\frac{10}{100}$ x 50000/=

= 5000/=

DISCOUNT

Discount is realized when a trader sells an item at a price less than the marked price.

1. The marked price of a book is sh.4000. If a customer is offered a 10% discount:

(a) How much is the discount?

Solution

= $\frac{10}{100}$ x 4000/=

= 10 x 40

= **400/=**

(b) How much does the customer pay?

Solution

4000/=	or new % = 100% - 10%	90 x 40
- 400/=	= 90%	**3600/=**
3600/=	= 90 x 4000/=	
	= **3600/=**	

2. The marked price of a shirt was sh. 1500. After a discount a customer paid sh.1200.how much was the discount

Solution

Discount = marked price – cash price

= 1500/= - 1200/=

= 300/=

(a) Calculate the percentage discount.

Solution

% discount = (Discount x 100) %
Marked price

= (300 x 100) %
1500/=

= 20%

FINDING THE MARKED PRICE (ORIGINAL PRICE)

1. Cissy paid sh. 18000 for a hand bag after being offered a discount of 10%. Calculate the marked price of the bag?

New % = 100% - 10%
= 90%

90% rep 18000/=

1% rep 18000
90

100% rep = 100 x 200
= 20000/=

(c) How much was the discount

20000/=
-18000/=
2000/=

or Discount = 10 x 20000/=
100
= 10 x 200
= 2000/=

COMMISSION

1. A salesman was paid a salary of sh.10000 plus a commission of 10% of the value of goods sold. If he sold goods worth sh 6500, how much did he earn altogether?

Solution

Salary = 10000/=

Commission = 10 x 6500
100
= **650/=**

Total amount earned = 10000
+ 650
10650/=

2. Kamara was given a commission of 3% of his sales. How much did he earn if he sold 50 toys at sh. 15000 each?

Solution

Total sales = 80 x 15000/=

= 1,200,000/=

His commission = $\frac{3}{100}$ x 1200, 000/=

= **36,000/=**

SIMPLE INTREST

1. Calculate the simple interest on sh.8000 for 2yrs at 10% per annum

Solution

S.I = PTR

= 8000 x 2 x $\frac{10}{100}$

= 80 x 20

= **1600/=**

2. Calculate the simple interest on sh.24000 for 8 months at simple interest rate of 15% per year.

Solution

S.I = PTR

= 24000 x $\frac{8}{12}$ x $\frac{15}{100}$

= 20 x 8 x 15

= **2400/=**

3. Calculate the simple interest on sh. 24000 for 8 months at a simple interest rate of 2% per month.

Solution

S.I = PTR

= 24000 x 8 x $\frac{2}{100}$

= 240 x 16

= **3840/=**

FINDING RATE, PRINCIPAL OR TIME

1. Nabifo deposited sh.50000 on her saving s account. At the end of 3yrs the simple interest earned was sh.15000. Calculate the rate of interest.

Solution

PTR = I

50000 x 3 x $\frac{R}{100}$ = 15000

$\frac{1500R}{1500} = \frac{15000}{1500}$

R = 10%

2. Calculate the rate of interest if sh.30000 can yield a simple interest of sh.1125 in 9months.

Solution

$P \times T \times R = I$

$30000 \times \frac{9}{12} \times \frac{R}{100} = 1125$

$\frac{75 \times 3 \times R}{75 \times 3} = \frac{1125}{75 \times 3}$

R = 5%

3. In what time will sh.1200 yield an interest of sh. 1800 at per year?

Solution

$P \times T \times R = I$

$12000 \times T \times \frac{5}{100} = 1800$

$\frac{600T}{600} = \frac{1800}{600}$

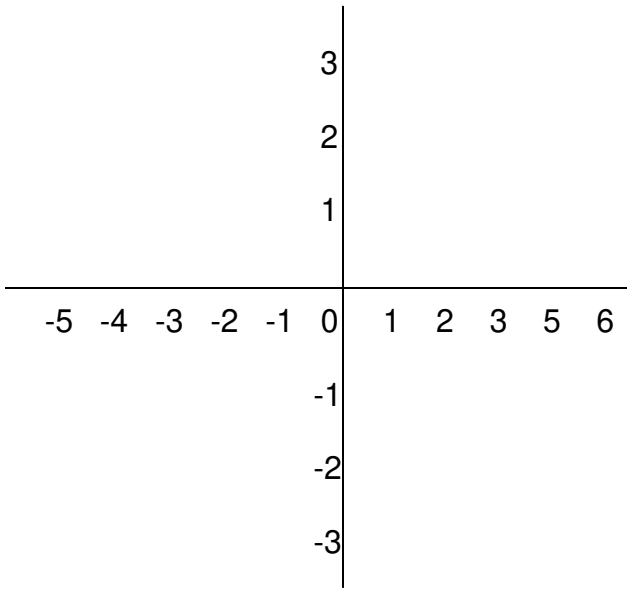
T= 3years.

COORDINATES

INTRODUCTION

Identifying lines of a coordinate graph

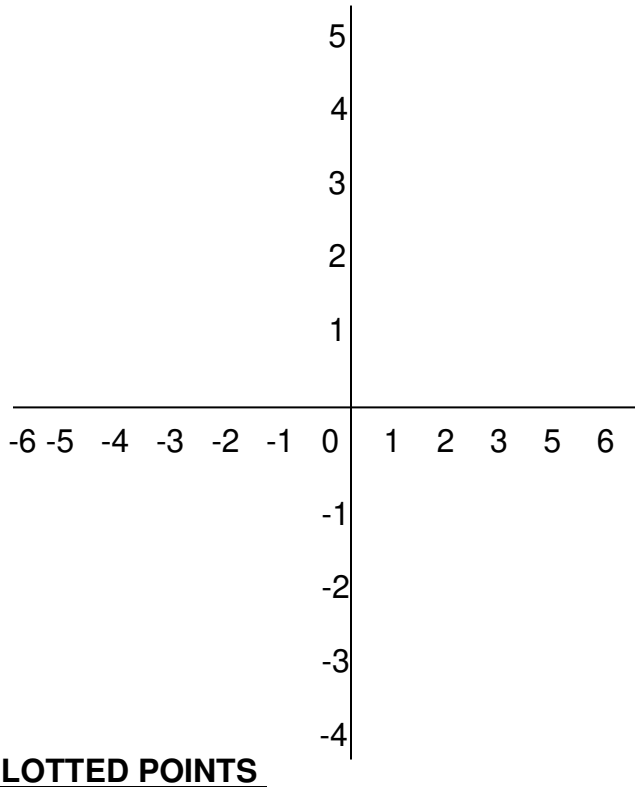
Identify all possible lines on the grid below;



PLOTING GIVEN POINTS

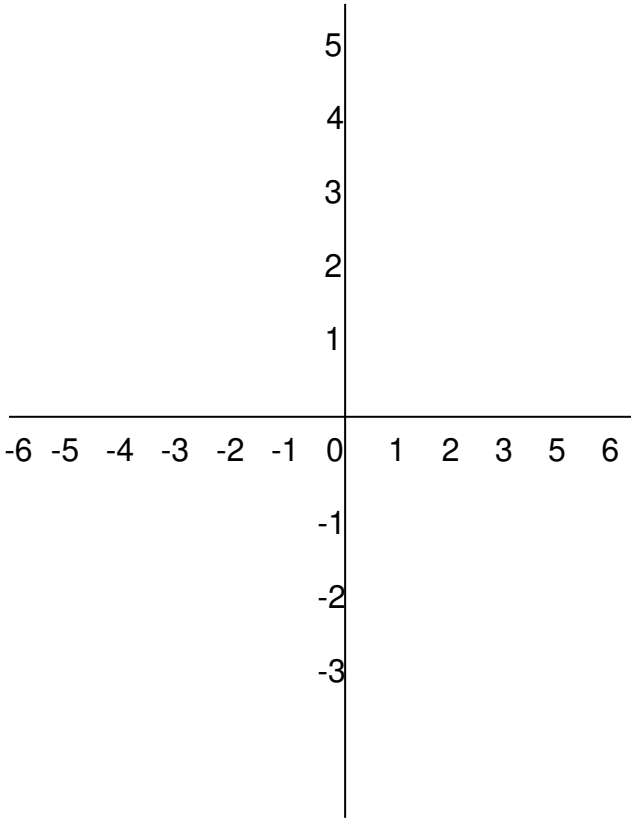
Plot the following point on a grid

A(0,5), B(0,-4) C(3,0), D(-4,0) E(-2,-2) F(-3,-5) G(+2,-4), H(-5,+1) etc.



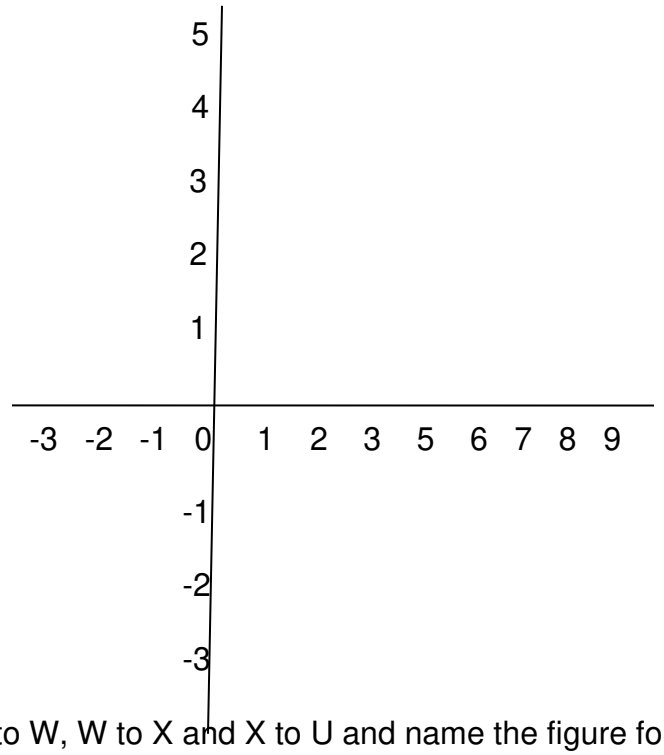
NAMING PLOTTED POINTS

Name the various points on the coordinate graph.



FORMING FIGURES

On the grid below plot the following points
U(-1,4), V(3,4), W(7,-2) and X(-1,-2)



Join point U, to V, V to W, W to X and X to U and name the figure formed .
A trapezium

(i) Find its area.

Area = $\frac{1}{2}$h (a + b)

$\frac{1}{2}$ x 6units (4units + 8units)

3units x 12units

= **36square units**

(ii) If each small square represents a cm, work out the area of the above figure

Area = $\frac{1}{2}$h (a + b)

1 x6cm (4cm + 8cm)

3cm x 12cm

= **36cm²**

USING EQUATION OF THE LINE TO COMPLETE TABLES

1. Given that y = x + 1, complete the table below.

X	-3	__	-1	__
Y	- 2	-1	__	1

2. Given that y = x - 2, complete the table below.

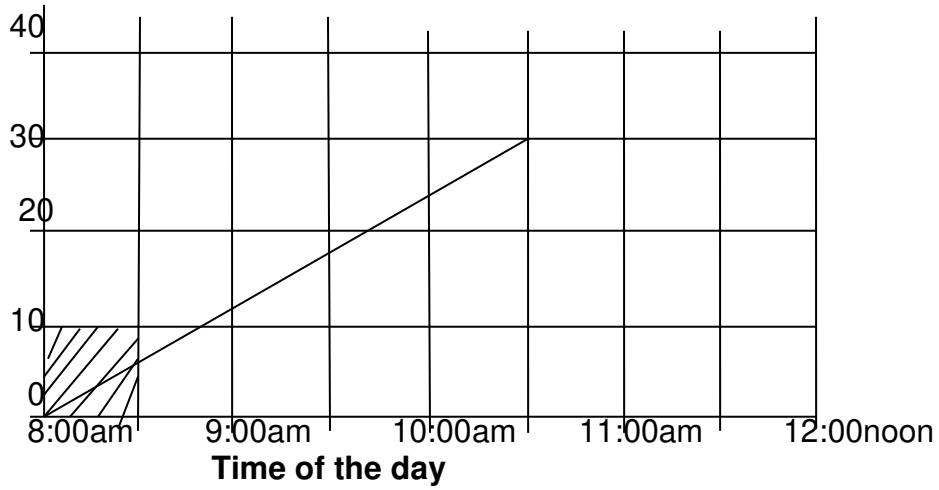
Y	- 4	---	- 2	---
X	- 2	- 1	---	1

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TRAVEL GRAPHS

READING HORIZONTAL AND VERTICAL SCALES.

- Identification of horizontal and vertical axis
- Interpreting and reading scales correctly study the travel graph below and answer the questions that follow.



1. What is shown on the

(i) Vertical axis?
Distance in km

(ii) Horizontal axis?
Time of the day

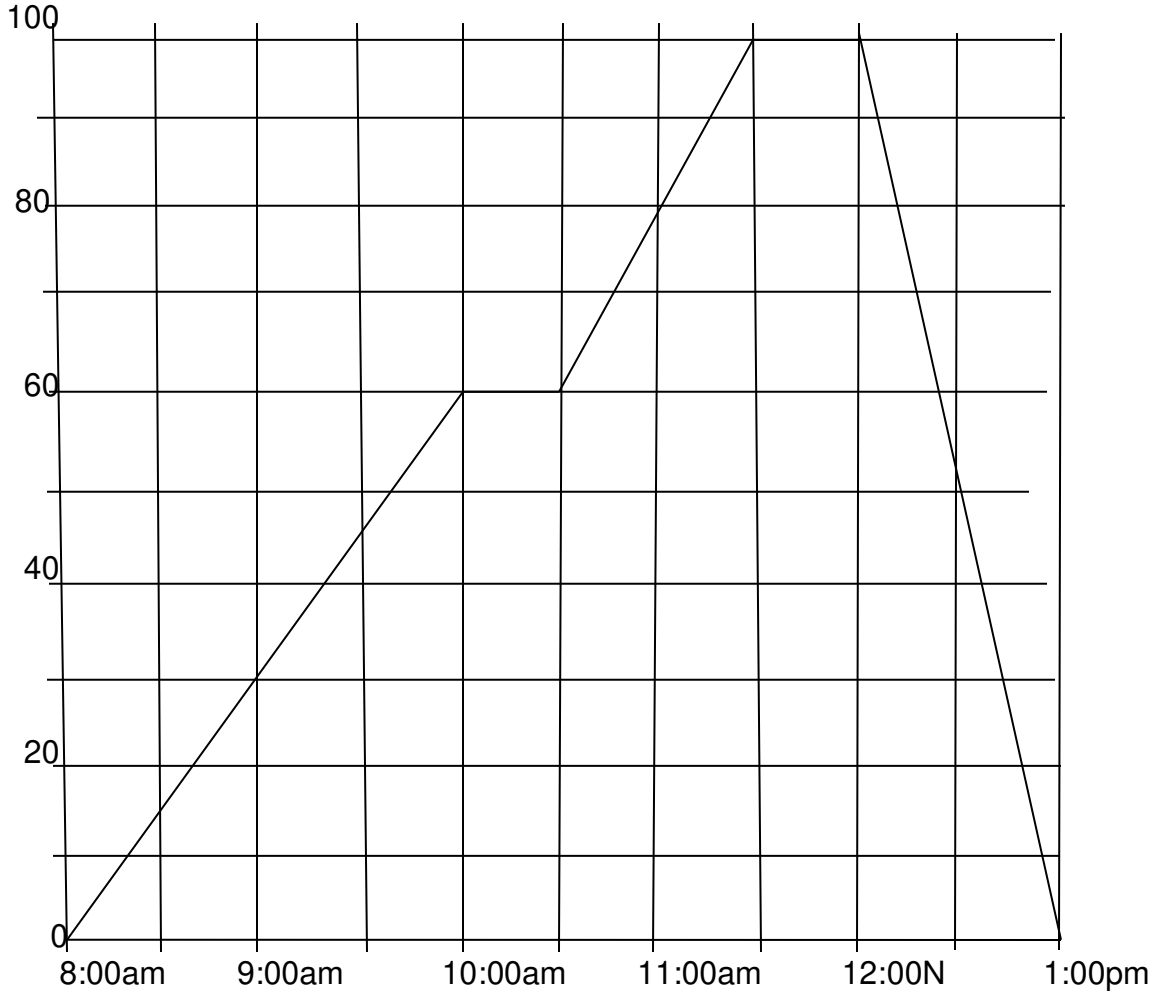
2. What is the scale on the

(i) vertical axis?
I small sq rep. 5km

(ii) horizontal axis?
I small sq rep 30minutes

INTERPRETING DRAWN TRAVEL GRAPHS

The travel graph below shows a journey of a motorist, use it to answer questions that follow.



a. At what time did the motorist leave town B?

At 9:30am

For how long was the motorist at B?

For 30minutes or ½hr

c. What was the motorist's speed between town A and B?

Solution

$S = \frac{D}{T}$

= 60KM ÷1 ½ HRS

= 60km ÷3/2hrs

= 60km x 2/3 hrs

$= \frac{20km \times 2}{1hr}$

= 40km/hr

d. Calculate the motorist's total distance for the whole journey.
100km + 100km
200km

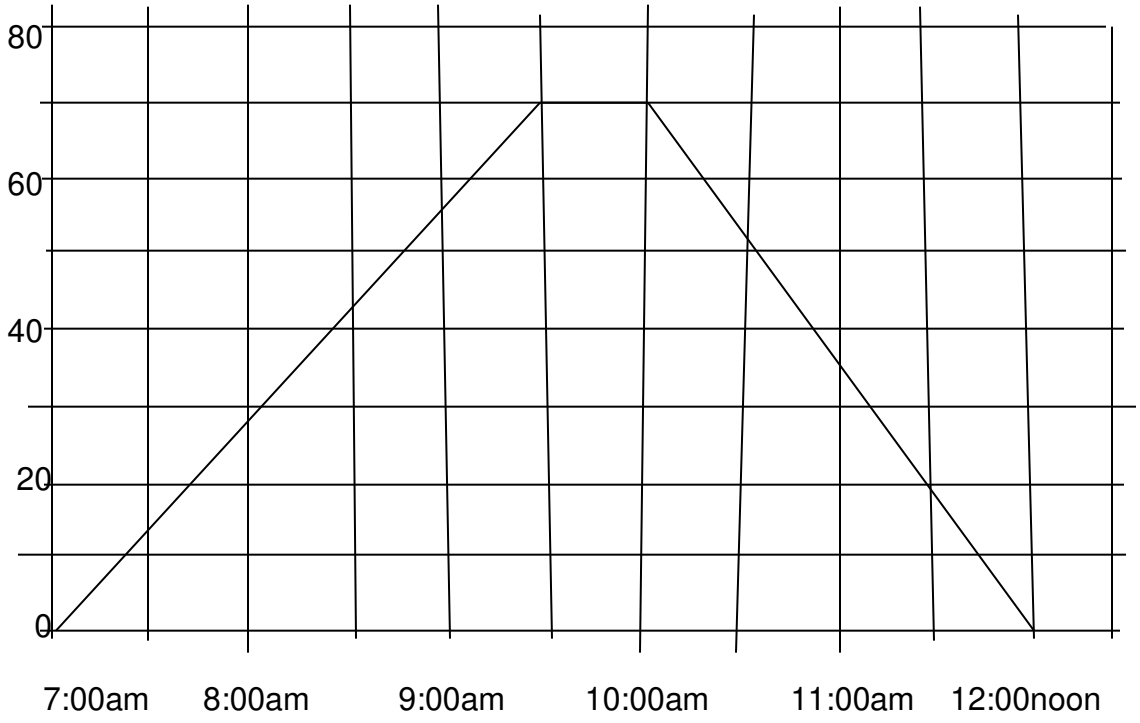
f. What was the total rest time?
30min + 30min
60minutes = 1hr

g. Find the motorist's average speed for the whole journey.
A.S = $\frac{TD}{TT}$
= $\frac{200km}{5hrs}$
= 40km/hr

3. Find the motorist's average speed of the whole journey while traveling
Total distance = 200km
Total time = 4hrs
Average speed while travelling = $\frac{200km}{4hrs}$
= 50km/hr

DRAWING TRAVEL GRAPHS

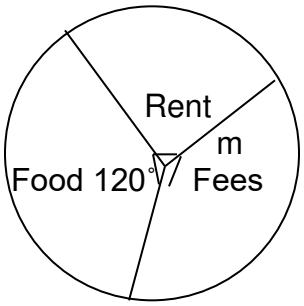
1. A Bus left x and 7:00am for town y, it travelled for 2hrs at an average speed of 40km/hr from x to y, it stayed at y for 30minutes before returning to x arriving at 12:00Noon. Draw a travel graph to show the movement of the bus.



Distance = S x T
= 40km x 2hrs
H
= 80km

PIE CHARTS

1. The pie chart below represents Mugisha's monthly expenditure and saving. If he earns sh 72000;

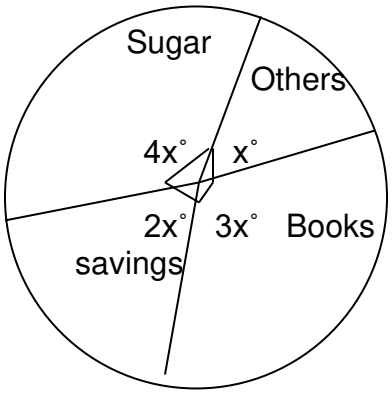


(a) How much does he spent on fees ?
Solution
M + 90 + 120 = 360°
M + 210 = 360°
M + 210 – 210 = 360° – 210°
M = 150°

Fees
150 x 72000/=
360°
15 x 2000/=
30000/=

(b) What percentage of his salary is spent on food?
Solution
= 120 x 100%
360
= 1 x 100%
3
= 100%
3
= 33 1%
3

2. Kironde was given sh. 12000 for his pocket money and spent it as below .



(a) Find the value of x

Solution

$4x + 3x + 2x + x = 360^\circ$

$\frac{10x}{10} = \frac{360^\circ}{10}$

X = 36˚

(b) How much does he save?

Savings = 2x

= 2 x 36˚

= 72˚

$= \frac{72 \times}{360}$ 12000/=

= 2 x 1200

= 2400/=

(c) How much does he spend on sugar than on books

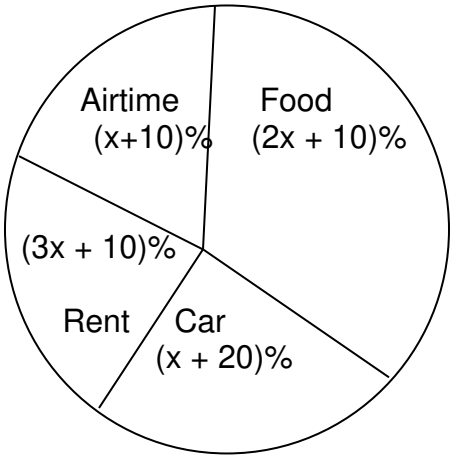
Solution

Sugar = 4x	Books = 3x	Difference
= 4 x 36	= 3 x 36	= 144 – 108
= **144**	= **108**	= **36**

$= \frac{36 \times}{360}$ 12000/=

= **1200/= more**

3. The pie chart below represents the expenditure of a family.



(a) Find the value of x.

$x + 10 + 3x - 10 + x + 20 + 2x + 10 = 100\%$
$x + 3x + x + 2x + 10 + 20 + 10 - 10 = 100\%$
$7x + 30\% = 100\%$
$7x + 30 - 30 = 100\% - 30\%$
$\frac{7x}{7} = \frac{70\%}{7}$
x = 10%

(b) If the family spends sh 40000 more on car than on rent, find the family's total expenditure.

%ge of car	%ge of rent	difference in %ge
x + 20%	3x – 10%	320% - 20%
10% + 20%	3 x 10% - 10%	**10%**
10% + 30%	30% - 10%	
30%	**20%**	

Total expenditure % = 100%
10% represents sh. 40000/=
10% represents sh. $\frac{40000}{10}$
100% represents 100 x 4000/=
400,000/=

DRAWING PIE CHARTS GIVEN FRACTIONS AND PERCENTAGES

1. Victor spends ¼ of his income on rent, 4/9 of the remainder on food and saves he rest.

(a) What fraction does he save?

Solution

Fraction for rent = ¼

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

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

Fraction for food = $\frac{4}{9} \times \frac{3}{4}$

$$\mathbf{\frac{1}{3}}$$

Fraction for savings $= \frac{3}{3} - \frac{1}{3}$

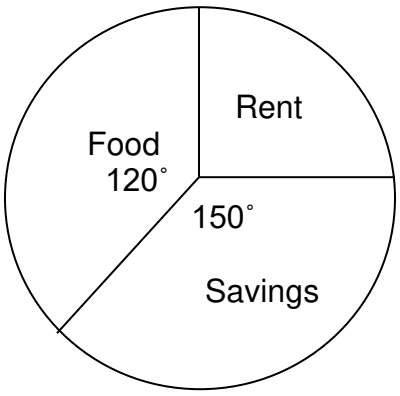
$$= \frac{9 - 4}{12}$$

$$\mathbf{= \frac{5}{12}}$$

(b) Using the above information, draw an accurate pie chart.

Solution

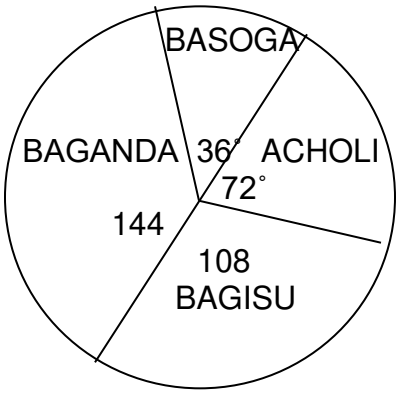
Rent	**food**	**savings**
$\frac{1}{4} \times 360$	$\frac{1}{3} \times 360$	$\frac{5}{12} \times 360$
90˚	**120˚**	**150˚**



2. In a certain town, 40% of the population are Baganda, 10% are Basoga, 30% are Bagisu and the rest are acholi. Draw an accurate pie-chart for the above information.

Solution

Baganda	Basoga	Bagisu	Acholi
$\frac{40}{100} \times 360$	$\frac{10}{100} \times 360$	$\frac{30}{100} \times 360$	360 – (144 + 36 + 108)
4 x 30	1 x 36	3 x 36	360 – 288
144˚	36˚	108˚	72˚

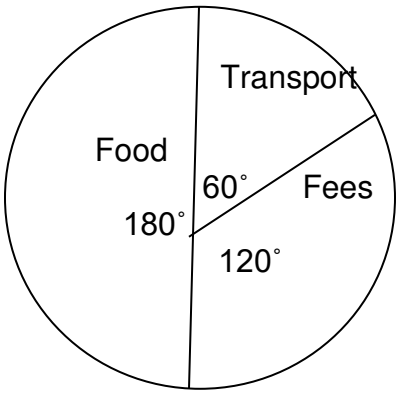


DRAWING PIE CHARTS GIVEN QUANTITIES

Nambooze spends her monthly salary as follows ;
sh. 12,000 on school fees
sh. 6000 on transport and
sh. 18,000 on food

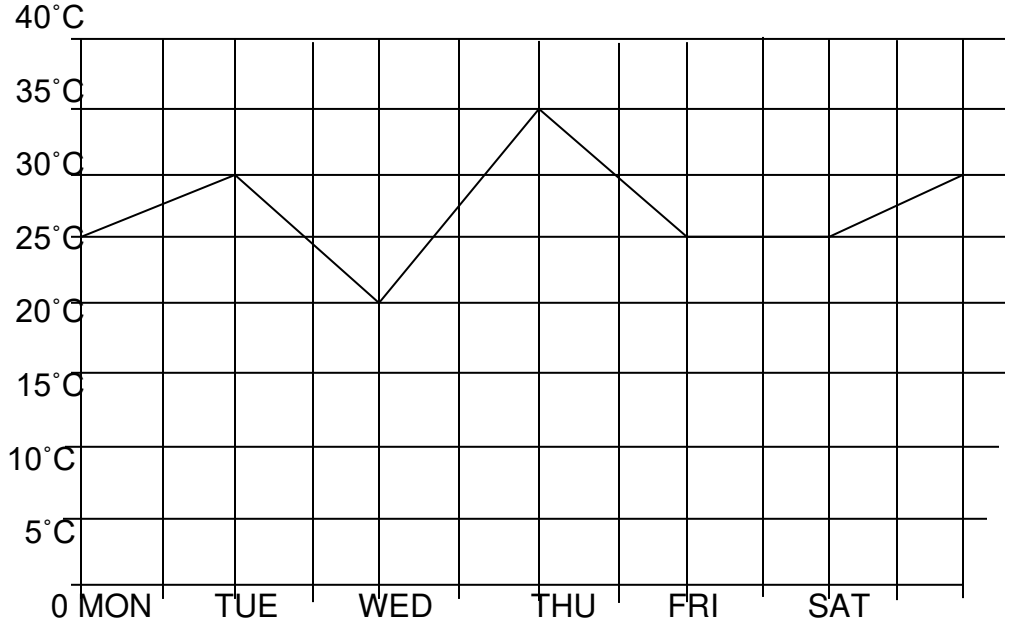
Draw an accurate pie chart for this information

Total expenditure	Fees	Transport	Food
Sh. 12,000	12000/= x 360	6000/= x 360	18000/= x 360
Sh. 6000	36000	36000	36000
Sh. 18000			
Sh. 36000	**120˚**	**60˚**	**180˚**



TEMPERATURE GRAPHS

The graph below represents the maximum temperatures of the week. Study it and use it to answer questions that follow



(a) What was the highest temperature of the week?
35ºC

(b) Which day had the lowest temperature?
Wednesday

(c) What was the drop in temperature between Tuesday and Wednesday?
30˚C-20˚C=10˚C

(d) Calculate the average temperature for the whole week.

$$\frac{25 + 30 + 20\ 35 + 25 + 25 + 27.5}{7}$$

$$\frac{190}{7}$$

$27\frac{1}{7}$˚C

APPLICATION OF MEAN

1. The mean age of 5 children is 12years, if a sixth child joins them, the mean age becomes 11years, find the age of the 6^{th} child.
   Solution
   Total age of 5 children = 5 x 12
   = 60yrs

   Total age of 6 children = 6 x 11
   = 66yrs

Age of 6^{th} child = (66 - 60) yrs
= 6yrs

2. The average age of 6 boys is 13years. If one boy leaves the group, the average age becomes 14 years.
   Find the age of the sixth boy.

   Total age of 6boys = 6 x 13yrs
   = 78yrs

   Total age of 5boys = 5 x 14
   = 70

   Age of the 6^{th} boy = (78 - 70)yrs
   = 8yrs

3. The average weight of 6pupils is 40kg; the average weight of other 4 pupils is 30kg. find the average weight of all the pupils
   Solution
   Total weight of 6 pupils = 6 x 40kg
   = 240kg

   Total weight of 4 pupils = 4 x 30kg
   = 120kg

   Total weight of 10 pupils = (120 + 240) kg
   = 360kg

   Average weight of pupils = $\frac{360kg}{10}$
   = 36kg

FORMING AND SOLVING EQUATIONS INVOLVING MEAN

1. The mean of y + 1, 5 and y is 6. Find the value of y.
   Solution
   $\frac{(y + 1) + 5 + y}{3} = 6$

   $\frac{Y + y + 5}{3} = 6$

   $3 \times \frac{2y + 6}{3} = 6 \times 3$

   $2y + 6 = 6 \times 3$

   $2y + 6 - 6 = 18 - 6$

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

   y = 6

2. The average of a, a-7, 3 and 2a is 8.

(a) Find the value of a.

Solution

$\frac{a + a + 3 + 2a + 3 - 7}{4} = 8 \times 4$

$\frac{4 \times (a + a + 2a + 3 - 7)}{4} = 8 \times 6$

$4a - 4 = 32$

$4a - 4 + 4 = 32 + 4$

$\frac{4a}{4} = \frac{36}{4}$

a = 9

(b) Find the range

Solution

1) a = 9
2) a – 7 = 9 – 7
   = 2
3) 2a = 2 x a
   = 2 x 9
   = 18
4) 3

Range = 18 – 2
= 16

PROBABILITY

Probability of success and failure.

1. The probability that peter will pass his examinations is 2/7. what is the probability that he will not pass his examinations?

   Solution

   $1 - \frac{2}{7}$

   $\frac{7}{7} - \frac{2}{7}$

   $\frac{5}{7}$

2. In a tin there are 30 blue and red pens. If the probability of picking a red pen is 3/5, how many red pens are in the tin?

   No of red pens = $\frac{3}{5} \times 30$

   $= 3 \times 6$

   = 18

Probability when two teams play

In a football match a team will either win, draw or lose a game.

a. What is the probability that a team wins the game?

No of total chances = 3

No of desired chances = 1

Probability (win) $\frac{1}{3}$

b. Find the probability that a team draws the match.

No of total chances = 3

No of desired chances = 1

Probability (draw) = $\frac{1}{3}$

c. What is the probability of a team losing a mach?

Tossing one coin.

If one coin is tossed, what is the probability of getting a head on top?

A coin has two sides the head (H) and the tail (T)

The head has the coat of arms

The tail is either a cow, fish or crane head.

Solution

Possible out comes = (H, T)

Number of possible out comes = 2

Expected out comes = (H)

Number of expected out comes = 1

Therefore probability = $\frac{n(E)}{n(D)}$

$\frac{1}{2}$

Tossing two coins.

If two coins are tossed once, what is the probability of two heads showing up?

		H	T
2nd Coin	H	HH	HT
	T	TH	TT

Total chances = (HH, HT, TH, TT)

No of Total Chances = 4

Desired chances = (HH)

No of desired chances = 1

Prob (HH) = $\frac{\text{No of desired chances}}{\text{N o of total chances}}$

$= \frac{1}{4}$

Tossing one die.

When a die is rolled once, what is the probability of getting an even number?

Total chances = (1, 2, 3, 4, 5, 6)

Number of total chances = 6

Desired chances = (2, 4, 6)

Number of desired chances = 3

Therefore probability = $\frac{\text{No of desired chances}}{\text{No of total chances}}$

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

Tossing two dice.

Calculate the probability of scoring a total of 8 when two dice are tossed at once

Die A	1	2	3	4	5	6
1	1, 1	1, 2	1, 3	1, 4	1, 5	1, 6
2	2,1	2,2	2,3	2,4	2,5	2,6
3	3,1	3,2	3,3	3,4	3,4	3,6
4	4, 1	4,2	4,3	4,4	4,5	4,6
5	5,1	5,2	5,3	5,4	5,5	6,6
6	6,1	6,2	6,3	6,4	6,5	6,6

Total chances = 36

Desired chances = 5

Probability = $\frac{5}{36}$

CIRCLES

Parts of a circle

1. Radius – line drawn from the centre to circumference.
2. Diameter – a line passing through the centre from circumference to circumference.
3. Arc – part of the circumference.
4. Circumference – distance round a circle.
5. Chord – straight line joining circumference to circumference.
6. Sector – an area of a circle bounded by two radii and arc.
7. Semi-circle – half a circle.
8. Quadrant – quarter circle.

RELATIONSHIP BETWEEN RADIUS AND DIAMETER

1. Find the diameter of a circle whose radius is

a) 10m

Solution

Diameter = 2R

= 2 x R

= 2 x 10m

= 20m

(b) 1 3/4m

solution

Diameter = 2R

= 2 x R

= 2 x 1 3/4m

= 2 x 7/4m

= 3 ½m

2. Find the radius of a circle whose diameter is

a) 30cm

R = Diameter / 2

30cm / 2

15cm

(b) 1 3/4 dm

R = D ÷ 2

= 1 3dm÷2 / 4 1

= 7dm x ½ / 4

= 7dm / 8

CIRCUMFERENCE OF A CIRCLE

1. Find the circumference of a circle whose diameter is

(a) 7cm.(use as 22/7)

TLD

22 x 7cm / 7

= 22cm

(b) 10cm use ∏ as 3.14

C = TLD

= 3.14 x 10cm

= 314 x 10cm / 100

= 314cm / 10

= 31.4 cm

2. Find the circumference of a circle whose radius is

(a) 7cm (use ∏= 22/7)

C = 2TLR

2 x 22 x 7cm / 7

= 44cm

(b) (∏=3.14)

C = 2TLR

= 2 x 3.14 x 20m / 100

= 2 x 314 x 20m / 100

= 628 x 2m / 10

= 1256m / 10

= 125.6m

FINDING RADIUS AND DIAMETER GIVEN CIRCUMFERENCE

1. The circumference of a circle is 44cm. Find the diameter of the circle.
(use ∏=22/7)

Solution

TLD = C

$\frac{22}{7}D = 44cm$

$7 \times \frac{22D}{7} = 44cm \times 7$

$\frac{22D}{22} = \frac{44cm}{22} \times 7$

$D = 2cm \times 7$

D = 14cm

2. Calculate the radius of a circle whose circumference is 44m.
(use ∏ as 22/7)

Solution

2TLR = C

$2 \times \frac{22}{7} \times R = 44m$

$7 \times \frac{44R}{7} = 44m \times 7$

$\frac{44R}{44} = \frac{44m}{44} \times 7$

R = 7m

FINDING NUMBER OF POLES AND SPACES

1. How many posts of 1.5m a part are needed to erect a circular hut of diameter 21m.

C = TLD

$= \frac{22}{7} \times 21m$

= 66m

No if posts = $\frac{66m}{1.5m}$

$= 66 \div \frac{15}{10}$

$= 66 \times \frac{10}{15}$

$66 \times \frac{10}{15}$

22×2

= 44posts

2. 11 Posts were fixed a distance of 4 meters a part to make a circular fence.

(a) Calculate the total distance a round the fence.

Solution

No of spaces = 11

Total distance = 11 x 4m

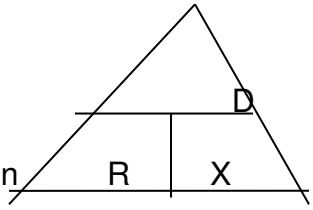
= 44m

(b) calculate the radius of the fence.

Solution

2TLR = C
2 x $\frac{22}{7}$ x R = 44m
7 x $\frac{44R}{7}$ = 44m x 7
$\frac{44R}{44} = \frac{44m \times 7}{44}$
R = 7m

APPLICATION OF CRIRUCMUFRERENCE (REVOLUTIONS)
Finding distance covered by circular objects in given number of revolutions.
1. A wheel is 35cm in diameter. What distance does it cover in
a) One complete revolution?



Distance /Length
Devolution
C Circumference
Rotation
Number of turns
Solution
Distance = Circumference x Revolution
But circumference = TLD
= $\frac{22}{7}$ x 35cm
= 22 x 5cm
= 110cm

Distance = 110cm x 1 Revol
= 110cm
b) 50 complete revolutions
Solution
Circumference = TLD
= $\frac{22}{7}$ x 35cm
= 110cm

No Distance = C x Revolution
= 110cm x 50
= 5500cm

Finding number of revolutions.
Revolutions = $\frac{\text{Distance}}{\text{Circumference}}$

2. How many revolutions does a wheel of diameter 56cm make to cover a distance of 1760cm? (TL = $\frac{22}{7}$)

Solution

No of rev. $= \frac{\text{Distance}}{\text{Circumference}}$

But circumference = TLD

$= \frac{22}{7} \times 56\text{cm}$

$= 22 \times 8\text{cm}$

= 176cm

No of Rev $= \frac{1760\text{cm}}{170\text{cm}}$

= 10 Revolutions

FINDING DIAMETER/RADIUS

3. The length of a wire is 176m. if the wire is wound around a cylindrical tin 4 times, find the diameter of the tin. (use Tl = $\frac{22}{7}$)

Solution

Circumference = $\frac{\text{Length of wire}}{\text{No of times}}$

$= \frac{176\text{m}}{4}$

= 44mm

TLD = C

22D = 44m

$7 \times \frac{22D}{7} = 44\text{m} \times 7$

$\frac{22D}{22} = \frac{44\text{m} \times 7}{22}$

D = 14m

FINDING LENGTH OF ARCS OF SEMI CIRCLES AND PERIMETER OF SEMI CIRCLES

Length of arc = ½ TLD

1. Find the length of the arc of the semicircle below.

14m

Solution

Length of arc = ½ TLD

$= ½ \times \frac{22}{7} \times 14\text{m}$

$= 11 \times 2\text{m}$

= 22m

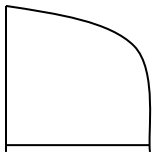
2. What is the distance around the semi-circle below (use TL = 22/7)

Perimeter = (½ TLD) + D
= (½ x 22/7 x 7m) + 7m
= 11m + 7m
= 18m

LENGTH OF ARC AND PERIMETER OF QUADRANTS

Length of arc = ¼ 2TlR

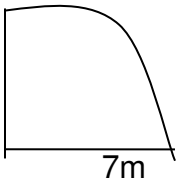
1. Find the length of the arc of the figure below.



Length of arc = ¼ x 2 TLR
= ¼ x 22/7 x 14mx2
= 11 x 2
= 22m

Perimeter of a quadrant = (¼ x 2TLR + 2R)
=(¼ X 2 x 22/7 x 14)+(2x14m)

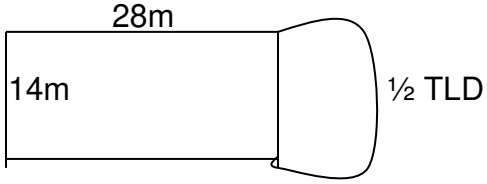
2. Calculate the distance around the figure below.
(USE TL as 22/7)



Perimeter = (¼ x 2TLR) + 2R
= ¼ x 2 x 22/7 x 7) + (2 x 7m)
= 11m + 14m
= 25m

DISTANCE ROUND COMBINED SHAPES

1.



SOLUTION

Length of arc = ½ TLD
= ½ x 22/7 x 14m

7

= 22m

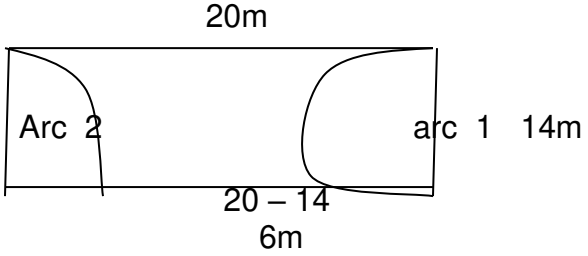
Perimeter = 22m + 28m + 14m + 25m

= (50 + 42) m

= 92m

2. Find the distance around the shaded part .

Solution



Length of arc

½ TLD

½ x 22 x 14m
7

22m

Arc 2

¼ x 2TLR

¼ x 2 x 22 x 14m
7

22m

Perimeter

22m + 22m + 20m + 6m

44m + 26m

70m

AREA OF A CIRCLE

Area of a circle =TLR²

1. Calculate the area of a circle whose radius is 7m.

(Use TL as 22)
7

Area = TLR²

= 22 x 7m x 7m
7

= 154m²

2. Find the area of a circle whose diameter is 28cm.

(Use TL = 22)
7

Solution

Area = TLR

= 22 X 28cm x 28cm
7 2 2

= 22 x 14cm x 2cm

= 22 x 28cm²

= 616cm²

FINDING AREA OF A CIRCLE GIVEN CIRCUMFERENCE

1. calculate the area of a circle whose circumference is 44dm.

(Use Tl = 22)

7

Procedure

i. Use given circumference to find radius
   2TLR= C

ii. Use the radius to find area
   Area = TLR²

Solution

Radius of the circle

Area 2TLR = C
7

2 x 22 x R = 44dm
7

7 x 44 x R = 44dm x 7
7

44R = 44dm X 7
44 44

R = 7dm

Area of circle

Area = TLR²

= 22 x 7dm x 7dm
7

= 22dm x 7dm

= 154dm²

FINDING RADIUS OF A CIRCLE GIVEN AREA

Find the radius of circle whose area is 154m².
(Use TL = 22)
7

Solution

TLR² = Area

22 x R² = 154m
7

7 x 22R² = 154m x 7
7 22

$\sqrt{R^2} = \sqrt{49m^2}$

R = 7m

FINDING CIRCUMFERENCE WHEN AREA IS GIVEN

STEPS TAKEN

1. Use the given area to find radius
   TLR² = AREA

2. Use the radius to find circumference
   C = 2TLR

Question

The area of a circle is 154cm². Find the circumference of the circle .
(Use TL as 22)
7

Solution

Radius of the circle
TLR² = Area

circumference
C = 2TLR

$\frac{22R^2}{7} = 154cm^2$

$7 \times \frac{22R^2}{7} = 154cm \times 7$

$\sqrt{R^2} = \sqrt{49cm^2}$

R = 7cm

$= 2 \times \frac{22}{7} \times 7cm$

= 44cm

FINDING AREA OF SEMI-CIRCLES

1. Find the area of a semi circle whose radius is 21dm.
   (Use TL as $\frac{22}{7}$)

   Solution

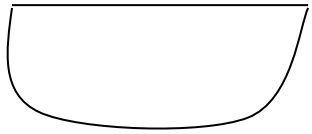
   Area $= \frac{1}{2} TLR^2$

   $= \frac{1}{2} \times \frac{22}{7} \times 21m \times 21m$

   $= 11 \times 16m^2$

   = 693m²

2. Calculate the area of the semi-circle below
   (Use TL= $\frac{22}{7}$)



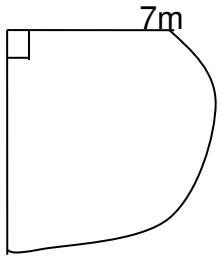
Area $= \frac{1}{2} TLR^2$

$= \frac{1}{2} \times \frac{22}{7} \times 14m \times 14m$

= 77m²

FINDING AREA OF QUADRANTS

Calculate the area of the quadrant below
(Use TL = $\frac{22}{7}$)



Area $= \frac{1}{4} \times TLR^2$

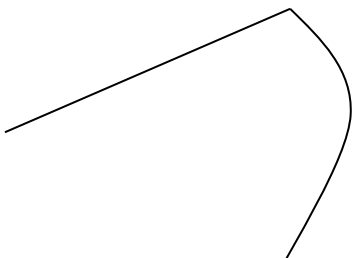
$= \frac{1}{4} \times \frac{22}{7} \times 7m \times 7m$

$= \frac{77}{2}m$

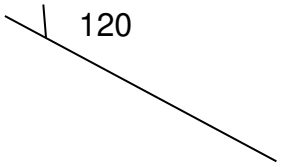
= 38½m²

AREA OF OTHER SECTORS

Find the area of the sector below
(Use TL = $\frac{22}{7}$)



Area $= \frac{120}{360} \times TLR$

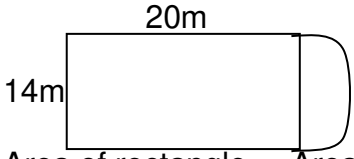


$= \frac{1}{3} \times \frac{22}{7} \times 21cm \times 21cm$

$= 22 \times 21cm^2$

$= 462cm^2$

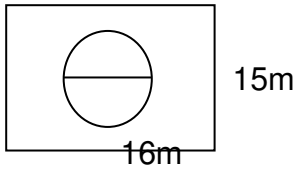
AREA OF COMBINED SHAPES



Area of rectangle	Area of semicil	Total area
L x W	$\frac{1}{2} \times \frac{22}{7} \times \frac{14}{7} \times \frac{14}{7}$	$280m^2$
20m x 14m	77m	$+ 77m^2$
$280m^2$		$357m^2$

AREA OF SHADED PORTIONS

1. Find the area of the shaded region



Area of whole figure
Area = L x W
= 16m x 15m
$=240m^2$

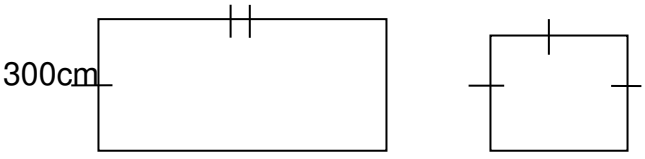
Area un shaded
Area = TLR^2
$= \frac{22}{7} \times \frac{14m}{7} \times \frac{14m}{7}$
$= 154m^2$

Area shaded
Area = 240m
$= 154m^2$
$86m^2$

2. Find the area of the shaded portion
(use TI $= \frac{22}{7}$)

MORE ABOUT AREA

1. A rectangular floor measures 400cm by 300cm.
How many square tiles 50cm by 50cm are required to cover the floor?
Solution



| | |
400cm 50cm

No of tiles = (L) X (W)
S S
= 400cm x 300cm
50cm 50cm
= 8 x 6
= ***48 tiles***

2. Abdul cut out circular plates of diameter 7cm from a rechangular. Sheet of metal of length 45cm and width 35cm
(Use TL= 22)
7

a) How many circular plate did he cut out

Solution

No of circular plates = (L) X (W)
D D
= 45cm x 35cm
7cm 7cm
= 6 x 5
= 30 plates

b) Find the area of the un used sheet after cutting out the circular plates.

Solution

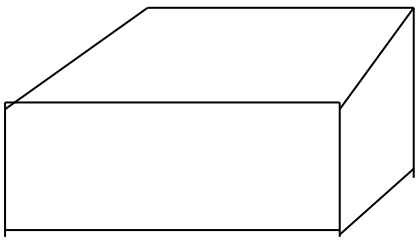
Area Circular
A = L x w
45cm x 35cm
1575cm²

Area of 30 Plates
A = TLr² x 30
= 22 x 70cm x 7cm x 50cm
7 2 9
= 11 x 7cm² x 15
= 1155cm²

Area Un Used
1575cm²
- 1155cm²
420cm²

PACKING CURE AND CUBOIDS IN BOXES

1. a box measures 24cm by 30cm and height of 35cm
(a) How many cubes of sides 4cm can fit into the box



35cm

24cm

30cm

No of cubes = L X W X h

$= \frac{30cm}{4cm} \times \frac{24cm}{4cm} \times \frac{35cm}{4cm}$

= 7 x 6 x 8

= 336 cubes

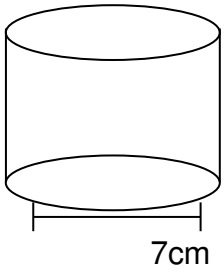
(b) Find the space left empty after packing all the cubes in the box.

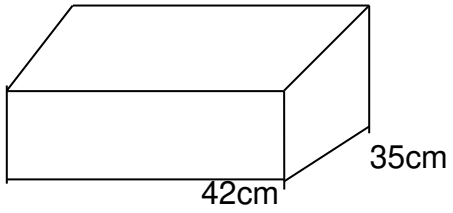
Solution

Volume of big box	**Volume of 336cubes**	**Space left**
Vol = L x W x h	Vol = S x S x S x 336	$252400cm^3$
= 30cm x 24cm x 35cm	= 4cm x 4cm x 4cm x 336	- $21504cm^3$
= 720cm x 35cm	= 64cm x 336	
$\underline{3696cm^3}$		
= 25200cm	**= $21504cm^3$**	

PACKING TINS IN BOXES AND FINDING SPACE LEFT

1. How many tins (B) type can fit in Box (A)





No of tins $= \frac{(L)}{D} \times \frac{(W)}{D} \times \frac{(H)}{h}$

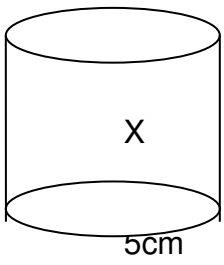
$= \frac{(42cm)}{7cm} \times \frac{(35cm)}{7cm} \times \frac{(56cm)}{8cm}$

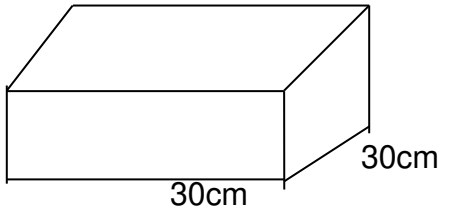
= 6 x 5 x 7

= 30 x 7

= 210 tins

2. Calculate the space left when tins (X) are packed in box (V)
(Use TI = $\frac{22}{7}$)





No of tins that fit in the box = (S) X (S) X (S)
D D N

= (30cm) x (30cm) x (30cm)
5cm 5cm 14

= 6 x 6 x 2

= 36 x2

= 72 tins

Vol. of box = S x S x S

= 30cm X 30cm X 30cm

= $900cm^2$ x 30cm

= $27000cm^3$

Vol. of 72 tins = TLR^2 X 72

= 22 X 5cm x 5cm x 14cm x 72
7 2 2

= 11 x 5cm x $5cm^2$ x 72

= 55cm x 5cm x 72

= $275cm^3$ x 72

= $19800cm^2$

FINDING VOLUME OF A CYLINDER

1. A cylindrical tin has radius of 7cm and height of 10cm.
   Calculate its volume

Solution

Vol= TLR^2h

= 22 x 7cm x 7cm x 10cm
7

= 22cm x $70cm^2$

= $1540cm^3$

2. calculate the volume of a cylindrical tin whose height is 5cm and a diameter of 10cm
   (Use TL = 3.14)

   Solution

   Vol = TLR^2h

   = 3.14 x 10cm x 10cm x 5cm
   2 2

   = 3.14 x 5cm x 5cm x 5cm
   100

   = (157 x 5) cm^3
   2

   = 785cm^3
   2

   = 392½cm^3

HOW TO FIND HEIGHT OR RADIUS WHEN VOLUME IS GIVEN

1. Calculate the height of a cylinder whose volume is $1694m^3$, if a cylinder has a radius of 7m.

   Solution

   $TLR^2h = vol$

   $\frac{22}{7} \times 7cm \times 7cm \times h = 1694cm^3$

   $\frac{22 \times 1cm \times 7cm}{22 \times m \times 7m} \times h = \frac{1694m \times m \times m}{22 \times m \times 7m}$

   $\underline{h = 11m}$

2. Find the radius of a cylinder whose volume is 62.8cm and height 5cm.

   (Use TL = 3.14)

   Solution

   $TLRh = Vol.$

   $3.14 \times R \times 5cm = 62.8cm$

   $\frac{314}{100} \times \frac{5}{10} \times R = 628cm$

   $\frac{1570cm}{100} \times R = \frac{628cm}{10}$

   $10 \times \frac{157cm}{10} \times R = \frac{628cm}{10} \times 10$

   $\frac{157cm}{157cm} \times R = \frac{628cm}{157cm}$

   $R = \frac{628 \times cm \times cm \times cm}{157 \times cm}$

   $R = 4cm$

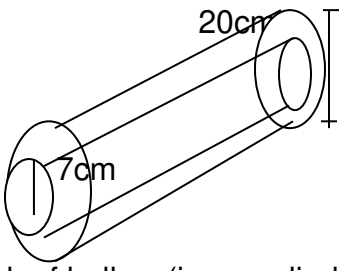
   $\underline{R = 2cm}$

SUBTRACTION OF VOLUME

1. The figure shows a cylindrical hollow pipe. Find the volume of the pipe.

   (Use TL = $\frac{22}{7}$)

   Solution



Vol. of whole figure (outer cylinder)

Vol. $= TLR^2h$

$= \frac{22}{7} \times \frac{14cm}{2} \times \frac{14cm}{2} \times 20cm$

$= 22 \times 7cm^2 \times 20cm$

$= 154cm^2 \times 20cm$

$= \mathbf{3080cm^2}$

Vol. of hollow (inner cylinder)

Vol = TLR^2h

= $\frac{22}{7} \times \frac{7cm}{2} \times \frac{7cm}{2} \times 20cm$

= 11 x 1cm x 7cm x 10cm

= 770cm³

Vol of the pipe

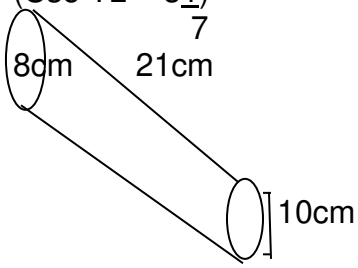
3080cm³

- 770cm³

2310cm³

2. Below is a cylindrical piece of wood after frilling a hollow in it.

(Use TL = $3\frac{1}{7}$)



(i) Find the volume of the materials removed to drill the hollow.

Solution

Vol = THR^2h

= $\frac{22}{7} \times \frac{8cm}{2} \times \frac{8cm}{2} \times 21cm$

= 22 x 4cm x 4cm x 3cm

= 22 x 48cm³

= 1056cm³

(ii) What is the volume of the wooden cylinder left after drilling the hollow?

Solution

Vol of the whole wood = TLR^2h

= $\frac{22}{7} \times \frac{10cm}{2} \times \frac{10cm}{2} \times 21cm$

= 22 x 5cm x 5cm x 3cm

= 22 x 75cm³

= 1650cm³

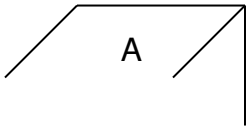
Vol of wood left 1650cm³

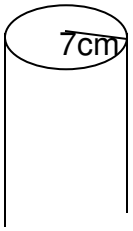
- 1056cm³

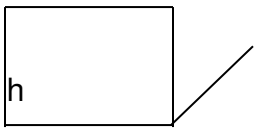
1650cm³

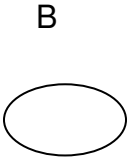
COMPARING VOLUMES

1. the figures below have the same volume









(a) Find the height of A.

Solution

Vol. of B

Vol. = TLR^2h

$\frac{22}{7}$ x 7cm x 7cm x 4cm

22cm x 7cm x 4cm

$154cm^2$ x 4cm

$\underline{616cm^3}$

Height of A

L x W x h = Vol.

11cm x 8cm x h = 616cm (same Vol as B)

$\frac{28cm \times 8cm \times h}{11cm \times 8cm} = \frac{616cm \times cm \times cm}{11cm \times 8cm}$

$\underline{h = 7cm}$

2. A cylindrical tank full of water has a diameter of 28m and height of 20metres. Find the height of water which remains after removing 154m of water.

Solution

Volume of tant who full

Vol. = TLR^2h

$= \frac{22}{7} \times \frac{8cm}{2} \times \frac{28m}{2} \times 20m$

= 22 x 14m x 2m x 20m

= 308m 40m

= 12320m

Vol of water that remains

$12320m^3$

$- 1540m^3$

$10780m^3$

Height of water left

TLRh = Vol of water left

$\frac{22}{7} \times \frac{28m}{2} \times \frac{28m}{2} \times h = 10780m$

$\frac{22 \times 14m \times 2m \times h}{22 \times 14m \times 2m} = \frac{10780m \times m \times m}{22 \times 4m \times 2m}$

$\underline{h = 17\frac{1}{2}m}$

METHOD II

Height of the tank = 20m

Height of the water removed

TLRh =Vol.

$\frac{22}{7} \times \frac{28m}{2} \times \frac{28m}{2} \times h = 1540m$

$\frac{22 \times 2m \times 14m \times h}{22 \times 2m \times 14m} = \frac{1540m}{22 \times 2m \times 14m}$

$h = \frac{5m}{2}$

$\underline{h = 2\frac{1}{2}m}$

Height of water which remains = 20m -2 ½ m

$= 20 - 5$

$= 1 \quad 2$

$= \frac{40m - 5m}{2}$

$= \frac{35m}{2}$

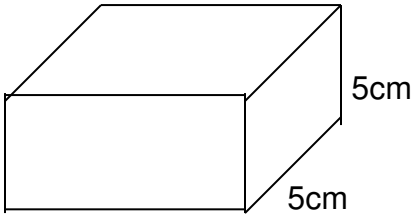
$= \mathbf{\underline{17\ ½\ m}}$

VOLUME IN LITRES

1. calculate the volume of the figure below in Litres

Solution

1 liter = 1000cc



Vol m.c.c = L x W x h

= 20cm 5cm x 5cm

= 100cm x 5cm

= **$\underline{500cm^3}$**

Vol. in litres

IL = 1000cm

1000cm = IL

1cm = $\frac{1}{1000}$ L

500cm = 500 x $\frac{1}{1000}$ L

$= \frac{5\ L}{10}$

= **$\underline{0.5L}$**

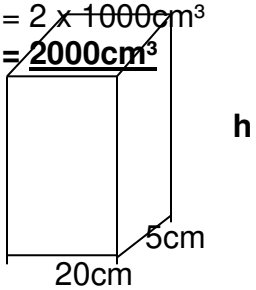
2. The tin below holds 2 Litres when completely filled with water. Find h.

Change 2c to cm^3

$1L = 1000cm^3$

$2L = 2 \times 1000cm^3$

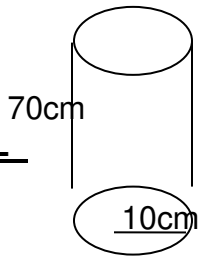
$= \underline{2000cm^3}$



L x W x h = Vol
20cm x 5cm h = 200cm³
20 x 5cm 20cm x 5cm
2000cm x cm x cm
20cm x 5cm
h = 20cm

3. Nanfuka filled a cylindrical tin whose radius is 10cm and height 70cm with passion juice. If she sells it at sh 600 per litre, how much money will she get after selling all the juice.

Solution



Vol. in cc
Vol = TLR^2h
= $\frac{22}{7}$ x 10cm x 10cm x 7cm
= 22 x 10cm x 10cm x 10m
= **22000cm³**

Vol. in litres
22000cc = $\frac{22000cc \times 1L}{1000cc}$
= **22L**

The cost of 22L
IL costs 600/=
22L cost 22 x 600/=
13200/=

TOTAL SURFACE AREA OF ACYLINDER

1. Calculate the surface area of the cylinder below.

Solution
T.S.A = $TLR^2 + 2TLRh + TLR^2$
= $(\frac{22}{7} \times \frac{14cm}{2} \times \frac{14cm}{2}) + (2 \times \frac{22}{7} \times \frac{14cm}{2}) \times 10cm + (\frac{22}{7} \times \frac{14cm}{2} \times \frac{14cm}{2})$

= 22 x $7cm^2$ + 2 x 22cm x 10cm + 22 x $7cm^2$
= $154cm^2$ + $440cm^2$ + $154cm^2$
= **$748cm^2$**

2. The diagram below shows a cylindrical tin without the top cover calculate its surface area.

T.S.A = $\frac{22}{7}$ X $\frac{7cm}{2}$ x $\frac{7cm}{2}$ + 2 x $\frac{22}{2}$ x $\frac{7cm}{2}$ x 7cm

= $\frac{77cm^2}{2}$ + 154cm²

= 38 ½ cm² + 154cm

= **192½ cm²**

3. Calculate the surface area of a hollow cylinder of radius 7cm and height 5cm. (Use TL = $\frac{22}{7}$)

T.S.A = 2 x $\frac{22}{7}$ x 7cm x 5cm

= 44cm x 5cm

= **220cm²**

MORE ABOUT VOLUME AND SURFACE ARAE OF ACYLINDER

1. A welder was given a metal sheet with measurements as shown in the diagram below. He welded it into a hollow cylinder making the height 1000cm. (Use TL = $\frac{22}{7}$)

44ocm



100cm

(a) What is the surface of the metal needed to cover the bottom of the cylinder?

Radius

2THR = C

2 x $\frac{22}{7}$ x R = 440cm

7 x 44R = 440cm x 7

$\frac{44R}{44}$ = $\frac{440cm}{44}$ x 7

R = 70cm

Area of metal needed to cover the bottom

Area TLR

22 x 70cm x 70cm

7

22 x 700cm

154cm

Calculate the maximum volume of water the cylinder will hold.

Solution

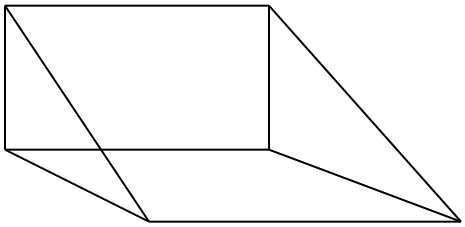
Vol. in cc = TLR²h

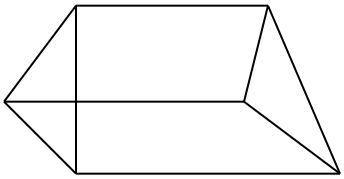
Vol. in litres

= 22 x 70cm x 70cm x 100cm
7
= 22 x 70cm x 1000cm²
= **1540000cm**

1000cm =lL
1540cm = 1540000
1000cm
= 1540Litres

A TRIANGULAR PRISM.

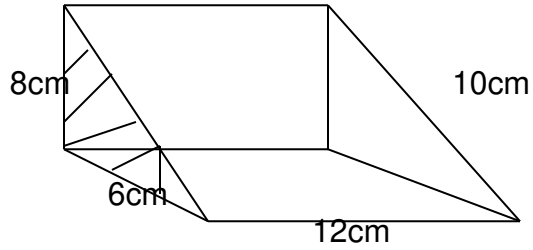




A triangular prism has a total of 5 faces.
Two faces of the triangular prism are triangular and three faces are rectangular.
It has 9 edges
It has got 6 vertices

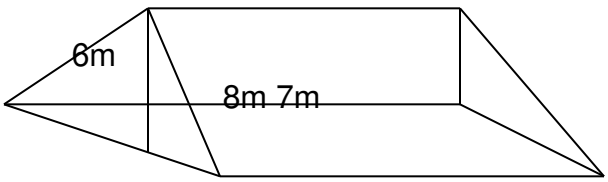
VOLUME OF TRIANGULAR PRISM
Vol. = Area of △ length of prism

Calculate the volume of the figure below.



Vol. = Area of D x L
= (½ b x h) x L
= ½ x 6cm x 8cm x 12cm
= 3cm x 8cm x 12cm
= 24cm² x 12cm²
= **288cm³**

What is the volume of the prism below?



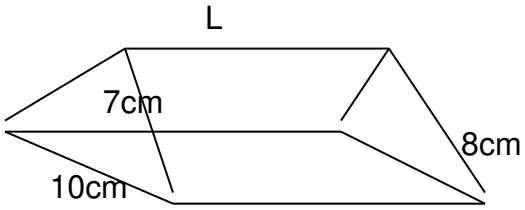
5m

10m

Vol =Area of D x length
= ½ x b x l x l
= ½ x 5m x 8m x 10m
= 5m x 4m x 10m
= 20m² x 10m
= **<u>200m²</u>**

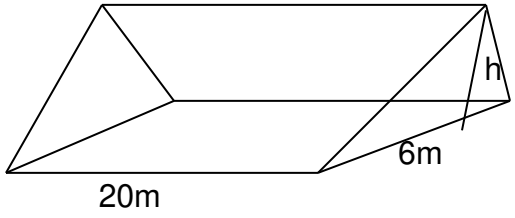
FINDING LENGTH,HEIGTHT OR BASE OF THE TRIANGULAR PPRISM GIVEN THE VOLUME.

1. The volume of the triangular prism below is 700cm.
Find L.



Area of D x L = Vol.
½ x b x h x L = 700cm²
½ 10cm x 7cm x L = 700cm³
35cm x L = 700cm³
<u>35cm</u> = <u>700cm³</u>
35cm 35cm
L = <u>700cm x cm x cm</u>
35cm x cm
<u>L = 20cm</u>

2. Below is a triangular prism whose volume is 480m
Find h.



Area of D x L = Vol.

½ x b x h x L = 480m³

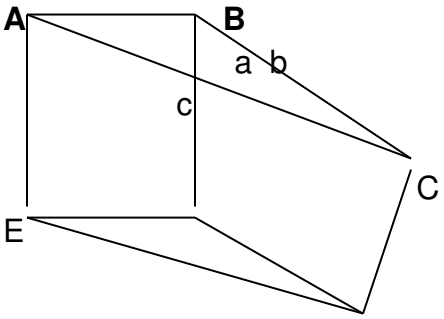
½ x 6m x h x 20m = 480m³

$\frac{3m \times 20m \times h}{3m \times 20m} = \frac{480m \times m \times m}{3m \times 20m}$

h = 8m

APPLICATION OF PYTHAGORAS THEOREM ON TRIANGULAR PRISM.

A. Use the figure below to answer questions that follow.



$a^2 + b^2 = c^2$ D

$a^2 + (6m)^2 = (10m)^2$

$a^2 + 6m \times 6m = 10m \times 10m$

$a^2 + 36m = 100m^2$

$a^2 + 36m^2 - 36m^2 = 100m^2 - 36m^2$

$a^2 = 64m^2$

$a^2 = 8m$

AB = 8m

B. Find the volume of the prism.

Vol = Area of D x L

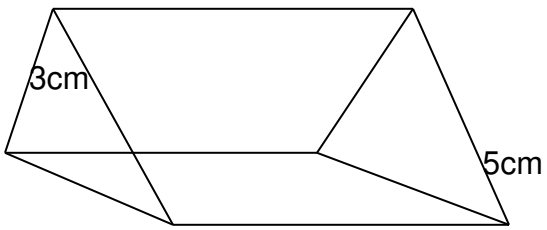
= ½ x b x h x L

= ½ x 8m x 6m x 12m

= 4m x 6m x 12m

= 24m² x 12m

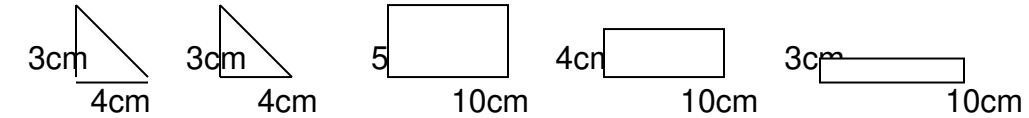
= 288m²



4cm

10cm

Solution

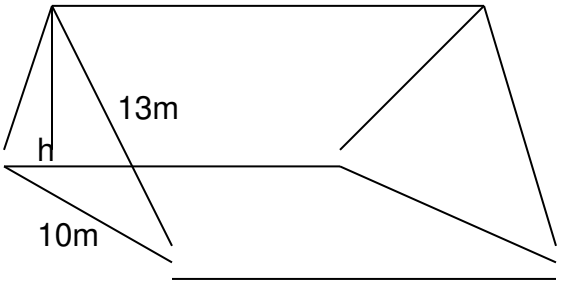


= (½ x 3cm x 4cm) x 2 + (5cm x 10cm) + (10cm x 4cm) + (10cxm x 3cm)

= $12cm^2 + 50cm^2 + 40cm^2 + 30cm^2$

= <u>$132cm^2$</u>

Find the total surface area of the figure below,



Solution

Value of h

6 + 6 = c

h + (5m) = (13m)

h + (5m x 5m) =13m + 13m

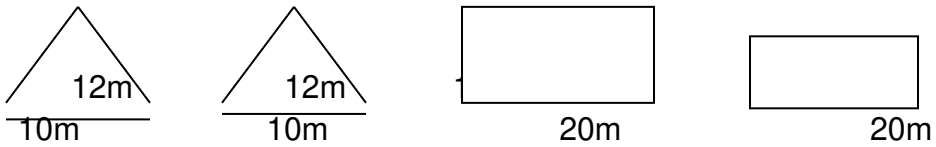
h + 25m = 169m

h + 25m – 25m = 169m -25m

h = 144m

<u>h = 12m</u>

Surface area

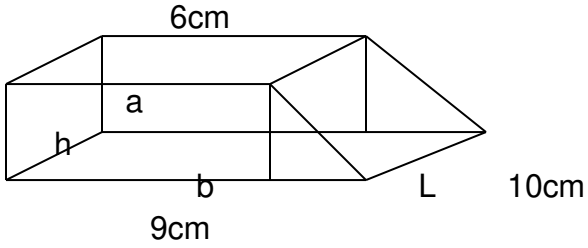


= (½ x 10m x 12m x 2) + (20m x 13m) + (20m x 13m) + (20m x 10m)

= $120m^2 + 260m^2 + 260m^2 + 200m^2$

= <u>$840m^2$</u>

VOLUME OF THETRAPEZOIDAL PRISM.



Vol = ½ h (a + b) x length
½ x 4cm (6cm + 9cm) x 10cm
2cm x 15cm x 10cm
30cm x 10cxm
300cm

SPEED ,TIMEAND DISTANCE.
AVERAGE SPEED
Average speed = total distance
Total time.

A man covered 50km in2hours and another 5okm in 3hours.
Find his average speed for the whole journey.

Total distance = 50km + 50km
= 10km
Total time = 2hours + 3hours
= 5hours

Average speed = $\frac{100km}{5hrs}$
= 20km/hr

Calculate the average speed of a motorist who rode from X to YAT 60KM/hr for 3hr and continued to Z at 40km/hr for another 3hrs.

Solution
Distance from x to y = 60km x 3hr

Hr

= 180km

Distance from y to z at 40km/hr for 3hrs = $\frac{40km \times 3hrs}{hr}$

= **180km**

Total distance from x to z = 180km + 120km

= **300km**

Total time = 3hrs + 3hrs

= **6hrs**

Average speed = $\frac{300km}{6hrs}$

= **50km/hr**

3.Nyangweso drove a distance of 40km at a speed of 20km/hr. Due to the bad road ,he show down speed to 15km /hr to cover 45km . Find the average speed for the whole journey.

Time taken at 20km/hr = $\frac{40km}{20km}$

= 2hrs

Time taken at 15km/hr = $\frac{45km}{15km/hr}$

= 3hrs

Total distance covered = 40km +45km

= 85km

Total time taken = 2hrs + 3hrs

= 5hrs

Average speed = $\frac{\text{total distance}}{\text{Total time}}$

= $\frac{85km}{5hrs}$

= 17km/hr

AVERAGE SPEED OF RETURN JOURNEYS

1.Lubwama drove at 55km/hr for 4 hours .if he returned following the same road at 11okm/hr, find his average speed for the whole journey.

Distance covered = 220km + 220km
= 440km

Total time taken = 4hrs + 2hrs
= 6hrs

Average speed = $\frac{440km}{6hrs}$
= 73 2/6km/hr
= 73 1/3km/hrs

A and B are two towns a part. Lunyolo drove from A to B at 40km/hr and then returned to A though the same route at 60km/hr. calculate LAunyolo average speed for the whole journey.

Total taken to cover 80km at 40km/hr = $\frac{80km/hr}{40km}$
= 2hrs

Time taken to cover at 60km/hr = $\frac{80km/hr}{60km/hr}$
= 1 1/3 km/hrs

Total distance from A and B and back = 80km + 50km
= 160km
= 2hrs + 1 1/3hrs
= 3 1/3hrs.

Average speed = $\frac{\text{total distance}}{\text{Total time}}$

= 160km ÷ 3 1/3hrs

= 160km ÷ $\frac{10hrs}{3}$

= 160km x $\frac{3}{10hrs}$

= 16km x $\frac{3}{1m}$

= **48km/hr**

AVERAGE SPEED INVOLVING STOPPAGES /RESTS.

Kato left town A driving at75km/hr . After 2hrs, his car got a puncture and he delayed for 45minutes. He then continued at 60km/hr for 2hours and 15minutes to town B. What distance had kato covered before his car got a puncture.

Distance = S x T

= 75km x 2hrs
hr

= 75km x 2

= 150km

How far is town B from town A.

Distance coved after puncture = S x T

= 60km 2 $\frac{15hrs}{Hr \quad 60}$

= 60km x $\frac{9}{4}$

= 15km x 9

= 135km

Total distance = 150km + 135km

= 285km

CALCULATE KATO AVERAGE SPEED FOR WHOLE JOURNEY.

Solution

Total distance = 285km

= 2hrs + 45krs + 2 ¼ hrs
60

= 2hrs + ¾ hrs + 2 ¼ hrs

2hrs + 2hrs + ¾ hrs + ¼ hrs
4hrs + 1hr
5hrs

Average speed = total distance
Total time
= 285km
5hrs
= 57km/hr

Town R and S are 120km a part . Okiror drove from R starting at 10:30am ,he arrived at S where he stayed for 1hr and then returned to R through the same road at a speed of 60km/hr.
(a)At what time did okiror arrived at R from S.

Solution
Time taken from R to S = 120km/hr
60km
Time he left S = 10 30am
+ 1 00
11: 30am

The time when he arrived at R = 11:30am
2:00
13:30

1:30pm
a)calculate okiror average speed for the whole journey.

Solution
Time taken from R to S = 10:30am – 9:00am
Hrs Min
10 30

- 9 00
1 30

= 1hrs 30 minutes
= 1 ½ hrs

Total time = 1 ½ hrs + 2hrs + 1hr
= 4 ½ hrs

Total distance = 12okm + 120km
= 240km

Average speed = total distance
total time
= 240km ÷ 4 ½ hrs
= 240km ÷ 9/2hrs
= 240km x 2
9h
= 4480km
9hrs
= 53 1/3km/hr

c)calculate okiror average speed for the whole journey while travelling.
Total distance = 240km
Total time = 1 ½ hrs + 2hrs
= 3 ½ hrs

Average speed = 240km 3 ½ hrs
= 240km 7/2 hrs
= 240km 2/7hrs
= 480km
7hrs
= 684/7km/hr

TELEGRAMS
NOTE
1. A telegram is a written message .
2. In telegrams , punctuation marks eg. commas , full stops are counted as words.
3. figures eg 234 , 26 are also counted as words.

The cost of sending a telegram is sh.1500 for the first 10 words and sh.200 for each extra word. Find the cost the cost of sending a telegram having 27 words.

Total number of words = 27
1st ten words cost sh. = 1500
Additional words = 27 – 10
= 17 words
Cost of 17 words = 17 x 200/=
= 3400/=

Total cost of 27words = 1500/= + 3400/=
= 4900/=
The cost of sending a telegram is sh.700 for the first 5 words , sh.400 for each of the next 5 words and sh. 100 for each additional word . Find the cost of the cost of sending the telegram below.

Solution
Total number of words = 14
1st 5 words cost sh. = 700
Remaining words = 14 – 5
= 9
Cost of next 5 words =5 x 400/=
= 2000/=

Remaining words 9– 5 = 4
Cost of 4 words = 4 x 100/=
= 400/=

Total cost of 14words = 700/= + 200/= + 400/=
= 3100/=
ANNOUNCEMENTS.
Note.
In announcement punctuation marks are not counted as words in telegrams.

1. The cost of sending a death announcement or radio Wolokoso is sh. 100 for the first 25 words. Find the cost of sending 2 death announcement of 55 words each.

1 announcement
Total number of words = 55
Cost of 25 words = 100/=
Remaining words = 55 – 25
= 30 words
Cost of 30 words = 30 x 100/=
= 3000/=

Total cost of 55 words = 3000/= + 100/=
= 4000/=

Charge for 2 death announcements = 4000/= x 2
= 8000/=

2. The cost of making an announcement on radio is a follows: for first the first 25 words sh. 1500.each additional word.sh.200. Find the cost of making the following announcement.

THE GENERAL ELECTRAL COMMISSION INFORMS THE PUBLIC THAT THE PRESIDENTIAL AND PARLIAMENTARY ELECTIONS WILL TAKE PLACE ON EIGHTEENTH FEBRUARY 2011,
THE VOTER ARE THEREFORE REMINDED TO CHECK FOR THEIR NAMES IN THE REGISTERS TO AVOID ANY INCONVINIENCES DURING THE ELECTION DAY.
CHAIRMAN ELECTORAL COMMISSION.

Total number of words = 44
Cost of 1st 25 words = 1500/=
Remaining words = 44 – 25
= 19

Cost of 19 words = 19 x 200/=
= 3800/=

Total cost of 44 words = 1500/= + 3800/=
= 5300/=

POSTAGE RATES .

1. Below are postage charges.

1ST UNIT OR LESS (30G) 600/=
Each addition unit 300/=

Printed papers
1st unit or less (50g) 300/=
Each addition unit 200/=

a)Find cost of posting a letter weighing 175g
Solution
Total number of units = 175g
30g
= 5 5/6
= 6units

Cost of 1st unit = 600/=

Remaining units = 6 – 1
= 5

Cost of 5 units = 5 x 300/=
= 1500/=

Total cost of 6 words = 600/= + 1500/=
= 2100/=

b) Find the cost of posting a letter weighing 150g and 2printed papers each weighing 300g

Cost of a letter weighing 150g
Total number of units in 150g = 150g
30g
= 5 units

Cost of 1st unit = 600/=

Cost of 4 units = 4 x 300
= 1200/=
Cost of 5 units = 600 + 1200
= 1500/=

Cost of printed papers weighing = 300g
Total number of units in 300g = $\frac{300g}{50g}$
= 6 units

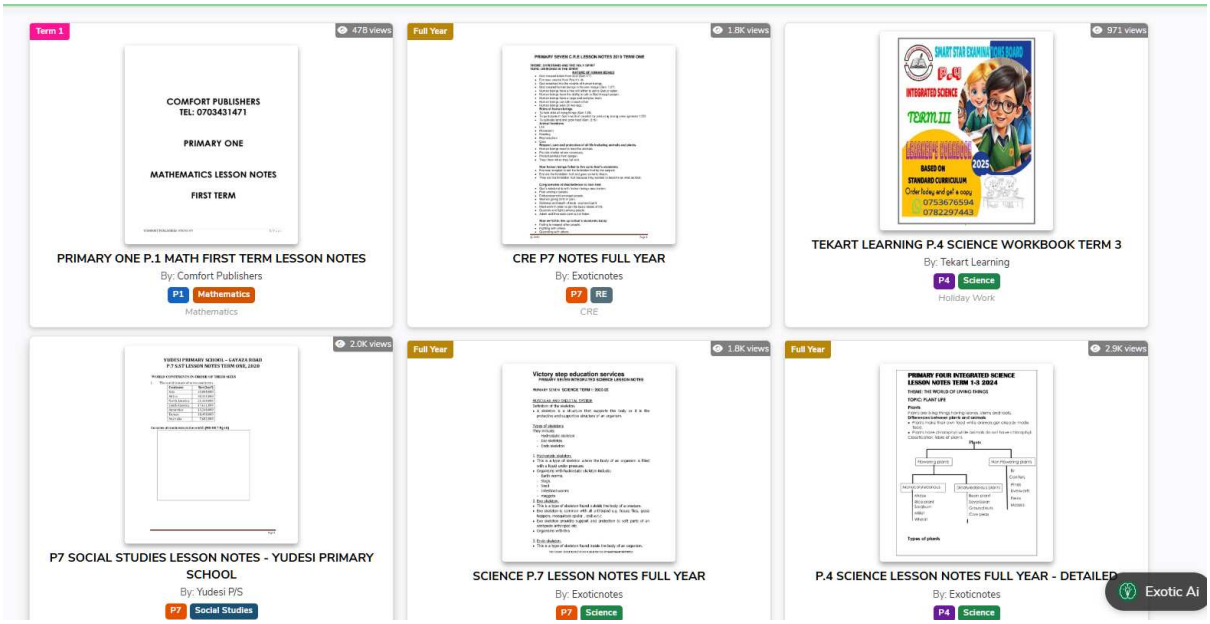
Cost of 1st unit = 300/=
Cost of 5 units = 5 x 200/=
= 1000/=

Total cost of 6 units = 1000/= + 300/=
= 1300/=

Total cost of 2 printed papers each weighing 300g = 1300 x 2
= 2600/=

Total cost = 1800/=
+2600/=
4400/=

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