



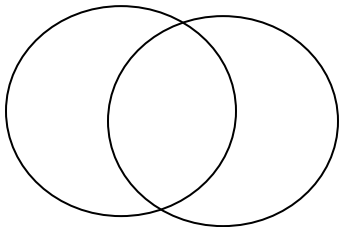
LESSON ONE

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

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

$$18+21-x = 30$$

$$39-x=30$$

$$39-39-x = 30-39$$

$$-x = -9$$

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

$$-1 \quad -1$$

$$\underline{\underline{X = 9}}$$

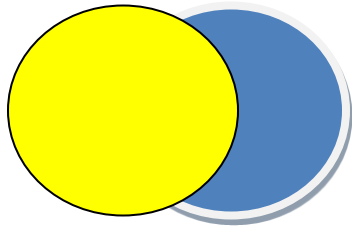
∴ 9 Pupils like both subjects

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

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

$$28+17-x = 40$$

$$45-x = 40$$

$$45-45-x = 40-45$$

$$-x = -5$$

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

$$-1 = -1$$

$$\underline{X = 5}$$

\therefore 5 Pupils like both subjects

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

Solution

$$(20-x) + (17-x)$$

$$(20-5) + (17-5)$$

$$15+12$$

$$= \underline{27}$$

$$\text{Prob (only one subject)} = \frac{27}{40}$$

LESSON TWO

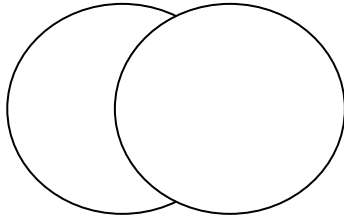
SOLVING PROBLEMS USING VENN DIAGRAMS GIVEN THE UNKNOWN IN THE "DIFFERENCE" REGION

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

$$y + 5 + 6 - 5 = 10$$

$$y + 6 + 5 - 5 = 10$$

$$Y + 6 = 10$$

$$y + 6 - 6 = 10 - 6$$

$$\underline{\underline{Y = 4}}$$

$$y + 6 = 10$$

$$y + 6 - 6 = 10 - 6$$

$$\underline{\underline{Y = 4}}$$

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

Solution

(y + 5) Pupils

4 + 5

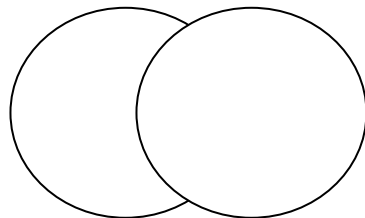
9 Pupils

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

$$x + 5 + 20 + (25 - 20) = 60$$

$$x + 25 + 5 = 60$$

$$x + 30 = 60$$

$$x + \cancel{30} - \cancel{30} = 60 - 30$$

$$\underline{\underline{x = 30}}$$

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

Solution

$$x + (25 - 20)$$

$$30 + 5$$

35 pupils

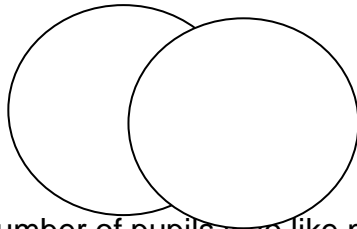
LESSON THREE

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

$$y - 13 + 13 + 20 - 13 = 35 \text{ OR}$$

$$y + 7 = 35$$

$$y + 7 - 7 = 35 - 7$$

$$\underline{y = 28}$$

$$y + 20 - 13 = 35$$

$$y + 7 = 35$$

$$y + 7 - 7 = 35 - 7$$

$$\underline{y = 28}$$

OR

$$y - 13 + 20 = 35$$

$$y + 7 = 35$$

$$y + 7 - 7 = 35 - 7$$

$$\underline{y = 28}$$

28 Pupils like mathematics

LESSON FOUR

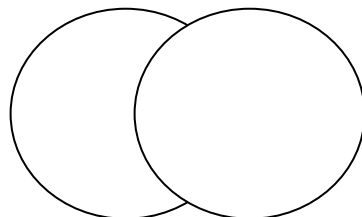
SOLVING PROBLEMS USING VENN DIAGRAMS. WHEN THE COMPLEMENT OF THE UNION IS NOT GIVEN

Example 1

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

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

Solution



(b) Find the value of t .

Solution

$$t + 16 + 10 + 14 = 60$$

$$t + 40 = 60$$

$$t + 40 - 40 = 60 - 40$$

$$\underline{t = 20}$$

LESSON FIVE

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

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

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

$$49 - p = 40$$

$$49 - 49 - p = 40 - 49$$

$$-p = -9$$

$$\underline{-p = -9}$$

$$-1 \quad -1$$

$$\underline{P = 9}$$

9 people participate in the three activities

WEEK THREE

LESSON ONE

SHARING IN RATIOS GIVEN TOTAL SHARE

Example 1

Share 18 mangoes in the ratio of 4:5.

Solution

Total ratio

$$4 + 5$$

$$\underline{9}$$

1st share

(4 x 18²) mangoes

$$\frac{4}{9}$$

(4 x 2) mangoes

8 mangoes

2nd share

(5 x 18²) mangoes

$$\frac{5}{9}$$

(5 x 2) 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
<u>Total ratio.</u>	10000	10000	10000
1 + 2 + 3	$\frac{1}{6} \times 60000/=$	$\frac{2}{6} \times 60000/=$	$\frac{3}{6} \times 60000/=$
6	$\frac{1}{6} \times 100000/=$	$\frac{2}{6} \times 100000/=$	$\frac{3}{6} \times 100000/=$
	<u>10000/=</u>	<u>20000/=</u>	<u>30000/=</u>

LESSON TWO

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 $\frac{3000}{5} \times 3$
? : 3000/=	
	3 part represent $\frac{3000}{5} \times 3$
	= 600/= x 3
	<u>= 1800/=</u>

(b) What was their total share?

Solution

Pupils share = 1800/=	OR	Let x represent total share
James' share = 3000/=		$\frac{5}{8} \times X = 3000/= \times 8$
<u>Total share = 4800/=</u>		8

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

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

$$X = 600 \times 8$$

$$**X = 4800/=**$$

LESSON THREE

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/=

LESSON FOUR

SHARING IN RATIOS, APPLICATION IN PERIMETER OF RECTANGLES

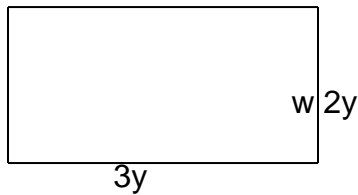
Examples

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 = $2y$



$$\begin{aligned} \text{Length} &= 3 \times y \\ &= 3 \times 4\text{cm} \\ &= \underline{\underline{12\text{cm}}} \end{aligned}$$

$$\begin{aligned} 2l + 2w &= p \\ (2 \times 3y) + (2 \times 2y) &= 40\text{cm} \\ 6y + 4y &= 40\text{cm} \\ 10y &= 40\text{cm} \\ \frac{10y}{10} &= \frac{40\text{cm}}{10} \\ \underline{\underline{Y = 4\text{cm}}} \end{aligned}$$

$$\begin{aligned} \text{width} &= 2 \times y \\ &= 2 \times 4\text{cm} \\ &= \underline{\underline{8\text{cm}}} \end{aligned}$$

(b) Find the area of the rectangle

Solution
 Area = $L \times W$
 $= 12\text{cm} \times 8\text{cm}$
 $= \underline{\underline{96\text{cm}^2}}$

LESSON FIVE

ADDITION AND SUBTRACTION OF DECIMALS

a. Simplify $2.62 + 14 + 6.4$

Solution

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

b. Subtract 0.99 from 2

solution

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

WEEK FOUR LESSON ONE

MULTIPLICATION OF DECIMALS

a. Multiply: 1.3×1.2

Solution

$$\begin{aligned} &= \frac{13}{10} \times \frac{12}{10} = \frac{156}{100} \\ &= \underline{\underline{1.56}} \end{aligned}$$

b. Work out: 2.45×0.25

solution

$$\begin{aligned} &= \frac{245}{100} \times \frac{25}{100} = \frac{6125}{10000} \\ &= \underline{\underline{0.6125}} \end{aligned}$$

LESSON TWO

DIVISION OF DECIMALS

Divide $0.72 \div 0.9$

Solution

$$\begin{aligned}
 0.72 \div 0.9 &= \frac{72}{100} \div \frac{9}{10} \\
 &= \frac{72}{100} \times \frac{10}{9} \\
 &= \frac{8}{10} \\
 &= \underline{\underline{0.8}}
 \end{aligned}$$

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

Solution

$$\begin{aligned}
 (7.5) \text{ m} \div 1.5\text{m} &= \frac{75}{10} \div \frac{15}{10} \\
 &= \frac{75}{10} \times \frac{10}{15} \\
 &= \mathbf{5\text{pieces}}
 \end{aligned}$$

LESSON THREE

COMBINED OPERATIONS ON DECIMALS

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

Solution

$$\begin{array}{r}
 3.20 \\
 0.08 \\
 \hline
 \mathbf{3.12}
 \end{array}$$

$$\begin{aligned}
 &= \frac{2 \times 3}{10 \ 10} \\
 &= \frac{6}{100} \\
 &= \underline{\underline{0.06}}
 \end{aligned}$$

$$\begin{aligned}
 &= \frac{312}{100} \div \frac{6}{100} \\
 &= \frac{312}{100} \times \frac{100}{6} \\
 &= \underline{\underline{52}}
 \end{aligned}$$

Work out: - $\frac{0.28 \times 0.81}{0.27 \times 4.2}$

Solution

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

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

$$\begin{array}{r}
 \frac{2}{10} \quad \frac{2 \times 1 \times 1 \times 1}{10 \times 1 \times 1} \\
 \underline{\underline{0.2}}
 \end{array}$$

LESSON FOUR

EXPRESSING FRACTIONS AS RECURRING DECIMALS

Express $\frac{2}{9}$ as a decimal

Solution**LESSON FIVE**Expressing recurring decimals as fractions

Change 0.33----to a fraction

Solution

$$M = 0.33 \text{ ----} \text{ (i)}$$

$$10m = 0.333 \text{ ---} \times 10$$

$$10m = 3.333 \text{ ----} \text{ (ii)}$$

$$-10m = 3.333 \text{ ---}$$

$$\underline{M = 0.333 \text{ ----}}$$

$$9m = 3$$

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

$$9 \quad 9$$

$$\underline{M = \frac{1}{3}}$$

Express 0.122 – to a common fraction

Solution

Let x represent the fraction

$$X = 0.1222 \text{ ----} \text{ (1)}$$

$$10 \times X = 0.1222 \text{ ----} \times 10$$

$$10x = 1.222 \text{ ----} \text{ (ii)}$$

$$10 \times 10x = 1.222 \text{ ----} \times 10$$

$$100x = 12.222 \text{ ----} \text{ (iii)}$$

$$100x = 12.222 \text{ ----} \text{ (iii)}$$

$$\underline{10x = 1.222 \text{ ----} \text{ (ii)}}$$

$$90x = 11$$

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

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

WEEK FIVE**LESSON ONE****ADDITION AND SUBTRACTION OF FRACTIONS**Work out: $-\frac{5}{6} - \frac{1}{3} + \frac{1}{2}$

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

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

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

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

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

solution

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

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

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

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

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

$$= \frac{11}{12}$$

LESSON TWO

MULTIPLICATION AND DIVISION OF FRACTIONS

1. Multiply: $-\frac{21}{4} \times \frac{11}{5}$

Solution

$$\begin{aligned}\frac{21}{4} \times \frac{11}{5} &= \frac{9}{4} \times \frac{6}{5} \\ &= \frac{9 \times 3}{2 \times 5} \\ &= \frac{27}{10} \\ &= \frac{27}{10}\end{aligned}$$

2. Work out: $-\frac{11}{4} \div \frac{13}{5}$

solution

$$\begin{aligned}\frac{11}{4} \div \frac{13}{5} &= \frac{5}{4} \div \frac{8}{5} \\ &= \frac{5}{4} \times \frac{5}{8} \\ &= \frac{25}{32}\end{aligned}$$

3. How many $\frac{12}{3}$ are contained in 15

solution

$$\begin{aligned}15 \div \frac{12}{3} \\ &= 15 \div \frac{5}{3} \\ &= 15 \times \frac{3}{5} \\ &= 3 \times 3\end{aligned}$$

= 9

LESSON THREE AND FOUR

COMBINED OPERATIONS

BODMAS

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

Solution

BODMAS

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

$$\frac{1}{3} \text{ of } \frac{1}{4} + \frac{7}{12}$$

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

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

$$\frac{8}{12}$$

$$\frac{2}{3}$$

LESSON FIVE

APPLICATION OF FRACTIONS

$\frac{2}{3}$ 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

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

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

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

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

$$\underline{X = 30}$$

(b) Find the number of boys

Solution

$$\begin{aligned} \text{Fraction of boys} &= 1 - \frac{2}{3} \\ &= \frac{3}{3} - \frac{2}{3} \\ &= \frac{1}{3} \end{aligned}$$

$$\begin{aligned} \text{Number of boys} &= \frac{1}{3} \times 30 \\ &= 1 \times 10 \\ &= \mathbf{10 \text{ boys}} \end{aligned}$$

$$\begin{aligned} \text{No of boys} &= 30 - 20 \\ &= 10 \text{ boys} \end{aligned}$$

WEEK SIX

LESSON ONE

APPLICATION OF FRACTIONS

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

Solution

$$\begin{aligned} \text{Fraction covered} \\ \frac{2}{3} \end{aligned}$$

$$\begin{aligned} \text{Fraction left} \\ 1 - \frac{2}{3} \\ \frac{3}{3} - \frac{2}{3} \\ \frac{1}{3} \end{aligned}$$

$$\begin{aligned} \text{Let whole journey} \\ \frac{1}{3} \text{ of } y &= 40 \text{ km} \\ \frac{1}{3} \times y &= 40 \text{ km} \\ 3 \times \frac{y}{3} &= 40 \text{ km} \times 3 \\ Y &= 120 \text{ km} \end{aligned}$$

2. In a group, $\frac{1}{6}$ are girls and there are 8 more boys than girls.

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

Solution

$$\begin{aligned} \text{Fraction of boys} &= 1 - \frac{1}{6} \\ &= \frac{6}{6} - \frac{1}{6} \\ &= \frac{5}{6} \end{aligned}$$

$$\begin{aligned} \text{Fraction of more boys} &= \frac{5}{6} - \frac{1}{6} \\ &= \frac{4}{6} \end{aligned}$$

Let the total number be x

$$4x = 8$$

$$6$$

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

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

$$x = 2 \times 6$$

$$\mathbf{x = 12}$$

There are 12 pupils in the group.

(b) How many girls are in the group?

Solution

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

$$6$$

2 girls

LESSON TWO

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

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

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

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

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

Solution

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

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

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

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

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

LESSON THREE AND FOUR

APPLICATION OF FRACTIONS (finding fraction of the remainder)

1. On a farm, $\frac{2}{3}$ of the animals are black, $\frac{1}{4}$ of the remainder are brown.

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

Solution

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

(b) Find $\frac{1}{5}$ of the fraction left

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

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

$$\frac{1}{20}$$

LESSON FIVE

MORE ABOUT APPLICATION OF FRACTIONS

John spent $\frac{1}{3}$ of his money on books and $\frac{1}{6}$ of the remainder 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 $\frac{2}{3}$	$\frac{2 - 1}{3 \times 9}$ or $1 - (\frac{1}{3} + \frac{1}{9})$
	$\frac{2}{3}$	$\frac{1 \times 1}{6 \times 3}$	$1 - \frac{3+1}{9}$
		$\frac{1}{9}$	$1 - \frac{4}{9}$
			$\frac{9 - 4}{9}$
			$\frac{5}{9}$

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

Solution

Let the total be x

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

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

$$\frac{5x}{5} = \frac{15000}{5} = x \cdot 9$$

$$x = 3000 = x \cdot 9$$

$$\underline{x = 27000}$$

WEEK SEVEN

LESSON ONE AND TWO

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 $\frac{1}{6}$ of the tank

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

Both taps fill $(\frac{1}{6} + \frac{1}{3})$ of the tank

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

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

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

total time taken of fill tank

$$= (1 \div \frac{1}{2}) \text{ minutes}$$

$$= (1 \times \frac{2}{1}) \text{ minutes}$$

$$= \mathbf{2 \text{ minutes}}$$

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

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

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

total time taken to fill the tank

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

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

$$\mathbf{12 \text{ minutes}}$$

3. Tap A and B are connected to a tank. Tap A can fill the tank in 3 minutes. Tap B draws water from the tank. When both taps are running, it 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 1 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

$$\begin{array}{r} 3 \ 12 \\ \underline{4-1} \\ 12 \\ \underline{3} \\ 12 \\ \underline{1} \\ 4 \end{array}$$

Total time taken to draw water from the taken

$$(1 \div 1)$$

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

4 minutes

LESSON THREE

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

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

$$= 80 \times 4$$

$$= \mathbf{320 \text{ cows}}$$

(a) Find the percentage of bulls.

Solution

$$100\% - 80\%$$

$$\mathbf{20\%}$$

(b) What is the total number of bulls?

Solution

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

$$= \mathbf{80 \text{ bulls}}$$

OR

$$\begin{array}{r} 400 \\ - 320 \\ \hline \mathbf{80\text{bulls}} \end{array}$$

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

%age saved = 100% - 30%

$$\begin{array}{l} \mathbf{70\%} \\ 70\% \text{ represent } 21000/= \\ 1\% \text{ represents } \frac{21000}{70} \end{array}$$

$$\begin{array}{l} 100\% \text{ represents } 21000 \times 100 \\ \qquad \qquad \qquad 70 \\ = 300 \times 100 \\ = \mathbf{30000/=} \end{array}$$

$$\begin{array}{l} \frac{70}{100} \times y = 21000/= \\ 10 \times \frac{7y}{10} = 21000/= \times 10 \\ \frac{7y}{7} = \frac{210000}{7} \\ \mathbf{y = 30000/=} \end{array}$$

LESSON FOUR

PERCENTAGE INCREASE AND DECREASE

1. Increase sh,800 by 20%

Solution

New % = 100% + 20%

$$\begin{array}{l} \qquad \qquad \qquad 120\% \\ \text{New amount } \frac{120}{100} \times 800/= \\ \qquad \qquad \qquad 120 \times 8 \\ = \mathbf{960/=} \end{array}$$

$$\begin{array}{l} \text{increase} \\ 20\% \text{ of } 800/= \\ \frac{20}{100} \times 800/= \\ 20 \times 8 \\ = \mathbf{160/=} \end{array}$$

$$\begin{array}{r} \text{New amount} \\ 800/= \\ + 160/= \\ \hline \mathbf{960/=} \end{array}$$

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

Solution

Method 1

10% increment

$$\begin{array}{l} \frac{10}{100} \times 2000 \\ 10 \times 20/= \\ \mathbf{200/=} \end{array}$$

new amount

$$\begin{array}{r} 2000 \\ + 200 \\ \hline \mathbf{2200/=} \end{array}$$

20% increment

$$\begin{array}{l} \frac{20}{100} \times 2200 \\ 20 \times 22 \\ \mathbf{440/=} \end{array}$$

new amount

$$\begin{array}{r} 2200 \\ + 440 \\ \hline \mathbf{2640/=} \end{array}$$

Method 2

$$\begin{aligned}
1^{\text{st}} \text{ increment} &= 100\% + 10\% \\
&= 110\% \\
2^{\text{nd}} \text{ increment} &= 100\% + 20\% \\
&= 120\% \\
\text{New amount} &= 110 \times 120 \times 2000 \\
&\quad \quad \quad 100 \quad 100 \\
&= 11 \times 120 \times 2000 \\
&= 1320 \times 2000 \\
&= \underline{\underline{2640000}}
\end{aligned}$$

3. Decrease sh.12000 by 10%

Solution

$$\begin{aligned}
\text{New \%} &= 100\% - 10\% \\
&= \underline{\underline{90\%}}
\end{aligned}$$

$$\begin{aligned}
&\frac{90}{100} \times 15000 = \\
&90 \times 15 \\
&\underline{\underline{13500}}
\end{aligned}$$

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

Solution

$$\begin{aligned}
&100\% - 5\% \text{ (5\% reduction)} \\
&100\% - 10\% \text{ (10\% reduction)} \\
&\frac{95}{100} \times \frac{90}{100} \times 12000 \\
&95 \times 9 \times 120 = \\
&\underline{\underline{102600}}
\end{aligned}$$

LESSON FIVE

FINDING ORIGINAL NUMBER AFTER INCREASE

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

Solution

After increase the new percentages

Method 1

$$\begin{aligned}
&100\% + 20\% = 120\% \\
&120\% \text{ rep } 1440 \\
&1\% \text{ rep } \frac{1440}{120} \\
&100\% \text{ rep } 100 \times \frac{1440}{120}
\end{aligned}$$

$$\begin{aligned}
&100 \times 12 \\
&\underline{\underline{1200}} =
\end{aligned}$$

Method 2

Let the amount be x

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

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

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

$$x = \underline{\underline{1200}} =$$

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

Method 1

$$\begin{aligned}
\text{New \%} &= 100\% + 30\% \\
&= \underline{\underline{130\%}}
\end{aligned}$$

method 2

let the salary be y

$$100\% + 30\% = 130\%$$

$$\begin{array}{r}
 130\% \text{ rep sh } 16900 \\
 1\% \text{ rep sh } \frac{16900}{130} \\
 = 130 \\
 100\% \text{ rep } 100 \times 130/= \\
 = 13000/=
 \end{array}$$

$$\begin{array}{r}
 \frac{130}{100} \times y = 16900 \\
 100 \times \frac{130y}{100} = 16900 \times 100 \\
 \frac{130y}{130} = \frac{16900}{130} \times 100 \\
 Y = 13000/=
 \end{array}$$

WEEK EIGHT
LESSON ONE AND TWO
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

$$\begin{array}{r}
 100\% - 35\% = 65\% \\
 65\% \text{ rep } 15600/= \\
 1\% \text{ rep } \frac{15600}{65} \\
 100\% \text{ rep } 100 \times \frac{15600}{65} \\
 100 \times 240 \\
 \mathbf{24000/=}
 \end{array}$$

method 11

$$\begin{array}{r}
 100\% - 35\% = 65\% \\
 \text{let the salary be } x \\
 \frac{65}{100} \text{ of } x = 15600/= \\
 100 \times \frac{65x}{100} = 15600 \times 100 \\
 65x = \frac{15600}{65} \times 100 \\
 \mathbf{X = 24000/=}
 \end{array}$$

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

$$\begin{array}{r}
 \text{New \%} = 100\% - 25\% \\
 = 75\% \\
 75\% \text{ rep } 67500/= \\
 1\% \text{ rep } \frac{67500}{75} \\
 \mathbf{900/=} \\
 100\% \text{ rep } 100 \times 900/= \\
 \mathbf{90,000/=}
 \end{array}$$

method 2

$$\begin{array}{r}
 \text{new \%} = 100\% - 25\% \\
 = 75\% \\
 \text{Let the old price be } x \\
 \frac{75}{100} \times X = 67500/= \\
 100 \times \frac{75x}{100} = 67500 \times 100 \\
 \frac{75x}{75} = \frac{6750000}{75} \\
 \mathbf{X = 90,000/=}
 \end{array}$$

LESSON THREE

FINDING PERCENTAGE OF INCREASE OR DECREASE

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

Solution

$$\begin{array}{r}
 \text{Increase} = 440\text{kg} \\
 \quad \quad -400\text{kg} \\
 \quad \quad \underline{\quad} \\
 \quad \quad \mathbf{40\text{kg}}
 \end{array}$$

$$(40\text{kg} \times 100)\%$$

400kg
10%
P = 10%

2. 800 pupils were decreased by $y\%$ to 680 pupils. find the value of y .

Solution

$$\begin{aligned} \text{Decrease} &= 800 \\ &\frac{-680}{\underline{120}} \end{aligned}$$

$$\begin{aligned} y &= \frac{(\text{Decrease} \times 100)}{\text{Old no}} \\ y &= \frac{120 \times 100}{800} \\ \mathbf{y} &= \mathbf{15\%} \end{aligned}$$

LESSON FOUR AND FIVE

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

$$\begin{aligned} \text{Profit} &= \text{sp} - \text{cp} \\ &= 120,000 - 100,000/= \\ &= \mathbf{20,000/=} \end{aligned}$$

$$\begin{aligned} \% \text{ profit} &= \frac{(\text{Profit} \times 100)}{\text{B.P}} \% \\ &= \frac{(20000 \times 100)}{100000} \% \\ &= \mathbf{20\%} \end{aligned}$$

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

Solution

$$\begin{aligned} \text{Loss} &= 4000/- - 3000/= \\ &= 1000/= \end{aligned}$$

$$\begin{aligned} \% \text{ loss} &= \frac{(\text{loss} \times 100)}{\text{B.P}} \% \\ &= \frac{(1000 \times 100)}{4000} \% \\ &= \mathbf{25\%} \end{aligned}$$

WEEK NINE

LESSON ONE AND TWO

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.

$$\begin{aligned} \text{Solution new \%} &= 100\% + 10\% \\ &= \mathbf{110\%} \end{aligned}$$

$$\begin{aligned} &\frac{110}{100} \times 300000/= \\ &\mathbf{330000/=} \end{aligned}$$

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

$$\text{Solution new \%} = 100\% - 25\%$$

$$\begin{aligned}
 &= 75\% \\
 \text{New amount} &= \frac{75}{100} \times 60000/= \\
 &= 75 \times 6000/= \\
 &= \mathbf{450000/=}
 \end{aligned}$$

LESSON THREE

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

$$\begin{aligned}
 \text{New \%} &= 100\% + 20\% \\
 &= \mathbf{120\%}
 \end{aligned}$$

$$\text{Cost price \%} = 100\%$$

$$120\% \text{ rep } 36000/=$$

$$1\% \text{ rep } \frac{36000}{120} =$$

$$100\% \text{ rep } 100 \times \frac{36000}{120} =$$

$$= \mathbf{30000/=}$$

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

- (a) Calculate the original price of the bicycle.

Solution

$$\begin{aligned}
 \text{New \%} &= 100\% - 10\% \\
 &= \mathbf{90\%}
 \end{aligned}$$

$$\text{Original \%} = 100\%$$

$$90\% \text{ rep } = 45000/=$$

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

$$100\% \text{ rep } 100 \times 500 =$$

$$= \mathbf{50000/=}$$

- (b) How much did he lose

Solution

$$\frac{10}{100} \times 50000 =$$

$$= \mathbf{5000/=}$$

LESSON FOUR AND FIVE

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
$$= \frac{10}{100} \times 4000/=$$
$$= 10 \times 40$$
$$= \underline{\underline{400/=}}$$

- (b) How much does the customer pay?

Solution

4000/=	or new % = 100% - 10%	90 x 40
- 400/=	= 90%	<u>3600/=</u>
<u>3600/=</u>	= 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

$$\text{Discount} = \text{marked price} - \text{cash price}$$
$$= 1500/= - 1200/=$$
$$= \underline{\underline{300/=}}$$

- (a) Calculate the percentage discount.

Solution

$$\% \text{ discount} = \frac{(\text{Discount} \times 100)}{\text{Marked price}} \%$$
$$= \frac{(300 \times 100)}{1500/=} \%$$
$$= \underline{\underline{20\%}}$$

WEEK TEN

LESSON ONE AND TWO

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?

$$\text{New \%} = 100\% - 10\%$$
$$= 90\%$$

$$90\% \text{ rep } 18000/=$$

$$1\% \text{ rep } \frac{18000}{90}$$

$$100\% \text{ rep} = 100 \times 200$$
$$= \underline{\underline{20000/=}}$$

(c) How much was the discount

$$\begin{array}{r} 20000/= \\ -18000/= \\ \hline \mathbf{2000/=} \end{array} \quad \text{or Discount} = \frac{10}{100} \times 20000/=$$
$$= 10 \times 200$$
$$= \mathbf{2000/=}$$

LESSON THREE

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

$$\text{Salary} = 10000/=$$

$$\text{Commission} = \frac{10}{100} \times 6500$$
$$= \mathbf{650/=}$$

$$\text{Total amount earned} = 10000$$

$$\begin{array}{r} + 650 \\ \hline \mathbf{10650/=} \end{array}$$

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

$$\text{Total sales} = 50 \times 15000/=$$
$$= 1,200,000/=$$

$$\text{His commission} = \frac{3}{100} \times 1,200,000/=$$
$$= \mathbf{36,000/=}$$

LESSON FOUR AND FIVE

SIMPLE INTEREST

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

Solution

$$\text{S.I} = \text{PTR}$$
$$= 8000 \times 2 \times \frac{10}{100}$$
$$= 80 \times 20$$
$$= \mathbf{1600/=}$$

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

Solution

$$\begin{aligned}
 S.I &= PTR \\
 &= 24000 \times \frac{8}{12} \times \frac{15}{100} \\
 &= 20 \times 8 \times 15 \\
 &= \underline{\underline{2400/=}}
 \end{aligned}$$

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

Solution

$$\begin{aligned}
 S.I &= PTR \\
 &= 24000 \times 8 \times \frac{2}{100} \\
 &= 240 \times 16 \\
 &= \underline{\underline{3840/=}}
 \end{aligned}$$

WEEK ELEVEN**LESSON ONE AND TWO****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

$$\begin{aligned}
 PTR &= I \\
 50000 \times 3 \times \frac{R}{100} &= 15000 \\
 \frac{1500R}{1500} &= \frac{15000}{1500} \\
 \underline{\underline{R = 10\%}}
 \end{aligned}$$

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

Solution

$$\begin{aligned}
 P \times T \times R &= I \\
 30000 \times \frac{9}{12} \times \frac{R}{100} &= 1125 \\
 \frac{75 \times 3 \times R}{75 \times 3} &= \frac{1125}{75 \times 3}
 \end{aligned}$$

$$\underline{\underline{R = 5\%}}$$

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

Solution

$$\begin{aligned}
 P \times T \times R &= I \\
 12000 \times T \times \frac{5}{100} &= 1800 \\
 \underline{\underline{600T = 1800}}
 \end{aligned}$$

600 600

T= 3years.

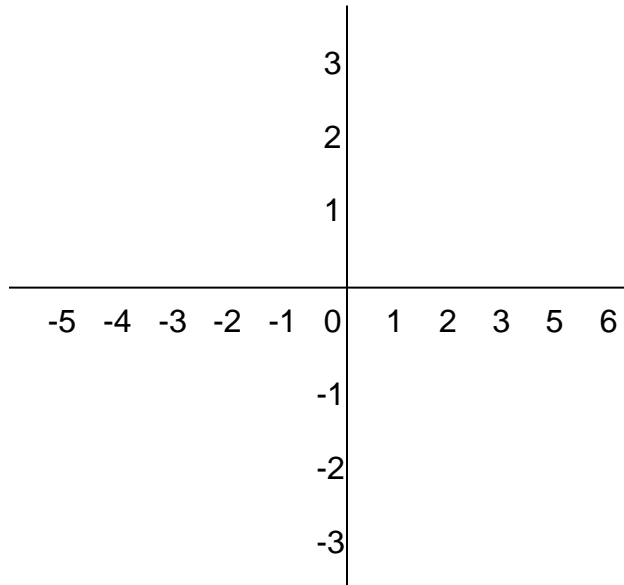
LESSON THREE

COORDINATES

INTRODUCTION

Identifying lines of a coordinate graph

Identify all possible lines on the grid below;

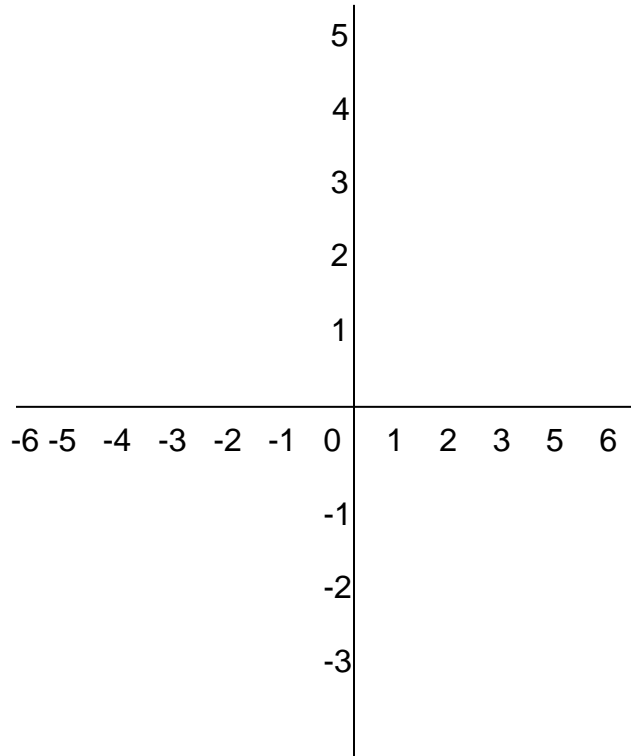


LESSON FOUR

PLOTTING GIVEN POINTS

Plot the following point on a grid

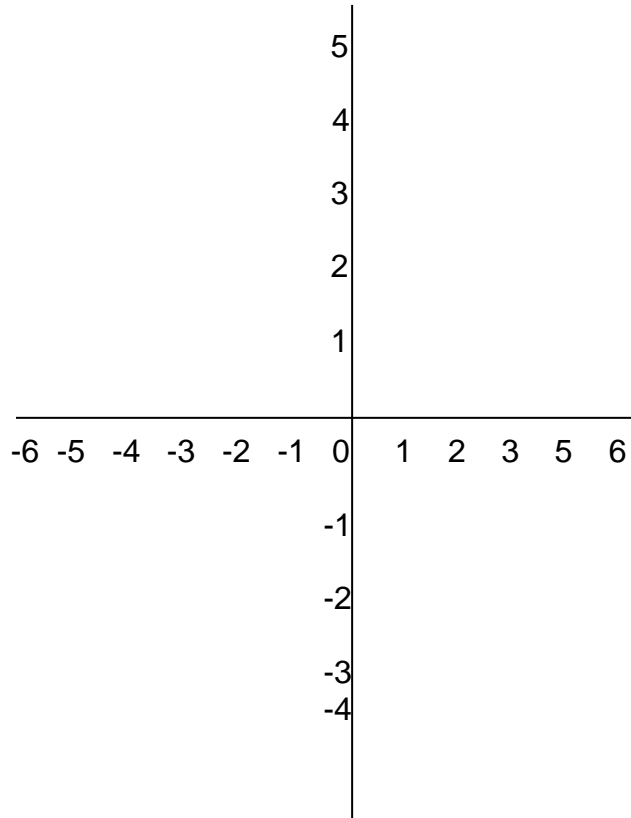
A(0,5), B(0,-4) C(3,0), D(-4,0) E(-2,-2) F(-3,-5) G(+2,-4), H(-5,+1) etc.



LESSON FIVE

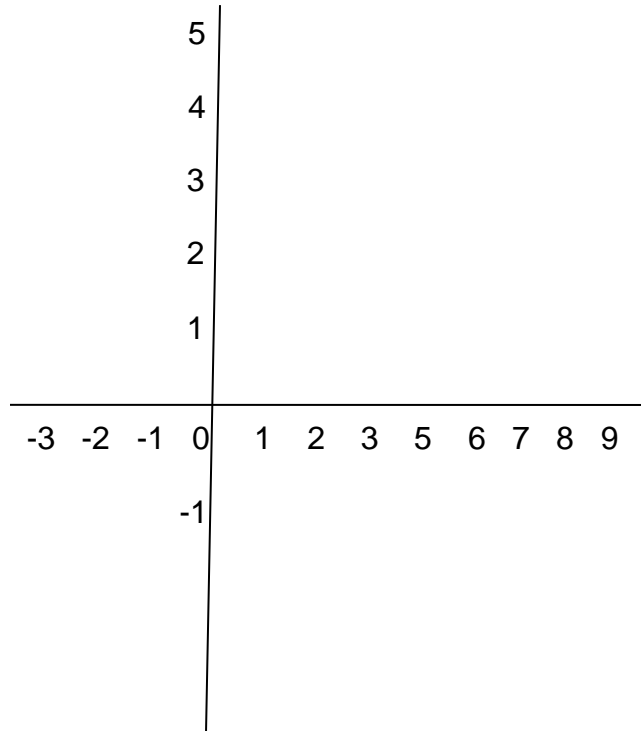
NAMING PLOTTED POINTS

Name the various points on the coordinate graph.



WEEK TWELVE
LESSON ONE AND TWO
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.

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

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

$$3\text{units} \times 12\text{units}$$

$$= \underline{\underline{36\text{square units}}}$$

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

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

$$1 \times 6\text{cm} (4\text{cm} + 8\text{cm})$$

$$3\text{cm} \times 12\text{cm}$$

$$= \underline{\underline{36\text{cm}^2}}$$

LESSON THREE AND FOUR

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.

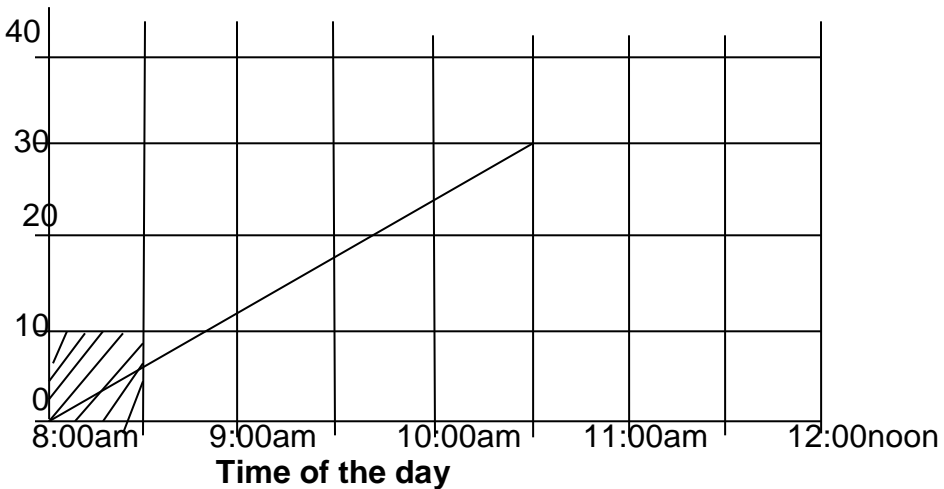
Y	- 4	---	- 2	---
X	- 2	- 1	---	1

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TERM TWO
WEEK TWO
LESSON ONE AND TWO
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.
-



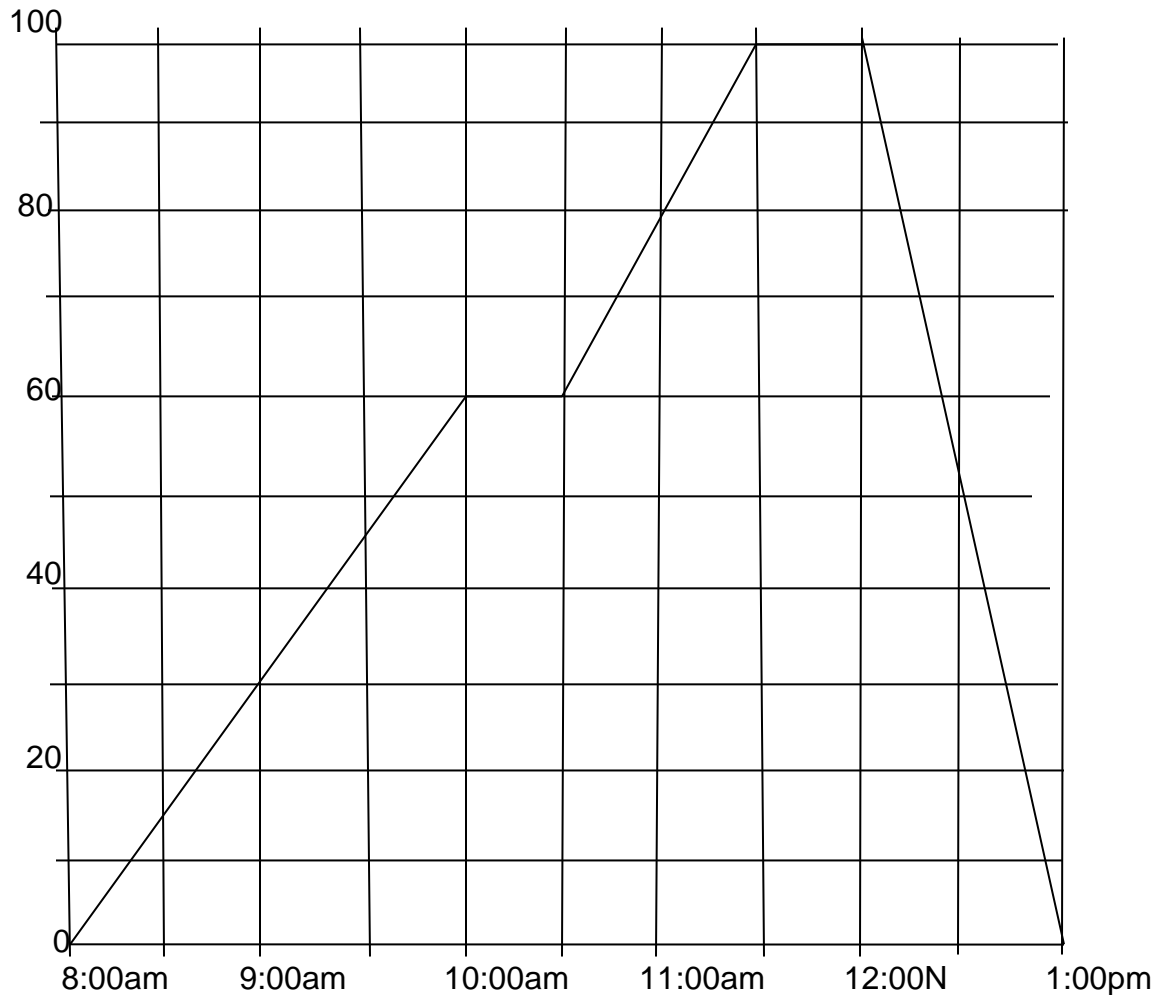
1. What is shown on the
 - (i) Vertical axis?
Distance in km
 - (ii) Horizontal axis?
Time of the day

2. What is the scale on the
- (i) vertical axis?
1 small sq rep. 5km
 - (ii) horizontal axis?
1 small sq rep 30minutes

LESSON THREE AND FOUR

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

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

$$= 60\text{KM} \div 1 \frac{1}{2} \text{HRS}$$

$$= 60\text{km} \div \frac{3}{2}\text{hrs}$$

$$= 60\text{km} \times \frac{2}{3} \text{hrs}$$

$$= \underline{20\text{km} \times 2}$$

$$1\text{hr}$$

$$= \underline{40\text{km/hr}}$$

d. Calculate the motorist's total distance for the whole journey.

$$100\text{km} + 100\text{km}$$

$$\underline{200\text{km}}$$

f. What was the total rest time?

$$\begin{aligned} & 30\text{min} + 30\text{min} \\ & 60\text{minutes} = 1\text{hr} \end{aligned}$$

g. Find the motorist's average speed for the whole journey.

$$\begin{aligned} \text{A.S} &= \frac{\text{TD}}{\text{TT}} \\ &= \frac{200\text{km}}{5\text{hrs}} \\ &= \underline{40\text{km/hr}} \end{aligned}$$

3. Find the motorist's average speed of the whole journey while traveling

Total distance = 200km

Total time = 4hrs

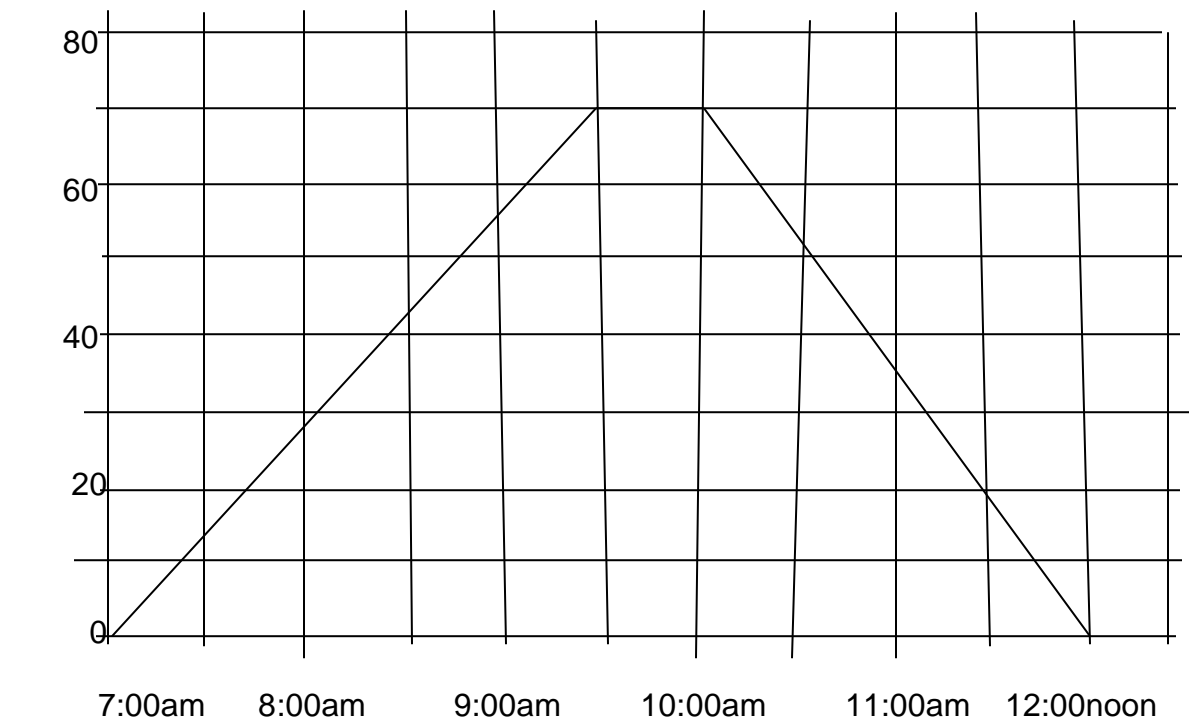
$$\text{Average speed while travelling} = \frac{200\text{km}}{4\text{hrs}}$$

LESSON FIVE

$$= \underline{50\text{km/hr}}$$

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.



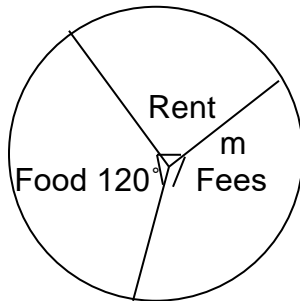
$$\begin{aligned} \text{Distance} &= \text{S} \times \text{T} \\ &= 40\text{km} \times 2\text{hrs} \\ &= 80\text{km} \end{aligned}$$

WEEK THREE

LESSON ONE AND TWO

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

$$M + 90 + 120 = 360^\circ$$

$$M + 210 = 360^\circ$$

$$M + 210 - 210 = 360^\circ - 210^\circ$$

$$\mathbf{M = 150^\circ}$$

Fees

$$\frac{150}{360} \times 72000/=$$

$$360^\circ$$

$$15 \times 2000/=$$

$$\mathbf{\underline{30000/=}}$$

- (b) What percentage of his salary is spent on food?

Solution

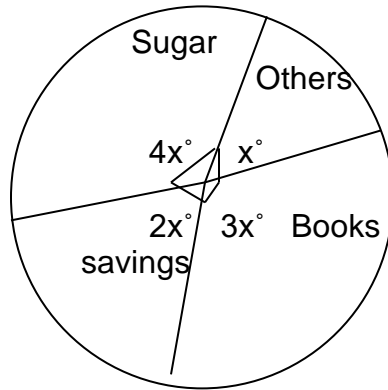
$$= \frac{120}{360} \times 100\%$$

$$= \frac{1}{3} \times 100\%$$

$$= \frac{100\%}{3}$$

$$= \mathbf{33 \frac{1}{3}\%}$$

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



(a) Find the value of x

Solution

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

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

$$10x = 360^\circ$$

$$x = 36^\circ$$

(b) How much does he save?

$$\text{Savings} = 2x$$

$$= 2 \times 36^\circ$$

$$= 72^\circ$$

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

$$= 2 \times 1200$$

$$= 2400/=$$

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

Solution

$$\text{Sugar} = 4x$$

$$= 4 \times 36$$

$$= 144$$

$$\text{Books} = 3x$$

$$= 3 \times 36$$

$$= 108$$

$$\text{Difference}$$

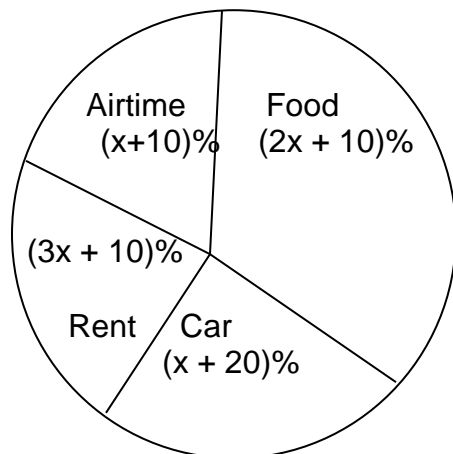
$$= 144 - 108$$

$$= 36$$

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

$$= 1200/= \text{ more}$$

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
$x + 20\%$	$3x - 10\%$	$320\% - 20\%$
$10\% + 20\%$	$3 \times 10\% - 10\%$	10%
$10\% + 30\%$	$30\% - 10\%$	
30%	20%	

Total expenditure % = 100%

10% represents sh. 40000/=

10% represents sh. $\frac{40000}{10}$

10

100% represents $100 \times 4000\text{/=}$

400,000/=

LESSON THREE AND FOUR

DRAWING PIE CHARTS GIVEN FRACTIONS AND PERCENTAGES

1. Victor spends $\frac{1}{4}$ of his income on rent, $\frac{4}{9}$ of the remainder on food and saves the rest.

(a) What fraction does he save?

Solution

Fraction for rent = $\frac{1}{4}$

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

3

4

$$\text{Fraction for food} = \frac{4}{9} \times \frac{3}{4} \\ = \frac{1}{3}$$

$$\text{Fraction for savings} = \frac{3}{3} - \frac{1}{3} \\ = \frac{9-4}{12} \\ = \frac{5}{12}$$

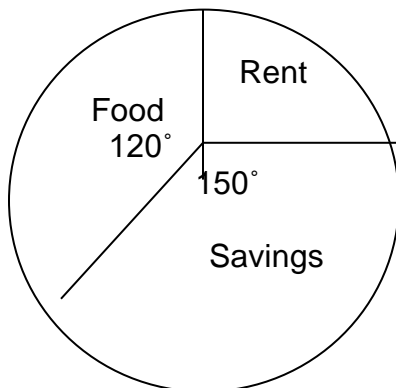
(b) Using the above information, draw an accurate pie chart.

Solution

$$\frac{\text{Rent}}{4} \times 360 \\ 90^\circ$$

$$\frac{\text{food}}{3} \times 360 \\ 120^\circ$$

$$\frac{\text{savings}}{12} \times 360 \\ 150^\circ$$



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.

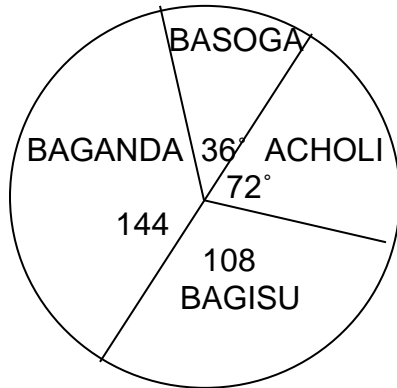
Solution

$$\text{Baganda} \\ \frac{40}{100} \times 360 \\ 4 \times 36 \\ 144^\circ$$

$$\text{Basoga} \\ \frac{10}{100} \times 360 \\ 1 \times 36 \\ 36^\circ$$

$$\text{Bagisu} \\ \frac{30}{100} \times 360 \\ 3 \times 36 \\ 108^\circ$$

$$\text{Acholi} \\ 360 - (144 + 36 + 108) \\ 360 - 288 \\ 72^\circ$$



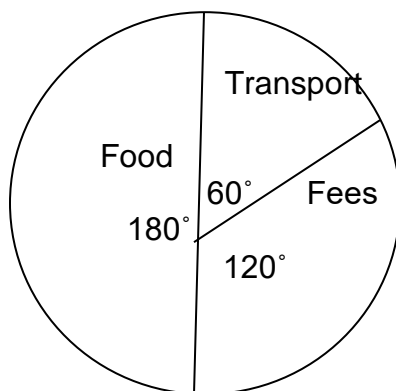
LESSON FIVE

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

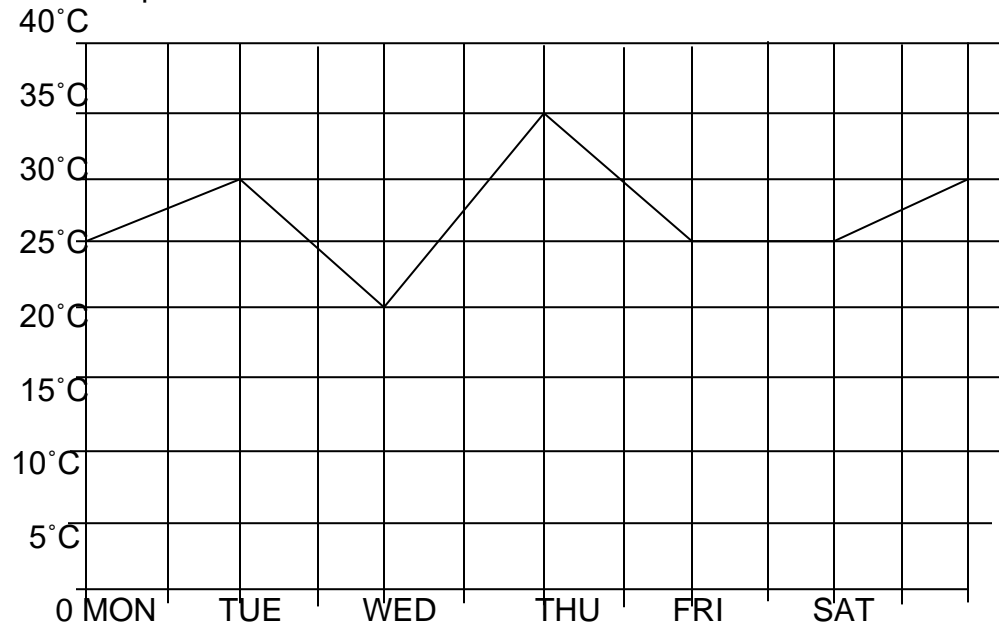
Total expenditure	Fees	Transport	Food
Sh. 12,000	$\frac{12000}{= x 360}$	$\frac{6000}{= x 360}$	$\frac{18000}{= x 360}$
Sh. 6000	36000	36000	36000
Sh. 18000			
<u>Sh. 36000</u>	120°	60°	180°



WEEK FOUR LESSON ONE AND TWO

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?

35°C

(b) Which day had the lowest temperature?

Wednesday

(c) What was the drop in temperature between Tuesday and Wednesday?

$30^{\circ}\text{C} - 20^{\circ}\text{C} = 10^{\circ}\text{C}$

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

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

$$\frac{190}{7}$$
$$27 \frac{1}{7}^{\circ}\text{C}$$

LESSON THREE

APPLICATION OF MEAN

1. The mean age of 5 children is 12 years, if a sixth child joins them, the mean age becomes 11 years, find the age of the 6th child.

Solution

$$\begin{aligned} \text{Total age of 5 children} &= 5 \times 12 \\ &= \mathbf{60\text{yrs}} \end{aligned}$$

$$\text{Total age of 6 children} = 6 \times 11$$

$$\begin{aligned} &= 66\text{yrs} \\ \text{Age of 6}^{\text{th}} \text{ child} &= (66 - 60) \text{ yrs} \\ &= 6\text{yrs} \end{aligned}$$

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

$$\begin{aligned} \text{Total age of 6 boys} &= 6 \times 13\text{yrs} \\ &= 78\text{yrs} \end{aligned}$$

$$\begin{aligned} \text{Total age of 5 boys} &= 5 \times 14 \\ &= 70 \end{aligned}$$

$$\begin{aligned} \text{Age of the 6}^{\text{th}} \text{ boy} &= (78 - 70)\text{yrs} \\ &= 8\text{yrs} \end{aligned}$$

3. The average weight of 6 pupils is 40kg; the average weight of other 4 pupils is 30kg. find the average weight of all the pupils

Solution

$$\begin{aligned} \text{Total weight of 6 pupils} &= 6 \times 40\text{kg} \\ &= 240\text{kg} \end{aligned}$$

$$\begin{aligned} \text{Total weight of 4 pupils} &= 4 \times 30\text{kg} \\ &= 120\text{kg} \end{aligned}$$

$$\begin{aligned} \text{Total weight of 10 pupils} &= (120 + 240) \text{ kg} \\ &= 360\text{kg} \end{aligned}$$

$$\begin{aligned} \text{Average weight of pupils} &= \frac{360\text{kg}}{10} \\ &= 36\text{kg} \end{aligned}$$

LESSON FOUR AND FIVE

FORMING AND SOLVING EQUATIONS INVOLVING MEAN

1. The mean of $y + 1$, 5 and y is 6. Find the value of y .

Solution

$$\frac{(y + 1) + 5 + y}{3} = 6$$

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

$$3 \times \frac{2y + 5}{3} = 6 \times 3$$

$$2y + 5 = 6 \times 3$$

$$2y + 5 - 5 = 18 - 5$$

$$\frac{2y}{2} = \frac{13}{2}$$

$$y = 6$$

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

(a) Find the value of a .

Solution

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

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

$$4a - 4 = 32$$

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

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

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

$$\mathbf{a = 9}$$

(b) Find the range

Solution

1) $a = 9$

2) $a - 7 = 9 - 7$
 $= 2$

3) $2a = 2 \times a$
 $= 2 \times 9$
 $= 18$

4) 3

$$\text{Range} = 18 - 2$$
$$= 16$$

WEEK FIVE

LESSON ONE

PROBABILITY

Probability of success and failure.

1. The probability that Peter will pass his examinations is $\frac{2}{7}$. What is the probability that he will not pass his examinations?

Solution

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

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

$$\mathbf{\frac{5}{7}}$$

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

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

$$= 3 \times 6$$

$$= 18$$

LESSON TWO

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

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

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

No of total chances = 3

No of desired chances = 1

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

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

LESSON THREE

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

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

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

LESSON FOUR

Tossing two coins.

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

		H	T
2 nd	H	HH	HT
Coin T	T	TH	TT

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

No of Total Chances = 4

Desired chances = (HH)

No of desired chances = 1

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

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

LESSON FIVE

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 $\frac{1}{2}$

WEEK SIX

LESSON ONE AND TWO

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 = $\frac{5}{36}$

LESSON THREE

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

$$\begin{aligned} \text{Solution} \\ \text{Diameter} &= 2R \\ &= 2 \times R \\ &= 2 \times 10\text{m} \\ &= 20\text{m} \end{aligned}$$

(b) $1\frac{3}{4}\text{m}$

$$\begin{aligned} \text{solution} \\ \text{Diameter} &= 2R \\ &= 2 \times R \\ &= 2 \times 1\frac{3}{4}\text{m} \\ &= 2 \times \frac{7}{4}\text{m} \\ &= 3\frac{1}{2}\text{m} \end{aligned}$$

2. Find the radius of a circle whose diameter is

a) 30cm

$$R = \frac{\text{Diameter}}{2}$$

$$\begin{aligned} \frac{30\text{cm}}{2} \\ \mathbf{15\text{cm}} \end{aligned}$$

(b) $1\frac{3}{4}\text{dm}$

$$\begin{aligned} R &= D \div 2 \\ &= 1\frac{3}{4}\text{dm} \div 2 \\ &= \frac{7\text{dm}}{4} \times \frac{1}{2} \\ &= \mathbf{7\text{dm}} \end{aligned}$$

LESSON FOUR

8

CIRCUMFERENCE OF A CIRCLE

1. Find the circumference of a circle whose diameter is

(a) 7cm. (use $\frac{22}{7}$)

$$\begin{aligned} \text{TLD} \\ \frac{22}{7} \times 7\text{cm} \end{aligned}$$

$$= \mathbf{22\text{cm}}$$

(b) 10cm use π as 3.14

$$\begin{aligned} C &= \text{TLD} \\ &= 3.14 \times 10\text{cm} \\ &= \frac{314}{100} \times 10\text{cm} \\ &= \frac{314\text{cm}}{10} \\ &= \mathbf{31.4\text{cm}} \end{aligned}$$

2. Find the circumference of a circle whose radius is

(a) 7cm (use $\frac{22}{7}$)

$$\begin{aligned} C &= 2\pi R \\ 2 \times \frac{22}{7} \times 7\text{cm} \\ &= 44\text{cm} \end{aligned}$$

(b) ($\pi=3.14$)

$$\begin{aligned} C &= 2\pi R \\ &= 2 \times \frac{3.14}{100} \times 20\text{m} \\ &= 2 \times \frac{314}{100} \times 20\text{m} \\ &= \frac{628 \times 2\text{m}}{10} \\ &= \frac{1256\text{m}}{10} \end{aligned}$$

$$= \underline{125.6m}$$

LESSON FIVE

FINDING RADIUS AND DIAMETER GIVEN CIRCUMFERENCE

1. The circumference of a circle is 44cm. Find the diameter of the circle.

(use $\pi=22/7$)

Solution

$$C = \pi D$$

$$22D = 44cm$$

7

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

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

$$D = 2cm \times 7$$

$$D = 14cm$$

2. Calculate the radius of a circle whose circumference is 44m.

(use π as $22/7$)

Solution

$$2\pi R = C$$

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

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

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

$$R = 7m$$

$$R = 7m$$

WEEK SEVEN

LESSON ONE AND TWO

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.

$$C = \pi D$$

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

$$= 66m$$

$$\text{No of posts} = \frac{66m}{1.5m}$$

$$= \frac{66}{1.5}$$

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

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

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

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

$$= 22 \times 2$$

$$= 44 \text{ posts}$$

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

$$\text{No of spaces} = 11$$

$$\text{Total distance} = 11 \times 4m$$

$$= 44m$$

(b) calculate the radius of the fence.

Solution

$$2\pi R = C$$

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

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

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

$$R = 7\text{m}$$

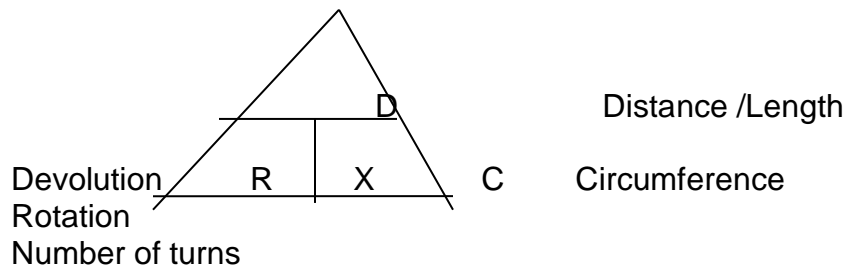
LESSON THREE AND FOUR

APPLICATION OF CIRCUMFERENCE (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?



Solution

$$\text{Distance} = \text{Circumference} \times \text{Revolution}$$

$$\text{But circumference} = \pi D$$

$$= \frac{22}{7} \times 35\text{cm}$$

$$= 22 \times 5\text{cm}$$

$$= \mathbf{110\text{cm}}$$

$$\text{Distance} = 110\text{cm} \times 1 \text{ Revol}$$

$$= 110\text{cm}$$

b) 50 complete revolutions

Solution

$$\text{Circumference} = \pi D$$

$$= \frac{22}{7} \times 35\text{cm}$$

$$= \mathbf{110\text{cm}}$$

$$\text{No Distance} = C \times \text{Revolution}$$

$$= 110\text{cm} \times 50$$

$$= \mathbf{5500\text{cm}}$$

Finding number of revolutions.

$$\text{Revolutions} = \frac{\text{Distance}}{\text{Circumference}}$$

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

Solution

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

$$\begin{aligned} \text{But circumference} &= \text{TLD} \\ &= \frac{22}{7} \times 56\text{cm} \\ &= 22 \times 8\text{cm} \\ &= \mathbf{176\text{cm}} \end{aligned}$$

$$\begin{aligned} \text{No of Rev} &= \frac{1760\text{cm}}{170\text{cm}} \\ &= \mathbf{10 \text{ Revolutions}} \end{aligned}$$

LESSON FIVE

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 $\text{TI} = \frac{22}{7}$)

Solution

$$\begin{aligned} \text{Circumference} &= \frac{\text{Length of wire}}{\text{No of times}} \\ &= \frac{176\text{m}}{4} \\ &= \mathbf{44\text{mm}} \end{aligned}$$

$$\begin{aligned} \text{TLD} &= C \\ 22D &= 44\text{m} \\ 7 \times \frac{22D}{7} &= 44\text{m} \times 7 \end{aligned}$$

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

$$\mathbf{D = 14\text{m}}$$

WEEK EIGHT

LESSON ONE AND TWO

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

$$\text{Length of arc} = \frac{1}{2} \text{TLD}$$

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

14m

Solution

$$\begin{aligned}\text{Length of arc} &= \frac{1}{2} \text{TLD} \\ &= \frac{1}{2} \times \frac{22}{7} \times 14\text{m} \\ &= 11 \times 2\text{m} \\ &= \mathbf{22\text{m}}\end{aligned}$$

2. What is the distance around the semi-circle below (use $\text{TL} = \frac{22}{7}$)

$$\begin{aligned}\text{Perimeter} &= (\frac{1}{2} \text{TLD}) + \text{D} \\ &= (\frac{1}{2} \times \frac{22}{7} \times 7\text{m}) + 7\text{m} \\ &= 11\text{m} + 7\text{m} \\ &= \mathbf{18\text{m}}\end{aligned}$$

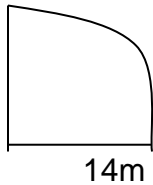
LESSON THREE AND FOUR

LENGTH OF ARC AND PERIMETER OF QUADRANTS

Length of arc = $\frac{1}{4}$ 2TIR

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

$$\text{Length of arc} = \frac{1}{4} \times 2 \text{TLR}$$

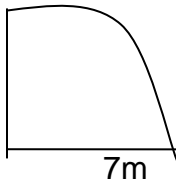


$$\begin{aligned}&= \frac{1}{4} \times \frac{22}{7} \times 14\text{m} \times 2 \\ &= 11 \times 2 \\ &= \mathbf{22\text{m}}\end{aligned}$$

$$\begin{aligned}\text{Perimeter of a quadrant} &= (\frac{1}{4} \times 2\text{TLR} + 2\text{R}) \\ &= (\frac{1}{4} \times 2 \times \frac{22}{7} \times 14) + (2 \times 14\text{m})\end{aligned}$$

2. Calculate the distance around the figure below.

(USE TL as $\frac{22}{7}$)

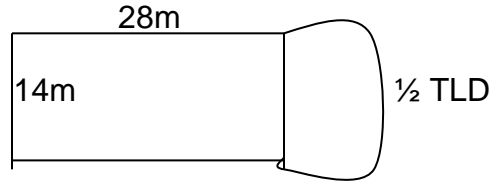


$$\begin{aligned}\text{Perimeter} &= (\frac{1}{4} \times 2\text{TLR}) + 2\text{R} \\ &= \frac{1}{4} \times 2 \times \frac{22}{7} \times 7 + (2 \times 7\text{m}) \\ &= 11\text{m} + 14\text{m} \\ &= \mathbf{25\text{m}}\end{aligned}$$

LESSON FIVE

DISTANCE ROUND COMBINED SHAPES

1. Find the perimeter of the figure below.



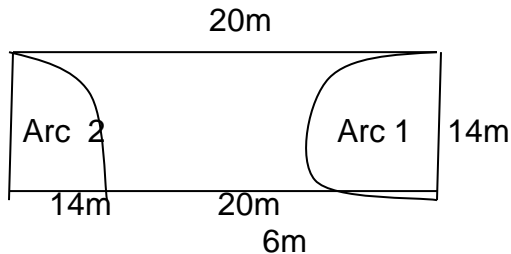
SOLUTION

$$\begin{aligned} \text{Length of arc} &= \frac{1}{2} \text{TLD} \\ &= \frac{1}{2} \times \frac{22}{7} \times 14\text{m} \\ &= \mathbf{22\text{m}} \end{aligned}$$

$$\begin{aligned} \text{Perimeter} &= 22\text{m} + 28\text{m} + 14\text{m} + 25\text{m} \\ &= (50 + 42) \text{m} \\ &= \mathbf{92\text{m}} \end{aligned}$$

2. Find the distance around the shaded part .

Solution



$$\begin{aligned} \text{Length of arc} & \\ \frac{1}{2} \text{TLD} & \\ \frac{1}{2} \times \frac{22}{7} \times 14\text{m} & \\ \mathbf{22\text{m}} & \end{aligned}$$

$$\begin{aligned} \text{Arc 2} & \\ \frac{1}{4} \times 2\text{TLR} & \\ \frac{1}{4} \times 2 \times \frac{22}{7} \times 14\text{m} & \\ \mathbf{22\text{m}} & \end{aligned}$$

$$\begin{aligned} \text{Perimeter} & \\ 22\text{m} + 22\text{m} + 20\text{m} + 6\text{m} & \\ 44\text{m} + 26\text{m} & \\ \mathbf{70\text{m}} & \end{aligned}$$

WEEK NINE LESSON ONE

AREA OF A CIRCLE

Area of a circle = πr^2

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

(Use π as $\frac{22}{7}$)

$$\begin{aligned} \text{Area} &= \pi r^2 \\ &= \frac{22}{7} \times 7\text{m} \times 7\text{m} \\ &= \mathbf{154\text{m}^2} \end{aligned}$$

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

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

$$\begin{aligned} \text{Solution} & \\ \text{Area} &= \pi r^2 \end{aligned}$$

$$\begin{aligned}
&= \frac{22}{7} \times \frac{28\text{cm}}{2} \times \frac{28\text{cm}}{2} \\
&= 22 \times 14\text{cm} \times 14\text{cm} \\
&= 22 \times 196\text{cm}^2 \\
&= \underline{\underline{616\text{cm}^2}}
\end{aligned}$$

LESSON TWO AND THREE

FINDING AREA OF A CIRCLE GIVEN CIRCUMFERENCE

1. calculate the area of a circle whose circumference is 44dm.
(Use $\pi = \frac{22}{7}$)

Procedure

- i. Use given circumference to find radius
 $2\pi R = C$
- ii. Use the radius to find area
 $\text{Area} = \pi R^2$

Solution

Radius of the circle

$$\text{Area } 2\pi R = C$$

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

$$7 \times \frac{44}{7} \times R = 44\text{dm} \times 7$$

$$\frac{44R}{44} = \frac{44\text{dm} \times 7}{44}$$

$$\underline{\underline{R = 7\text{dm}}}$$

Area of circle

$$\text{Area} = \pi R^2$$

$$= \frac{22}{7} \times 7\text{dm} \times 7\text{dm}$$

$$= 22\text{dm} \times 7\text{dm}$$

$$= \underline{\underline{154\text{dm}^2}}$$

LESSON FOUR

FINDING RADIUS OF A CIRCLE GIVEN AREA

- Find the radius of circle whose area is 154m².
(Use $\pi = \frac{22}{7}$)

Solution

$$\pi R^2 = \text{Area}$$

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

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

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

$$\underline{\underline{R = 7\text{m}}}$$

LESSON FIVE

FINDING CIRCUMFERENCE WHEN AREA IS GIVEN

STEPS TAKEN

1. Use the given area to find radius
 $\pi R^2 = \text{AREA}$

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

Question

The area of a circle is 154cm^2 . Find the circumference of the circle .
 (Use TL as $\frac{22}{7}$)

Solution

Radius of the circle

$$TLR^2 = \text{Area}$$

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

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

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

$$\mathbf{R = 7\text{cm}}$$

circumference

$$C = 2TLR$$

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

$$\mathbf{= 44\text{cm}}$$

WEEK TEN

LESSON ONE

FINDING AREA OF SEMI-CIRCLES

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

Solution

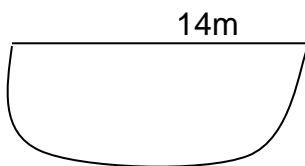
$$\text{Area} = \frac{1}{2} TLR^2$$

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

$$= 11 \times 16\text{m}^2$$

$$\mathbf{= 693\text{m}^2}$$

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



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

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

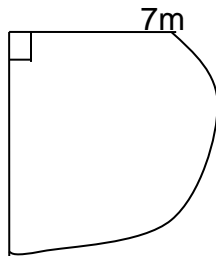
$$\mathbf{= 77\text{m}^2}$$

LESSON TWO

FINDING AREA OF QUADRANTS

Calculate the area of the quadrant below

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

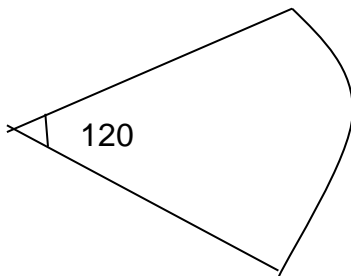


$$\begin{aligned} \text{Area} &= \frac{1}{4} \times \text{TLR}^2 \\ &= \frac{1}{4} \times \frac{22}{7} \times 7\text{m} \times 7\text{m} \\ &= \frac{77\text{m}}{2} \\ &= 38\frac{1}{2}\text{m}^2 \end{aligned}$$

LESSON THREE AREA OF OTHER SECTORS

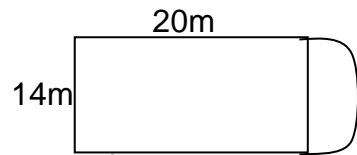
Find the area of the sector below

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



$$\begin{aligned} \text{Area} &= \frac{120}{360} \times \text{TLR} \\ &= \frac{1}{3} \times \frac{22}{7} \times 21\text{cm} \times 21\text{cm} \\ &= 22 \times 21\text{cm}^2 \\ &= \underline{462\text{cm}^2} \end{aligned}$$

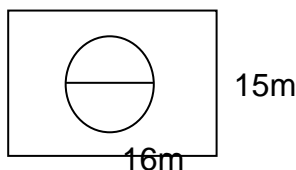
LESSON FOUR AREA OF COMBINED SHAPES



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

LESSON FIVE AREA OF SHADED PORTIONS

- Find the area of the shaded region



$$\begin{aligned} \text{Area of whole figure} \\ \text{Area} &= L \times W \\ &= 16\text{m} \times 15\text{m} \\ &= \underline{240\text{m}^2} \end{aligned}$$

$$\begin{aligned} \text{Area un shaded} \\ \text{Area} &= \text{TLR}^2 \\ &= \frac{22}{7} \times \frac{14\text{m}}{7} \times \frac{14\text{m}}{7} \\ &= \underline{154\text{m}^2} \end{aligned}$$

$$\begin{aligned} \text{Area shaded} \\ \text{Area} &= 240\text{m} \\ &- 154\text{m}^2 \\ &= \underline{86\text{m}^2} \end{aligned}$$

- Find the area of the shaded portion

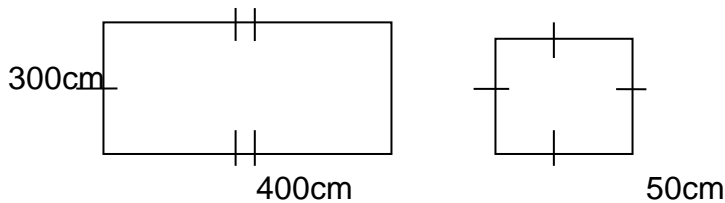
$$\left(\text{use } TL = \frac{22}{7}\right)$$

WEEK ELEVEN LESSON ONE

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



$$\begin{aligned} \text{No of tiles} &= \frac{(L)}{S} \times \frac{(W)}{S} \\ &= \frac{400\text{cm}}{50\text{cm}} \times \frac{300\text{cm}}{50\text{cm}} \\ &= 8 \times 6 \\ &= \underline{\underline{48 \text{ tiles}}} \end{aligned}$$

2. Abdul cut out circular plates of diameter 7cm from a rectangular sheet of metal of length 45cm and width 35cm

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

- a) How many circular plates did he cut out

Solution

$$\begin{aligned} \text{No of circular plates} &= \frac{(L)}{D} \times \frac{(W)}{D} \\ &= \frac{45\text{cm}}{7\text{cm}} \times \frac{35\text{cm}}{7\text{cm}} \\ &= 6 \times 5 \\ &= \underline{\underline{30 \text{ plates}}} \end{aligned}$$

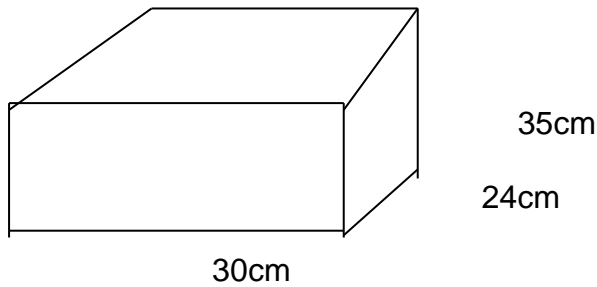
- b) Find the area of the un used sheet after cutting out the circular plates.

Solution

Area Circular	Area of 30 Plates	Area Un Used
$A = L \times w$	$A = TLr^2 \times 30$	1575cm ²
45cm x 35cm	$= \frac{22}{7} \times \frac{70\text{cm}}{2} \times \frac{7\text{cm}}{9} \times 50\text{cm}$	- 1155cm ²
1575cm²	$= 11 \times 7\text{cm}^2 \times 15$	<u>420cm²</u>
	= 1155cm²	

LESSON TWO AND THREE PACKING CUBES 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



$$\begin{aligned}
 \text{No of cubes} &= L \times W \times h \\
 &= \frac{30\text{cm}}{4\text{cm}} \times \frac{24\text{cm}}{4\text{cm}} \times \frac{35\text{cm}}{4\text{cm}} \\
 &= 7 \times 6 \times 8 \\
 &= 336 \text{ cubes}
 \end{aligned}$$

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

Solution

Volume of big box

left

$$\begin{aligned}
 \text{Vol} &= L \times W \times h \\
 &= 30\text{cm} \times 24\text{cm} \times 35\text{cm} \\
 &= 720\text{cm} \times 35\text{cm}
 \end{aligned}$$

$$= \underline{3696\text{cm}^3}$$

$$= 25200\text{cm}^3$$

Volume of 336cubes

$$\begin{aligned}
 \text{Vol} &= S \times S \times S \times 336 \\
 &= 4\text{cm} \times 4\text{cm} \times 4\text{cm} \times 336 \\
 &= 64\text{cm} \times 336
 \end{aligned}$$

$$= 21504\text{cm}^3$$

Space

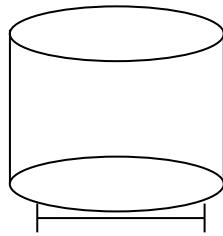
$$252400\text{cm}^3$$

$$- \underline{21504\text{cm}^3}$$

LESSON FOUR AND FIVE

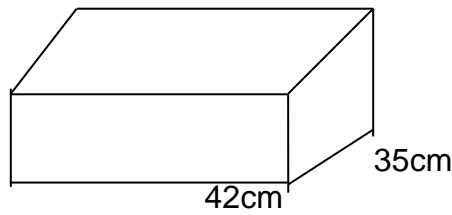
PACKING TINS IN BOXES AND FINDING SPACE LEFT

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



7cm

8cm



56cm

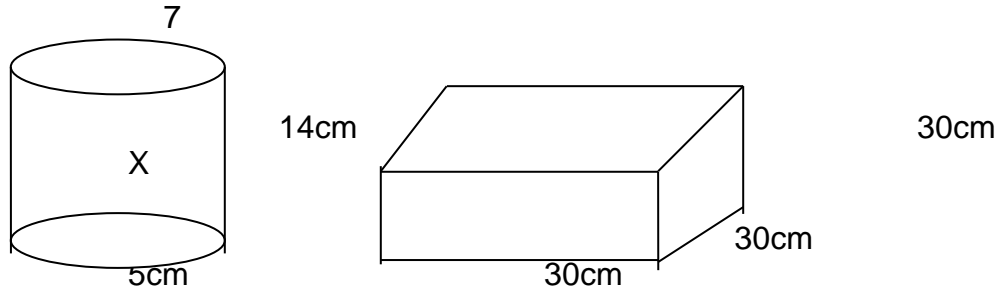
42cm

35cm

No of tins

$$\begin{aligned}
 &= \frac{(L)}{D} \times \frac{(W)}{D} \times \frac{(H)}{h} \\
 &= \frac{42\text{cm}}{7\text{cm}} \times \frac{35\text{cm}}{7\text{cm}} \times \frac{56\text{cm}}{8\text{cm}} \\
 &= 6 \times 5 \times 7 \\
 &= 30 \times 7 \\
 &= 210 \text{ tins}
 \end{aligned}$$

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



$$\begin{aligned} \text{No of tins that fit in the box} &= \left(\frac{S}{D}\right) \times \left(\frac{S}{D}\right) \times \left(\frac{S}{N}\right) \\ &= \left(\frac{30\text{cm}}{5\text{cm}}\right) \times \left(\frac{30\text{cm}}{5\text{cm}}\right) \times \left(\frac{30\text{cm}}{14}\right) \\ &= 6 \times 6 \times 2 \\ &= 36 \times 2 \\ &= 72 \text{ tins} \end{aligned}$$

$$\begin{aligned} \text{Vol. of box} &= S \times S \times S \\ &= 30\text{cm} \times 30\text{cm} \times 30\text{cm} \\ &= 900\text{cm}^2 \times 30\text{cm} \\ &= 27000\text{cm}^3 \end{aligned}$$

$$\begin{aligned} \text{Vol. of 72 tins} &= \pi R^2 \times H \times 72 \\ &= \frac{22}{7} \times \frac{5\text{cm}}{2} \times \frac{5\text{cm}}{2} \times 14\text{cm} \times 72 \\ &= 11 \times 5\text{cm} \times 5\text{cm}^2 \times 72 \\ &= 55\text{cm} \times 5\text{cm} \times 72 \\ &= 275\text{cm}^3 \times 72 \\ &= 19800\text{cm}^3 \end{aligned}$$

WEEK TWELVE

LESSON ONE

FINDING VOLUME OF A CYLINDER

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

Calculate its volume

Solution

$$\begin{aligned} \text{Vol} &= \pi R^2 h \\ &= \frac{22}{7} \times 7\text{cm} \times 7\text{cm} \times 10\text{cm} \\ &= 22\text{cm} \times 70\text{cm}^2 \\ &= \mathbf{1540\text{cm}^3} \end{aligned}$$

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

Solution

$$\begin{aligned}
 \text{Vol} &= \pi R^2 h \\
 &= 3.14 \times \frac{10\text{cm}}{2} \times \frac{10\text{cm}}{2} \times 5\text{cm} \\
 &= \frac{3.14}{100} \times 5\text{cm} \times 5\text{cm} \times 5\text{cm} \\
 &= \frac{(157 \times 5) \text{cm}^3}{2} \\
 &= \frac{785\text{cm}^3}{2} \\
 &= \underline{\underline{392\frac{1}{2}\text{cm}^3}}
 \end{aligned}$$

LESSON TWO**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

$$\begin{aligned}
 \pi R^2 h &= \text{vol} \\
 22 \times 7\text{cm} \times 7\text{cm} \times h &= 1694\text{cm}^3 \\
 7 & \\
 \frac{22 \times 1\text{cm} \times 7\text{cm} \times h}{22 \times \text{m} \times 7\text{m}} &= \frac{1694\text{m} \times \text{m} \times \text{m}}{22 \times \text{m} \times 7\text{m}} \\
 \underline{\underline{h = 11\text{m}}}
 \end{aligned}$$

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

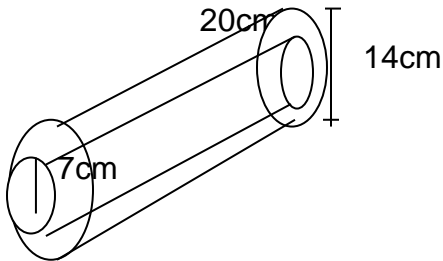
(Use $\pi = 3.14$)

Solution

$$\begin{aligned}
 \pi R h &= \text{Vol.} \\
 3.14 \times R \times 5\text{cm} &= 62.8\text{cm} \\
 314 \times 5 \times R &= 628\text{cm} \\
 100 & \quad 10 \\
 \frac{1570\text{cm} \times R}{100} &= \frac{628\text{cm}}{10} \\
 10 \times \frac{157\text{cm}}{10} \times R &= \frac{628\text{cm}}{10} \times 10 \\
 \frac{157\text{cm}}{157\text{cm}} \times R &= \frac{628\text{cm}}{157\text{cm}} \\
 R &= \frac{628 \times \text{cm} \times \text{cm} \times \text{cm} \times \text{cm}}{157 \times \text{cm}} \\
 R &= 4\text{cm} \\
 \underline{\underline{R = 2\text{cm}}}
 \end{aligned}$$

LESSON THREE**SUBTRACTION OF VOLUME**

1. The figure shows a cylindrical hollow pipe. Find the volume of the pipe.
(Use $\pi = 22$)

Solution

Vol. of whole figure (outer cylinder)

$$\begin{aligned}
 \text{Vol.} &= TLR^2h \\
 &= \frac{22}{7} \times \frac{14\text{cm}}{2} \times \frac{14\text{cm}}{2} \times 20\text{cm} \\
 &= 22 \times 7\text{cm}^2 \times 20\text{cm} \\
 &= 154\text{cm}^2 \times 20\text{cm} \\
 &= \mathbf{3080\text{cm}^3}
 \end{aligned}$$

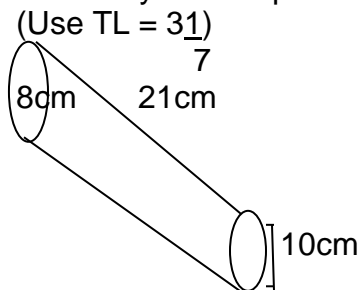
Vol. of hollow (inner cylinder)

$$\begin{aligned}
 \text{Vol} &= TLR^2h \\
 &= \frac{22}{7} \times \frac{7\text{cm}}{2} \times \frac{7\text{cm}}{2} \times 20\text{cm} \\
 &= 11 \times 1\text{cm} \times 7\text{cm} \times 10\text{cm} \\
 &= \mathbf{770\text{cm}^3}
 \end{aligned}$$

Vol of the pipe

$$\begin{aligned}
 &3080\text{cm}^3 \\
 &- 770\text{cm}^3 \\
 \hline
 &\mathbf{2310\text{cm}^3}
 \end{aligned}$$

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

(Use $TL = \frac{31}{7}$)

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

Solution

$$\begin{aligned}
 \text{Vol} &= THR^2h \\
 &= \frac{22}{7} \times \frac{8\text{cm}}{2} \times \frac{8\text{cm}}{2} \times 21\text{cm} \\
 &= 22 \times 4\text{cm} \times 4\text{cm} \times 3\text{cm} \\
 &= 22 \times 48\text{cm}^3 \\
 &= \mathbf{1056\text{cm}^3}
 \end{aligned}$$

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

Solution

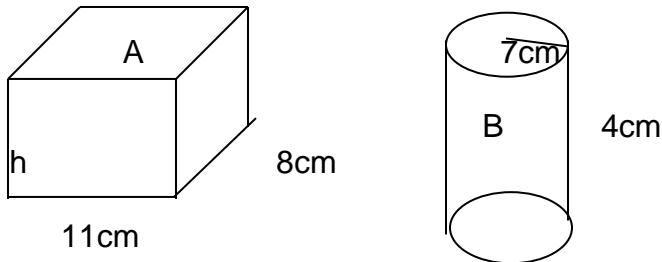
$$\begin{aligned}
 \text{Vol of the whole wood} &= TLR^2h \\
 &= \frac{22}{7} \times \frac{10\text{cm}}{2} \times \frac{10\text{cm}}{2} \times 21\text{cm}
 \end{aligned}$$

$$\begin{aligned}
 &= 22 \times 5\text{cm} \times 5\text{cm} \times 3\text{cm} \\
 &= 22 \times 75\text{cm}^3 \\
 &= \underline{\underline{1650\text{cm}^3}}
 \end{aligned}$$

$$\begin{array}{r}
 \text{Vol of wood left } 1650\text{cm}^3 \\
 - 1056\text{cm}^3 \\
 \hline
 1650\text{cm}^3
 \end{array}$$

LESSON FOUR COMPARING VOLUMES

1. the figures below have the same volume



- (a) Find the height of A.

Solution

Vol. of B

$$\text{Vol.} = \text{TLR}^2\text{h}$$

$$\frac{22}{7} \times 7\text{cm} \times 7\text{cm} \times 4\text{cm}$$

$$22\text{cm} \times 7\text{cm} \times 4\text{cm}$$

$$154\text{cm}^2 \times 4\text{cm}$$

$$\underline{\underline{616\text{cm}^3}}$$

Height of A

$$\text{L} \times \text{W} \times \text{h} = \text{Vol.}$$

$$11\text{cm} \times 8\text{cm} \times \text{h} = 616\text{cm}^3 \text{ (same Vol as B)}$$

$$\frac{28\text{cm} \times 8\text{cm} \times \text{h}}{11\text{cm} \times 8\text{cm}} = \frac{616\text{cm}^3 \times \text{cm} \times \text{cm}}{11\text{cm} \times 8\text{cm}}$$

$$11\text{cm} \times 8\text{cm} \times \text{h} = \frac{616\text{cm}^3 \times \text{cm} \times \text{cm}}{11\text{cm} \times 8\text{cm}}$$

$$\underline{\underline{\text{h} = 7\text{cm}}}$$

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 tank when full

$$\text{Vol.} = \text{TLR}^2\text{h}$$

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

$$= 22 \times 14\text{m} \times 2\text{m} \times 20\text{m}$$

$$= 308\text{m} \times 40\text{m}$$

$$= 12320\text{m}^3$$

Vol of water that remains

$$12320\text{m}^3$$

$$- 1540\text{m}^3$$

$$10780\text{m}^3$$

Height of water left

$$\text{TLRh} = \text{Vol of water left}$$

$$\frac{22}{7} \times \frac{28\text{m}}{2} \times \frac{28\text{m}}{2} \times \text{h} = 10780\text{m}^3$$

$$\frac{22}{7} \times 14\text{m} \times 2\text{m} \times \text{h} = \frac{10780\text{m}^3 \times \text{m} \times \text{m}}{22 \times 14\text{m} \times 2\text{m}}$$

$$\frac{22 \times 14\text{m} \times 2\text{m} \times \text{h}}{22 \times 14\text{m} \times 2\text{m}} = \frac{10780\text{m}^3 \times \text{m} \times \text{m}}{22 \times 14\text{m} \times 2\text{m}}$$

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

METHOD II

Height of the tank = 20m

Height of the water removed

TLRh = Vol.

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

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

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

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

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

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

Height of water which remains = 20m - 2 $\frac{1}{2}$ m

$$= 20 - 5$$

$$= 15$$

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

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

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

$$= \mathbf{17\frac{1}{2} m}$$

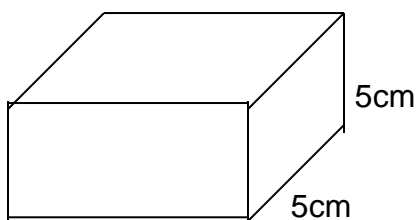
LESSON FIVE

VOLUME IN LITRES

1. calculate the volume of the figure below in Litres

Solution

1 liter = 1000cc



$$\begin{aligned} \text{Vol m.c.c} &= L \times W \times h \\ &= 20\text{cm} \times 5\text{cm} \times 5\text{cm} \\ &= 100\text{cm} \times 5\text{cm} \\ &= \mathbf{500\text{cm}^3} \end{aligned}$$

20cm

Vol. in litres

1L = 1000cm³

1000cm³ = 1L

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

$$500\text{cm}^3 = 500 \times \frac{1}{1000} \text{ L}$$

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

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

$$= \mathbf{0.5L}$$

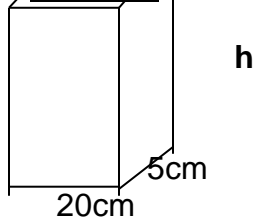
2. The tin below holds 2 Litres when completely filled with water. Find h.

Change 2c to cm^3

$$1\text{L} = 1000\text{cm}^3$$

$$2\text{L} = 2 \times 1000\text{cm}^3$$

$$= \underline{2000\text{cm}^3}$$



$$L \times W \times h = \text{Vol}$$

$$\frac{20\text{cm} \times 5\text{cm} \times h}{20 \times 5\text{cm} \quad 20\text{cm} \times 5\text{cm}} = \frac{2000\text{cm}^3}{20\text{cm} \times 5\text{cm}}$$

$$\frac{2000\text{cm} \times \text{cm} \times \text{cm}}{20\text{cm} \times 5\text{cm}}$$

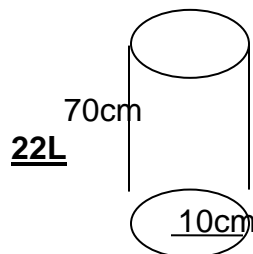
$$2000\text{cm} \times \text{cm} \times \text{cm} = 20\text{cm} \times 5\text{cm} \times h$$

$$2000\text{cm} \times \text{cm} \times \text{cm} = 100\text{cm} \times h$$

$$h = \underline{20\text{cm}}$$

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

$$\text{Vol} = \pi R^2 h$$

$$= \frac{22}{7} \times 10\text{cm} \times 10\text{cm} \times 7\text{cm}$$

$$= 22 \times 10\text{cm} \times 10\text{cm} \times 10\text{cm}$$

$$= \underline{22000\text{cm}^3}$$

Vol. in litres

$$22000\text{cc} = \frac{22000\text{cc} \times 1\text{L}}{1000\text{cc}} =$$

The cost of 22L

1L costs 600/=

22L cost 22 x 600/=

13200/=

TERM THREE

WEEK ONE

LESSON ONE

TOTAL SURFACE AREA OF A CYLINDER

1. Calculate the surface area of the cylinder below.

Solution

$$\begin{aligned}
\text{T.S.A} &= \text{TLR}^2 + 2\text{TLRh} + \text{TLR}^2 \\
&= \left(\frac{22}{7} \times \frac{14\text{cm}}{2} \times \frac{14\text{cm}}{2}\right) + \left(2 \times \frac{22}{7} \times \frac{14\text{cm}}{2}\right) \times 10\text{cm} + \left(\frac{22}{7} \times \frac{14\text{cm}}{2} \times \frac{14\text{cm}}{2}\right) \\
&= 22 \times 7\text{cm}^2 + 2 \times 22\text{cm} \times 10\text{cm} + 22 \times 7\text{cm}^2 \\
&= 154\text{cm}^2 + 440\text{cm}^2 + 154\text{cm}^2 \\
&= \underline{\underline{748\text{cm}^2}}
\end{aligned}$$

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

$$\begin{aligned}
\text{T.S.A} &= \frac{22}{7} \times \frac{7\text{cm}}{2} \times \frac{7\text{cm}}{2} + 2 \times \frac{22}{7} \times \frac{7\text{cm}}{2} \times 7\text{cm} \\
&= \frac{77\text{cm}^2}{2} + 154\text{cm}^2 \\
&= 38 \frac{1}{2} \text{cm}^2 + 154\text{cm}^2 \\
&= \underline{\underline{192 \frac{1}{2} \text{cm}^2}}
\end{aligned}$$

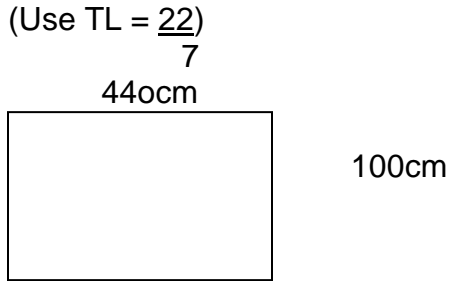
3. Calculate the surface area of a hollow cylinder of radius 7cm and height 5cm.
(Use $\text{TL} = \frac{22}{7}$)

$$\begin{aligned}
\text{T.S.A} &= 2 \times \frac{22}{7} \times 7\text{cm} \times 5\text{cm} \\
&= 44\text{cm} \times 5\text{cm} \\
&= \underline{\underline{220\text{cm}^2}}
\end{aligned}$$

LESSON TWO AND THREE

MORE ABOUT VOLUME AND SURFACE AREA 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.



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

Radius

$$2\pi R = C$$

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

$$7 \times 44R = 440\text{cm} \times 7$$

$$\frac{44R}{44} = \frac{440\text{cm} \times 7}{44}$$

$$\mathbf{R = 70\text{cm}}$$

Area of metal needed to cover the bottom

Area πR^2

$$\frac{22}{7} \times 70\text{cm} \times 70\text{cm}$$

$$22 \times 700\text{cm}$$

$$\mathbf{15400\text{cm}^2}$$

Calculate the maximum volume of water the cylinder will hold.

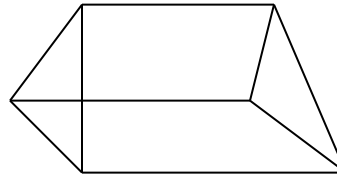
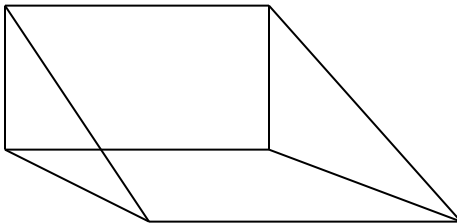
Solution

$$\begin{aligned} \text{Vol. in cc} &= \pi R^2 h \\ &= \frac{22}{7} \times 70\text{cm} \times 70\text{cm} \times 100\text{cm} \\ &= \frac{22}{7} \times 70\text{cm} \times 1000\text{cm}^2 \\ &= \mathbf{1540000\text{cm}^3} \end{aligned}$$

$$\begin{aligned} \text{Vol. in litres} & \\ 1000\text{cm}^3 &= 1\text{L} \\ 1540000\text{cm}^3 &= \frac{1540000}{1000} \\ &= \mathbf{1540\text{Litres}} \end{aligned}$$

LESSON FOUR AND FIVE

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.

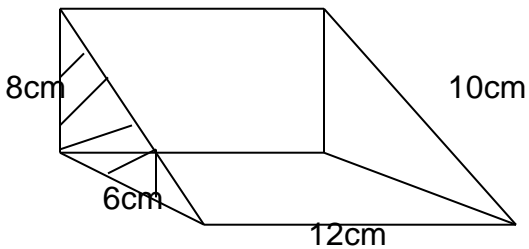
It has 9 edges

It has got 6 vertices

VOLUME OF TRIANGULAR PRISM

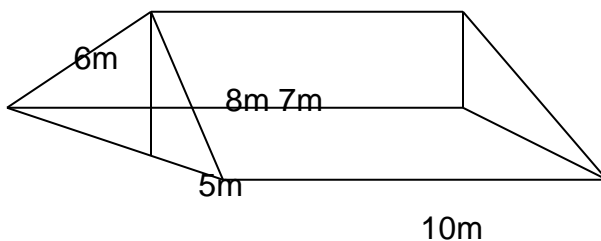
Vol. = Area of \triangle length of prism

Calculate the volume of the figure below.



$$\begin{aligned}\text{Vol.} &= \text{Area of } D \times L \\ &= \left(\frac{1}{2} b \times h\right) \times L \\ &= \frac{1}{2} \times 6\text{cm} \times 8\text{cm} \times 12\text{cm} \\ &= 3\text{cm} \times 8\text{cm} \times 12\text{cm} \\ &= 24\text{cm}^2 \times 12\text{cm} \\ &= \underline{\underline{288\text{cm}^3}}\end{aligned}$$

What is the volume of the prism below?



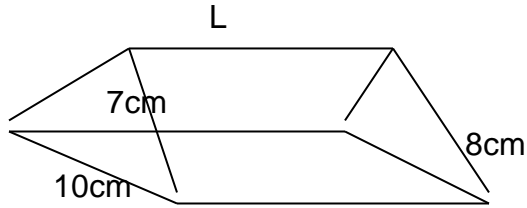
$$\begin{aligned}\text{Vol} &= \text{Area of } D \times \text{length} \\ &= \frac{1}{2} \times b \times l \times l \\ &= \frac{1}{2} \times 5\text{m} \times 8\text{m} \times 10\text{m} \\ &= 5\text{m} \times 4\text{m} \times 10\text{m} \\ &= 20\text{m}^2 \times 10\text{m} \\ &= \underline{\underline{200\text{m}^2}}\end{aligned}$$

WEEK TWO

LESSON ONE AND TWO

FINDING LENGTH, HEIGHT OR BASE OF THE TRIANGULAR PRISM GIVEN THE VOLUME.

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



Area of D x L = Vol.

$$\frac{1}{2} \times b \times h \times L = 700\text{cm}^3$$

$$\frac{1}{2} \times 10\text{cm} \times 7\text{cm} \times L = 700\text{cm}^3$$

$$35\text{cm} \times L = 700\text{cm}^3$$

$$\underline{35\text{cm} = \frac{700\text{cm}^3}{35\text{cm}}}$$

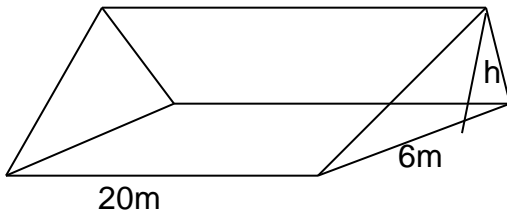
$$35\text{cm} \quad 35\text{cm}$$

$$L = \frac{700\text{cm} \times \text{cm} \times \text{cm}}{35\text{cm} \times \text{cm}}$$

$$L = 20\text{cm}$$

L = 20cm

2. Below is a triangular prism whose volume is 480m³
Find h.



Area of D x L = Vol.

$$\frac{1}{2} \times b \times h \times L = 480\text{m}^3$$

$$\frac{1}{2} \times 6\text{m} \times h \times 20\text{m} = 480\text{m}^3$$

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

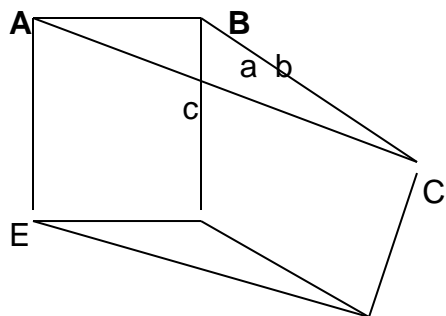
$$3\text{m} \times 20\text{m} \quad 3\text{m} \times 20\text{m}$$

h = 8m

LESSON THREE

APPLICATION OF PYTHAGORAS THEOREM ON TRIANGULAR PRISM.

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



$$a^2 + b^2 = c^2 \quad \text{D}$$

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

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

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

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

$$a^2 = 64m^2$$

$$a^2 = 8m$$

AB = 8m

B. Find the volume of the prism.

$$\text{Vol} = \text{Area of D} \times L$$

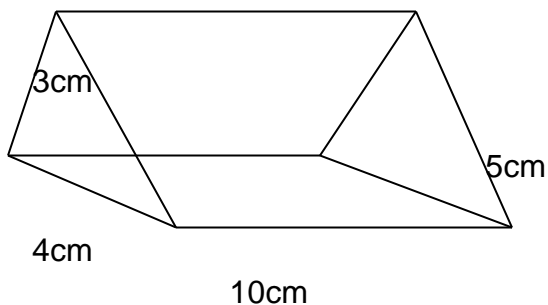
$$= \frac{1}{2} \times b \times h \times L$$

$$= \frac{1}{2} \times 8m \times 6m \times 12m$$

$$= 4m \times 6m \times 12m$$

$$= 24m^2 \times 12m$$

$$= 288m^2$$



Solution

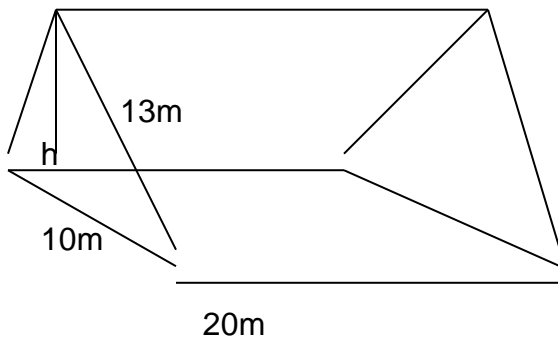
$$= (\frac{1}{2} \times 3\text{cm} \times 4\text{cm}) \times 2 + (5\text{cm} \times 10\text{cm}) + (10\text{cm} \times 4\text{cm}) + (10\text{cm} \times 3\text{cm})$$

$$= 12\text{cm}^2 + 50\text{cm}^2 + 40\text{cm}^2 + 30\text{cm}^2$$

$$= \underline{\underline{132\text{cm}^2}}$$

LESSON FOUR

Find the total surface area of the figure below,



Solution

Value of h

$$6 + 6 = c$$

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

$$h + (5m \times 5m) = 13m + 13m$$

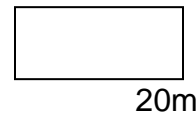
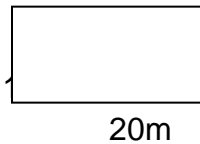
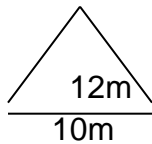
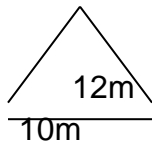
$$h + 25m = 169m$$

$$h + 25m - 25m = 169m - 25m$$

$$h = 144m$$

$$\mathbf{h = 12m}$$

Surface area



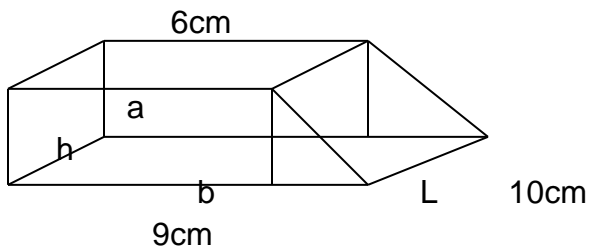
$$= (\frac{1}{2} \times 10m \times 12m \times 2) + (20m \times 13m) + (20m \times 13m) + (20m \times 10m)$$

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

$$= \mathbf{840m^2}$$

LESSON FIVE

VOLUME OF THE TRAPEZOIDAL PRISM.



$$\text{Vol} = \frac{1}{2} h (a + b) \times \text{length}$$

$\frac{1}{2} \times 4\text{cm} (6\text{cm} + 9\text{cm}) \times 10\text{cm}$
 $2\text{cm} \times 15\text{cm} \times 10\text{cm}$
 $30\text{cm} \times 10\text{cm}$
 300cm

WEEK THREE

LESSON ONE AND TWO

SPEED, TIME AND DISTANCE.

AVERAGE SPEED

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

A man covered 50km in 2 hours and another 50km in 3 hours.
Find his average speed for the whole journey.

Total distance = $50\text{km} + 50\text{km}$
 $= 100\text{km}$

Total time = $2\text{hours} + 3\text{hours}$
 $= 5\text{hours}$

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

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

Solution

Distance from x to y = $60\text{km} \times 3\text{hr}$
 $= 180\text{km}$

Distance from y to z at 40km/hr for 3hrs = $\frac{40\text{km} \times 3\text{hrs}}{\text{hr}}$
 $= \underline{120\text{km}}$

Total distance from x to z = $180\text{km} + 120\text{km}$
 $= \underline{300\text{km}}$

Total time = $3\text{hrs} + 3\text{hrs}$

$$= 6\text{hrs}$$

$$\begin{aligned}\text{Average speed} &= \frac{300\text{km}}{6\text{hrs}} \\ &= \underline{50\text{km/hr}}\end{aligned}$$

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

$$\begin{aligned}\text{Time taken at } 20\text{km/hr} &= \frac{40\text{km}}{20\text{km/hr}} \\ &= 2\text{hrs}\end{aligned}$$

$$\begin{aligned}\text{Time taken at } 15\text{km/hr} &= \frac{45\text{km}}{15\text{km/hr}} \\ &= 3\text{hrs}\end{aligned}$$

$$\begin{aligned}\text{Total distance covered} &= 40\text{km} + 45\text{km} \\ &= 85\text{km}\end{aligned}$$

$$\begin{aligned}\text{Total time taken} &= 2\text{hrs} + 3\text{hrs} \\ &= 5\text{hrs}\end{aligned}$$

$$\begin{aligned}\text{Average speed} &= \frac{\text{total distance}}{\text{Total time}} \\ &= \frac{85\text{km}}{5\text{hrs}} \\ &= 17\text{km/hr}\end{aligned}$$

LESSON THREE

AVERAGE SPEED OF RETURN JOURNEYS

1. Lubwama drove at 55km/hr for 4 hours. If he returned following the same road at 110km/hr, find his average speed for the whole journey.

$$\begin{aligned}\text{Distance covered} &= 220\text{km} + 220\text{km} \\ &= 440\text{km}\end{aligned}$$

$$\begin{aligned}\text{Total time taken} &= 4\text{hrs} + 2\text{hrs} \\ &= 6\text{hrs}\end{aligned}$$

$$\begin{aligned}
 \text{Average speed} &= \frac{440\text{km}}{6\text{hrs}} \\
 &= 73 \frac{2}{6}\text{km/hr} \\
 &= 73 \frac{1}{3}\text{km/hrs}
 \end{aligned}$$

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.

$$\begin{aligned}
 \text{Total taken to cover 80km at 40km/hr} &= \frac{80\text{km/hr}}{40\text{km}} \\
 &= 2\text{hrs}
 \end{aligned}$$

$$\begin{aligned}
 \text{Time taken to cover at 60km/hr} &= \frac{80\text{km/hr}}{60\text{km/hr}} \\
 &= 1 \frac{1}{3} \text{ km/hrs}
 \end{aligned}$$

$$\begin{aligned}
 \text{Total distance from A and B and back} &= 80\text{km} + 50\text{km} \\
 &= 160\text{km} \\
 &= 2\text{hrs} + 1 \frac{1}{3}\text{hrs} \\
 &= 3 \frac{1}{3}\text{hrs}.
 \end{aligned}$$

$$\begin{aligned}
 \text{Average speed} &= \frac{\text{total distance}}{\text{Total time}} \\
 &= \frac{160\text{km}}{3 \frac{1}{3}\text{hrs}} \\
 &= \frac{160\text{km}}{\frac{10}{3}\text{hrs}} \\
 &= 160\text{km} \times \frac{3}{10\text{hrs}} \\
 &= 16\text{km} \times 3 \\
 &= \frac{48\text{km}}{1\text{m}} \\
 &= \underline{\underline{48\text{km/hr}}}
 \end{aligned}$$

LESSON FOUR AND FIVE

AVERAGE SPEED INVOLVING STOPPAGES /RESTS.

Kato left town A driving at 75km/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.

$$\begin{aligned}
 \text{Distance} &= S \times T \\
 &= 75\text{km} \times 2\text{hrs} \\
 &\quad \text{hr} \\
 &= 75\text{km} \times 2 \\
 &= 150\text{km}
 \end{aligned}$$

How far is town B from town A.

$$\begin{aligned}
 \text{Distance covered after puncture} &= S \times T \\
 &= 60\text{km} \times \frac{15\text{hrs}}{60} \\
 &= 60\text{km} \times \frac{9}{4} \\
 &= 15\text{km} \times 9 \\
 &= 135\text{km}
 \end{aligned}$$

$$\begin{aligned}
 \text{Total distance} &= 150\text{km} + 135\text{km} \\
 &= 285\text{km}
 \end{aligned}$$

CALCULATE KATO AVERAGE SPEED FOR WHOLE JOURNEY.

Solution

$$\begin{aligned}
 \text{Total distance} &= 285\text{km} \\
 &= 2\text{hrs} + \frac{45\text{hrs}}{60} + 2\frac{1}{4}\text{hrs} \\
 &= 2\text{hrs} + \frac{3}{4}\text{hrs} + 2\frac{1}{4}\text{hrs} \\
 &= 2\text{hrs} + 2\text{hrs} + \frac{3}{4}\text{hrs} + \frac{1}{4}\text{hrs} \\
 &= 4\text{hrs} + 1\text{hr} \\
 &= 5\text{hrs}
 \end{aligned}$$

$$\begin{aligned}
 \text{Average speed} &= \frac{\text{total distance}}{\text{Total time}} \\
 &= \frac{285\text{km}}{5\text{hrs}} \\
 &= 57\text{km/hr}
 \end{aligned}$$

Town R and S are 120km apart. 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 arrive at R from S.

Solution

$$\text{Time taken from R to S} = \frac{120\text{km}}{60\text{km/hr}}$$

$$\begin{aligned} \text{Time he left S} &= 10:30\text{am} \\ &+ 1:00 \\ &= 11:30\text{am} \end{aligned}$$

$$\begin{aligned} \text{The time when he arrived at R} &= 11:30\text{am} \\ &+ 2:00 \\ &= 13:30 \end{aligned}$$

1:30pm

a) Calculate Okiror's average speed for the whole journey.

Solution

$$\text{Time taken from R to S} = 10:30\text{am} - 9:00\text{am}$$

Hrs	Min
10	30
- 9	00
1	30

$$= 1\text{hrs } 30\text{ minutes}$$

$$= 1\frac{1}{2}\text{ hrs}$$

$$\begin{aligned} \text{Total time} &= 1\frac{1}{2}\text{ hrs} + 2\text{hrs} + 1\text{hr} \\ &= 4\frac{1}{2}\text{ hrs} \end{aligned}$$

$$\begin{aligned} \text{Total distance} &= 120\text{km} + 120\text{km} \\ &= 240\text{km} \end{aligned}$$

$$\begin{aligned} \text{Average speed} &= \frac{\text{total distance}}{\text{total time}} \\ &= 240\text{km} \div 4 \frac{1}{2} \text{ hrs} \\ &= 240\text{km} \div \frac{9}{2}\text{hrs} \\ &= 240\text{km} \times \frac{2}{9\text{h}} \\ &= 480\text{km} \\ &\quad 9\text{hrs} \\ &= 53 \frac{1}{3}\text{km/hr} \end{aligned}$$

c) calculate okiror average speed for the whole journey while travelling.

$$\text{Total distance} = 240\text{km}$$

$$\begin{aligned} \text{Total time} &= 1 \frac{1}{2} \text{ hrs} + 2\text{hrs} \\ &= 3 \frac{1}{2} \text{ hrs} \end{aligned}$$

$$\begin{aligned} \text{Average speed} &= \frac{240\text{km}}{3 \frac{1}{2} \text{ hrs}} \\ &= \frac{240\text{km}}{7/2 \text{ hrs}} \\ &= 240\text{km} \times \frac{2}{7}\text{hrs} \\ &= 480\text{km} \\ &\quad 7\text{hrs} \\ &= 68 \frac{4}{7}\text{km/hr} \end{aligned}$$

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.

$$\text{Total number of words} = 27$$

$$1^{\text{st}} \text{ ten words cost sh.} = 1500$$

$$\begin{aligned} \text{Additional words} &= 27 - 10 \\ &= 17 \text{ words} \end{aligned}$$

$$\begin{aligned} \text{Cost of 17 words} &= 17 \times 200/= \\ &= 3400/= \end{aligned}$$

$$\begin{aligned} \text{Total cost of 27 words} &= 1500/= + 3400/= \\ &= 4900/= \end{aligned}$$

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

$$\begin{aligned} \text{Total number of words} &= 14 \\ \text{1}^{\text{st}} \text{ 5 words cost sh.} &= 700 \\ \text{Remaining words} &= 14 - 5 \\ &= 9 \\ \text{Cost of next 5 words} &= 5 \times 400/= \\ &= 2000/= \end{aligned}$$

$$\begin{aligned} \text{Remaining words} &9 - 5 = 4 \\ \text{Cost of 4 words} &= 4 \times 100/= \\ &= 400/= \end{aligned}$$

$$\begin{aligned} \text{Total cost of 14 words} &= 700/= + 200/= + 400/= \\ &= 3100/= \end{aligned}$$

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.

$$\begin{aligned} &\text{1 announcement} \\ \text{Total number of words} &= 55 \\ \text{Cost of 25 words} &= 100/= \\ \text{Remaining words} &= 55 - 25 \\ &= 30 \text{ words} \\ \text{Cost of 30 words} &= 30 \times 100/= \\ &= 3000/= \end{aligned}$$

$$\begin{aligned} \text{Total cost of 55 words} &= 3000/= + 100/= \\ &= 4000/= \end{aligned}$$

$$\begin{aligned} \text{Charge for 2 death announcements} &= 4000/= \times 2 \\ &= 8000/= \end{aligned}$$

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

THE GENERAL ELECTORAL 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 INCONVENIENCES DURING THE ELECTION DAY.
CHAIRMAN ELECTORAL COMMISSION.

$$\begin{aligned} \text{Total number of words} &= 44 \\ \text{Cost of 1}^{\text{st}} \text{ 25 words} &= 1500/= \\ \text{Remaining words} &= 44 - 25 \\ &= 19 \end{aligned}$$

$$\begin{aligned} \text{Cost of 19 words} &= 19 \times 200/= \\ &= 3800/= \end{aligned}$$

$$\begin{aligned} \text{Total cost of 44 words} &= 1500/= + 3800/= \\ &= 5300/= \end{aligned}$$

POSTAGE RATES .

1. Below are postage charges.

$$\begin{aligned} \text{1}^{\text{ST}} \text{ UNIT OR LESS (30G)} &= 600/= \\ \text{Each addition unit} &= 300/= \end{aligned}$$

$$\begin{aligned} \text{Printed papers} & \\ \text{1}^{\text{st}} \text{ unit or less (50g)} &= 300/= \\ \text{Each addition unit} &= 200/= \end{aligned}$$

a) Find cost of posting a letter weighing 175g

Solution

$$\begin{aligned}\text{Total number of units} &= 175\text{g} \\ & \quad 30\text{g} \\ &= 5 \frac{5}{6} \\ &= 6\text{units}\end{aligned}$$

$$\text{Cost of 1}^{\text{st}} \text{ unit} = 600/=$$

$$\begin{aligned}\text{Remaining units} &= 6 - 1 \\ &= 5\end{aligned}$$

$$\begin{aligned}\text{Cost of 5 units} &= 5 \times 300/= \\ &= 1500/= \end{aligned}$$

$$\begin{aligned}\text{Total cost of 6 words} &= 600/= + 1500/= \\ &= 2100/= \end{aligned}$$

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

Cost of a letter weighing 150g

$$\begin{aligned}\text{Total number of units in 150g} &= 150\text{g} \\ & \quad 30\text{g} \\ &= 5 \text{ units}\end{aligned}$$

$$\text{Cost of 1}^{\text{st}} \text{ unit} = 600/=$$

$$\begin{aligned}\text{Cost of 4 units} &= 4 \times 300 \\ &= 1200/= \end{aligned}$$

$$\begin{aligned}\text{Cost of 5 units} &= 600 + 1200 \\ &= 1500/= \end{aligned}$$

$$\text{Cost of printed papers weighing} = 300\text{g}$$

$$\begin{aligned}\text{Total number of units in 300g} &= \underline{300\text{g}} \\ & \quad 50\text{g} \\ &= 6 \text{ units}\end{aligned}$$

$$\begin{aligned}\text{Cost of 1}^{\text{st}} \text{ unit} &= 300/= \\ \text{Cost of 5 units} &= 5 \times 200/= \\ &= 1000/= \end{aligned}$$

$$\begin{aligned}\text{Total cost of 6 units} &= 1000/= + 300/= \\ &= 1300/= \end{aligned}$$

$$\begin{aligned}\text{Total cost of 2 printed papers each weighing 300g} &= 1300 \times 2 \\ &= 2600/= \end{aligned}$$

$$\begin{aligned}\text{Total cost} &= 1800/= \\ &+ 2600/= \\ &4400/= \end{aligned}$$