



# SUREKEY EXAMINATIONS BOARD

## PRE-PLE SUPER SERIES EXAMINATION

### 2023

### MATHEMATICS GUIDE

## PREPARED BY:









MR. MUBIRU SULAIMAN:

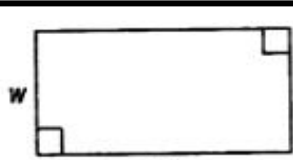
0700 758668

MR. BUMBA RONALD:

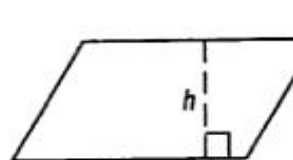
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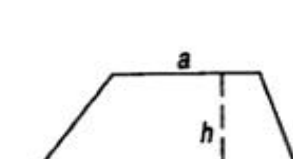
### POLYGONS ATTRIBUTE

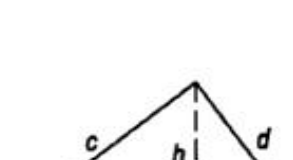
POLYGONS	No. of Sides	Angle	No. of Vertices	No. of Diagonals
TRIANGLE 	3	60°	3	0
SQUARE 	4	90°	4	2
PENTAGON 	5	108°	5	5
HEXAGON 	6	120°	6	9
HEPTAGON 	7	128.6°	7	14
OCTAGON 	8	135°	8	20
NONAGON 	9	140°	9	27
DECAGON 	10	144°	10	35
n-GON	n	$(n-2) \times 180$ n	n	$\frac{n(n-3)}{2}$



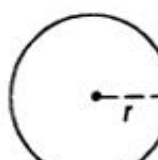
$$P = 2l + 2w$$

$$A = lw$$


$$A = bh$$


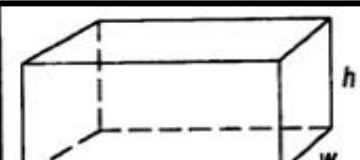
$$A = \frac{1}{2}h(a + b)$$


$$P = b + c + d$$


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


$$C = 2\pi r$$

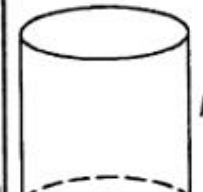
$$A = \pi r^2$$




$$SA = 2lw + 2lh + 2wh$$

$$V = lwh$$


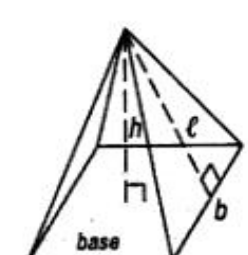
$$SA = 4\pi r^2$$

$$V = \frac{4}{3}\pi r^3$$


$$SA = 2\pi r^2 + 2\pi rh$$

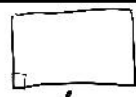
$$V = \pi r^2 h$$


$$SA = \pi r^2 + \pi r \sqrt{r^2 + h^2}$$


$$V = \frac{1}{3}\pi r^2 h$$


$$SA = (\text{Area of the base}) + \frac{1}{2} \ell (\text{number of base sides})(b)$$

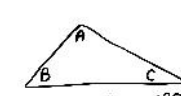
$$V = \frac{1}{3} (\text{Area of the base}) \times h$$




$$P = 2l + 2w$$

$$A = lw$$


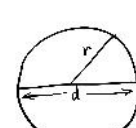
$$P = 4s$$

$$A = s^2$$



$$P = a + b + c$$

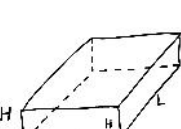
$$A = \frac{1}{2}bh$$



$$P = 2a + 2b$$

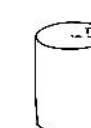
$$A = bh$$


$$C = 2\pi r$$


$$A = \pi r^2$$


$$V = \frac{4}{3}\pi r^3$$


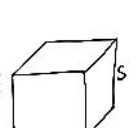
$$V = \pi r^2 h$$


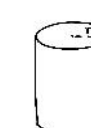
$$V = \frac{1}{3}\pi r^2 h$$



$$SA = 2\pi r^2 + 2\pi rh$$



$$P = a + b + c$$

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


$$V = s^3$$


$$V = \pi r^2 h$$


$$SA = 2\pi r^2 + 2\pi rh$$

## SECTION A: 40 MARKS

Answer **all** questions in this Section

Questions **1** to **20** carry two marks each

1. Workout:  $16 - 4$ .

$16 - 4 = 12$		$\begin{array}{r} \text{OR} \\ 16 \\ - 4 \\ \hline 12 \end{array}$
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2. Round off 4613 to the nearest hundreds.

$$\begin{array}{r} 4613 \\ + 0 \\ \hline 4600 \end{array}$$

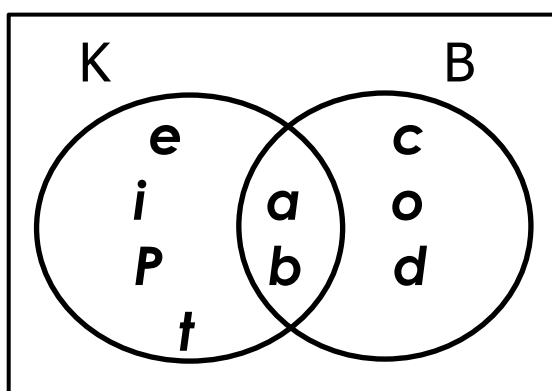
$4613 \approx 4600$

3. Workout:  $5 - 1\frac{1}{4}$ .

$\begin{array}{r} 5 - \frac{5}{4} \\ \frac{5}{1} - \frac{5}{4} \\ \hline \frac{20 - 5}{4} \\ \frac{15}{4} \end{array}$	=	$3\frac{3}{4}$
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$\begin{array}{r} \text{OR} \\ \sqrt{\phantom{00}} \\ 5 - (1 + 1) + \frac{4}{4} - \frac{1}{4} \\ (5 - 2) + \frac{4 - 1}{4} \\ 3 + \frac{3}{4} \\ 3\frac{3}{4} \end{array}$	<p><i>Remember <math>\frac{1}{4}</math> is part of a whole</i></p> <p><i>That is why we are adding another whole</i></p>
--	--

4. Use the Venn diagram below to find  $n(K \cap B)'$ .



$$(K \cap B)' = \{e, i, p, t, c, o, d\}$$

$$\underline{\underline{n(K \cap B)' = 7}}$$

5. Find the next number in the sequence:

11, 15, 21, 29, 38, .....<sup>48</sup>.....

$$11 + 4 = 15$$

$$15 + 6 = 21$$

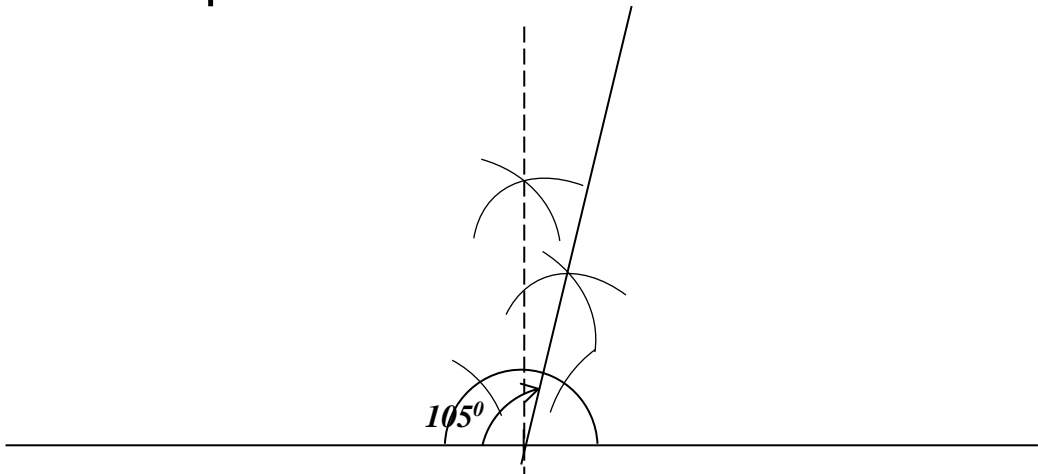
$$21 + 8 = 29$$

$$29 + 9 = 38$$

$$38 + 10 = 48$$

*Adding composite numbers*

6. Using a pair of compasses, ruler and pencil only, construct an angle of  $105^\circ$  in the space below.



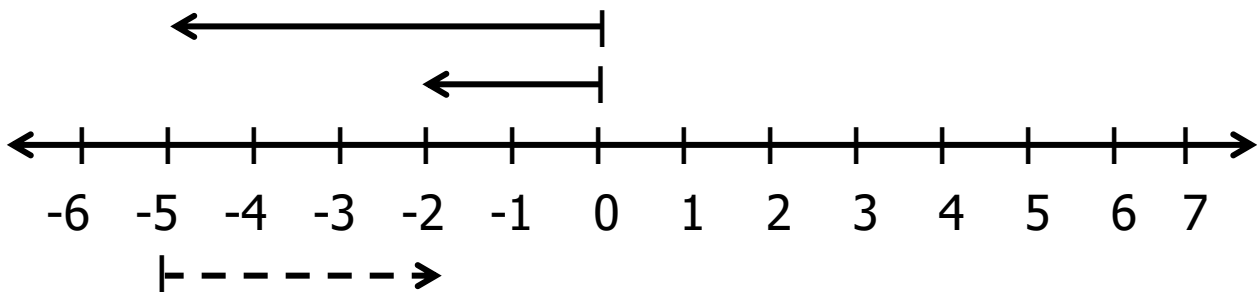
7. A car uses 4 litres of petrol every day. How many  $\frac{1}{4}$  litre bottles of petrol does the car use in the day?

$$\begin{aligned} \text{Number of litres} &= 4 \div \frac{1}{4} \\ &= 4 \times \frac{4}{1} \\ &= 16 \\ \therefore \text{The cars uses } 16 \frac{1}{4} \text{ litre bottles} \end{aligned}$$

8. Simplify:  $8 - 3(m + 5)$ .

$$\begin{aligned} &8 - (3 \times m) - (3 \times 5) \\ &8 - 3m - 15 \\ &8 - 15 - 3m \\ &= \underline{\underline{-7 - 3m}} \end{aligned}$$

9. Write the mathematical statement shown on the number line below.



$$^{-}2 - ^{-}5 = ^{+}3$$

10. The total mass of 4 girls is 146kg. The average weight of three of them is 36.1kg. Find the mass of the fourth girl.

Total mass of three girls

= 36 . 1

x 3

108 . 3kg

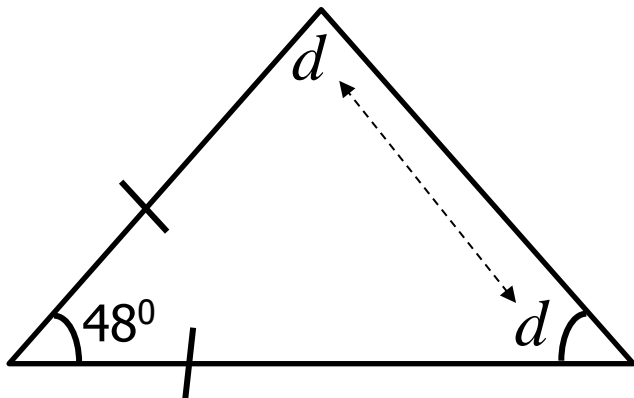
Mass of fourth girl

= 146 . 0

- 108 . 3

37 . 7kg

11. Find the size of angle marked *d* in the figure below



$d + d + 48^0 = 180^0$

(int <sum of a triangle)

$2d + 48^0 = 180^0$

$2d + 48^0 - 48^0 = 180^0 - 48^0$

$2d = 132^0$

$\frac{2d}{2} = \frac{132^0}{2}$

$d = 66^0$

12. Solve for *y*:  $3^y \times 3^2 = 27$ .

$3^y \times 3^2 = 27$

$3^y \times 3^2 = 3^3$

$3^{(y + 2)} = 3^3$

$y + 2 = 3$

$y + 2 - 2 = 3 - 2$

$y = 1$

3	27
3	9
3	3
	1

13. Given the exchange rates below,  
1 USD costs Ugsh.3,600.  
1 Ksh costs Ugsh.36.  
Workout the cost of a mattress in US dollar if it costs Ksh.14,000.

buying rate

x amount

selling rate

USD (~~Ugsh. 36~~) x 14000

(Ugsh. 3600)

USD 140

OR

Cost in Ugsh

36 x 14000

Ugsh.504000

Cost in USD

Ugsh.504000

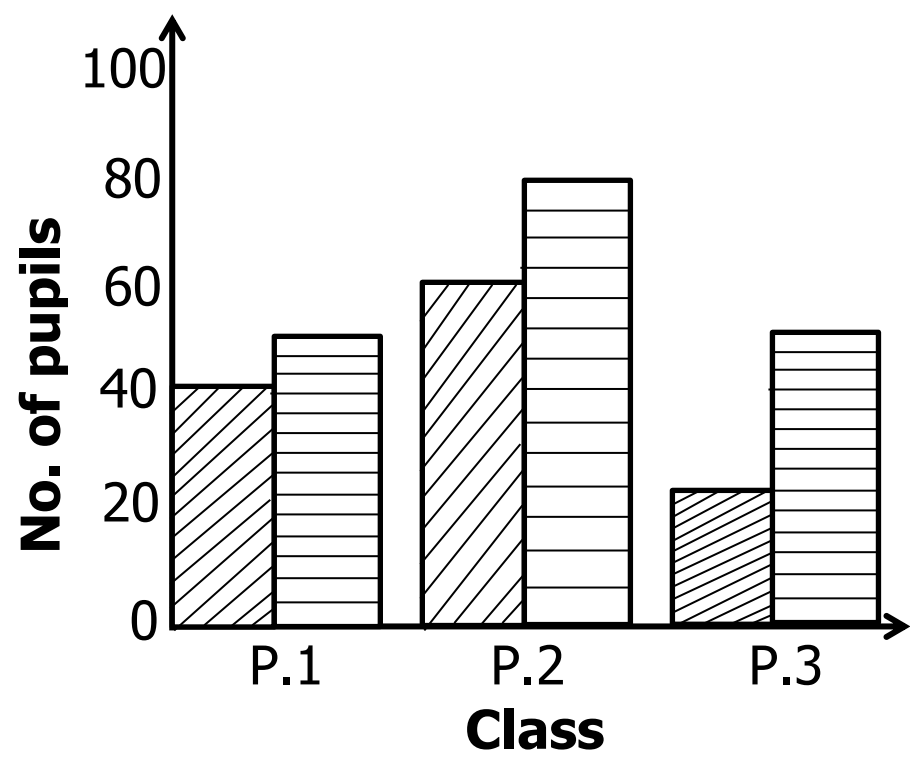
Ugsh. 3600

USD 140

14. Use distributive property to workout:  $(8 \div 3) + (10 \div 3)$ .

$$\begin{array}{r} (8 + 10) \div 3 \\ 18 \div 3 \\ \hline 6 \end{array}$$

15. The graph below shows the number of pupils, boys and girls respectively in the Lower section of Habanomu Junior School.



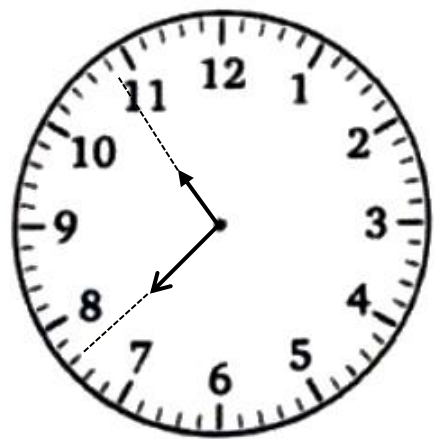
Express the number of pupils in P.2 as a percentage of the total number of pupils in Lower primary.

<u>Number of pupils in P.1</u>	<u>Total number of pupils in school</u>	<u>Percentage of P.2</u>
$40 + 50$ 90 pupils	140	$\frac{140}{300} \times 100\%$
<u>Number of pupils in P.2</u> $60 + 80$ 140pupils	90 <u>+ 70</u> 300pupils	$\frac{140}{300} \times 100\%$
<u>Number of pupils in P.3</u> $20 + 50$ 70 pupils		$46\frac{2}{3}\%$

16. Trees are planted along a straight road at intervals of 10m. Find the distance from the first to the eleventh pole. **OR**

$Distance = Number\ of\ spaces \times interval$ $= (11 - 1) \times 10m$ $= 10 \times 10m$ <u><math>= 100m</math></u>	$Distance = (Position - 1) \times interval$ $= (11 - 1) \times 10m$ $= 10 \times 10m$ <u><math>= 100m</math></u>
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17. Use the clock face below to show 22 minutes to 11 o'clock.



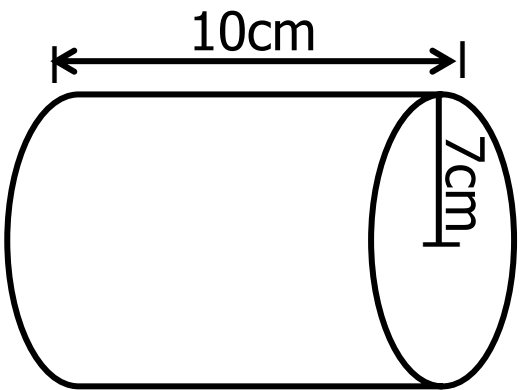
18. Today is Monday, term three starts. It will end after 74 days from today. On which day of the week will the term end?

$$\begin{aligned} \text{Mon} + 74 &= \dots (\text{mod}7) \\ 1 + 74 &= \dots (\text{mod}7) \\ 75 &= \dots (\text{mod}7) \\ \frac{75}{7} &= 10 \text{ rem } 5 (\text{mod}7) \\ &= 5(\text{mod}7) \end{aligned}$$

5 represents Friday

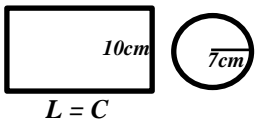
∴ The term will end on Friday

19. Calculate the total surface area of the cylinder below. (Use  $\pi$  as  $\frac{22}{7}$ )



$$\begin{aligned} TSA &= \pi r^2 + 2\pi rh \\ &= \left(\frac{22}{7} \times 7 \times 7\right) + \left(2 \times \frac{22}{7} \times 7\right) \times 10 \\ &= 154 + 440 \\ &= \underline{594\text{cm}^2} \end{aligned}$$

OR



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

Area of rectangular sheet

$$\begin{aligned} \text{Area} &= L \times W \\ &= 44\text{cm} \times 10\text{cm} \\ &= 440\text{cm}^2 \end{aligned}$$

Area of two circles

$$\begin{aligned} A &= \pi r^2 \\ &= \frac{22}{7} \times 7\text{cm} \times 7\text{cm} \\ &= 22\text{cm} \times 7\text{cm} \\ &= 154\text{cm}^2 \end{aligned}$$

Total surface area

$$\begin{aligned} &440\text{cm}^2 + 154\text{cm}^2 \\ &\underline{594\text{cm}^2} \end{aligned}$$

20. The product of two numbers is 54. The LCM of the two number is 18. Find their GCF.

$$\begin{aligned} \text{Product of numbers} &= \text{LCM} \times \text{GCF} \\ \frac{54}{18} &= \frac{18 \times \text{GCF}}{18} \\ 3 &= \text{GCF} \\ \text{GCF} &= 3 \end{aligned}$$

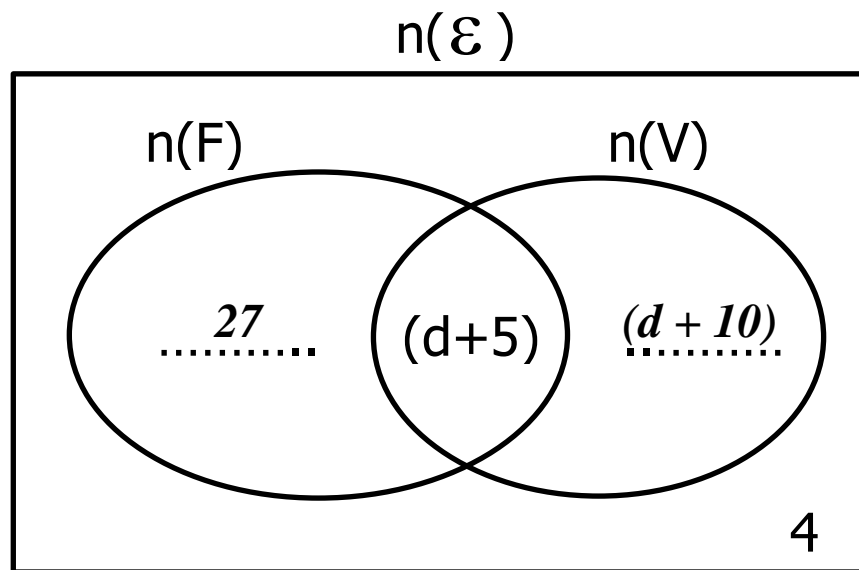
## SECTION B: 60 MARKS

Answer **all** questions in this section

Marks for each question are indicated in brackets.

21. In a market, 27 traders sell Fruits (F) only.  $(d+10)$  traders sell vegetables (V) only.  $(d+5)$  traders sell both Fruits and Vegetables, while 4 traders sell other items.

- (a) Complete the Venn diagram below using the above information. (02 Marks)



- (b) If 29 traders sell vegetables, find the value of  $d$ ? (02 Marks)

$$\begin{aligned}
 (d+10) + (d+5) &= 29 \\
 d + d + 10 + 5 &= 29 \\
 2d + 15 &= 29 \\
 2d + 15 - 15 &= 29 - 15 \\
 2d &= 14 \\
 \frac{2d}{2} &= \frac{14}{2} \\
 d &= 7
 \end{aligned}$$

- (c) How many traders sell only one item? (01 Mark)

$$\begin{aligned}
 (d+10) + 27 \\
 (7+10) + 27 \\
 17 + 27 \\
 44
 \end{aligned}$$

$\therefore 44$  traders sell only one item

22. (a) Add:  $\begin{array}{r} \overset{1}{1} \ \overset{1}{2} \ 1\text{three} \\ + \ 2 \ \underline{2}\text{three} \\ \hline 2 \ 2 \ 0 \ \text{three} \end{array}$  

$1 + 2 = 3$   
 $3 \div 3 = 1 \text{ rem } 0$   
 $1 + 2 + 2 = 5$   
 $5 \div 3 = 1 \text{ rem } 2$   
 $1 + 1 = 2$

 (02 Marks)

- (b) Given that  $101_k = 1101_{\text{three}}$ . Find the value of the base represented by letter **k**. (03 Marks)

$$\begin{aligned}
 (1 \times k^2) + (0 \times k^1) + (1 \times k^0) &= (1 \times 3^3) + (1 \times 3^2) + (0 \times 3^1) + (1 \times 3^0) \\
 (1 \times k^2) + (0 \times k) + (1 \times 1) &= (1 \times 3 \times 3 \times 3) + (1 \times 3 \times 3) + (0 \times 3) + (1 \times 1) \\
 k^2 + 0 + 1 &= 27 + 9 + 0 + 1 \\
 k^2 + 1 &= 37 \\
 k^2 + 1 - 1 &= 37 - 1 \\
 k^2 &= 36 \\
 k^2 &= 36 \\
 k &= 6 \\
 k &= \text{base six}
 \end{aligned}$$

Accept other correct approaches

23. A trader bought 120 mangoes at Sh.120 per mango and 30 oranges at Sh.400 each. He later sold each mango at Sh.150 and each orange at Sh.500. Calculate the percentage profit the trader made. (04 Marks)

<u>Cost of mangoes</u> Sh. 120 x 120 Sh. 14400	<u>Selling price of mangoes</u> Sh. 120 x 150 Sh. 18000	<u>profit</u> S.P – B.P Sh. 33000 – sh. 26400 Sh. 6600
<u>Cost of oranges</u> Sh.400 x 30 Sh.12000	<u>Selling price of oranges</u> Sh.500 x 30 Sh.15000	<u>Percentage profit</u> <del>Sh. 6600</del> x 100% <del>Sh.26400</del> = 25%
<u>Total cost of the two items</u> Sh. 14400 + sh.12000 Sh. 26400	<u>Selling price of the two items</u> Sh. 14400 + sh.12000 Sh. 33000	

OR

<u>Cost of mangoes</u> Sh. 120 x 120 Sh. 14400	<u>profit on mangoes</u> sh. 120 x (sh. 150 – sh 120) 120 x sh. 30 sh. 3600	<u>Percentage profit</u> <del>Sh. 6600</del> x 100% <del>Sh.26400</del> = 25%
<u>Cost of oranges</u> Sh.400 x 30 Sh.12000	<u>profit in oranges</u> 30 x (sh.500 – sh100) 30 x sh. 100 sh.3000	
<u>Total cost of the two items</u> Sh. 14400 + sh.12000 Sh. 26400	<u>total profit</u> sh. 3000 + sh.3600 sh. 6600	



24. Nantongo bought the following from the market.

Item	Quantity	Unit Cost	Amount
Pineapples	4 pineapples	Sh.5,000 for every 2 pineapples	Sh...10000...
Rice	.....3.....kg	Sh.8,000 per kg	Sh.24,000
Cooking oil	500ml	Sh. ....8000...per litre	Sh.4,000
TOTAL EXPENDITURE			Sh. ....38000...

(a) Complete the table above. (04 Marks)

<u>pineapples</u> $\frac{4}{2} \times \text{sh. } 5000$ $\text{sh. } 4 \times 2500$ $\text{sh. } 10000$	<u>rice</u> $\frac{\text{sh. } 24000}{3}$ $\text{sh. } 8000$	<u>cooking oil</u> $\text{sh. } 4000 \div \frac{500\text{ml}}{1000\text{ml}}$ $\text{sh. } 4000 \times \frac{1000^2}{500}$ $\text{sh. } 4000 \times 2$ $\text{sh. } 8000$	<u>total expenditure</u> $\text{sh. } 24000$ $\text{sh. } 10000$ $\text{sh. } 4000$ $+ \text{sh. } 38000$
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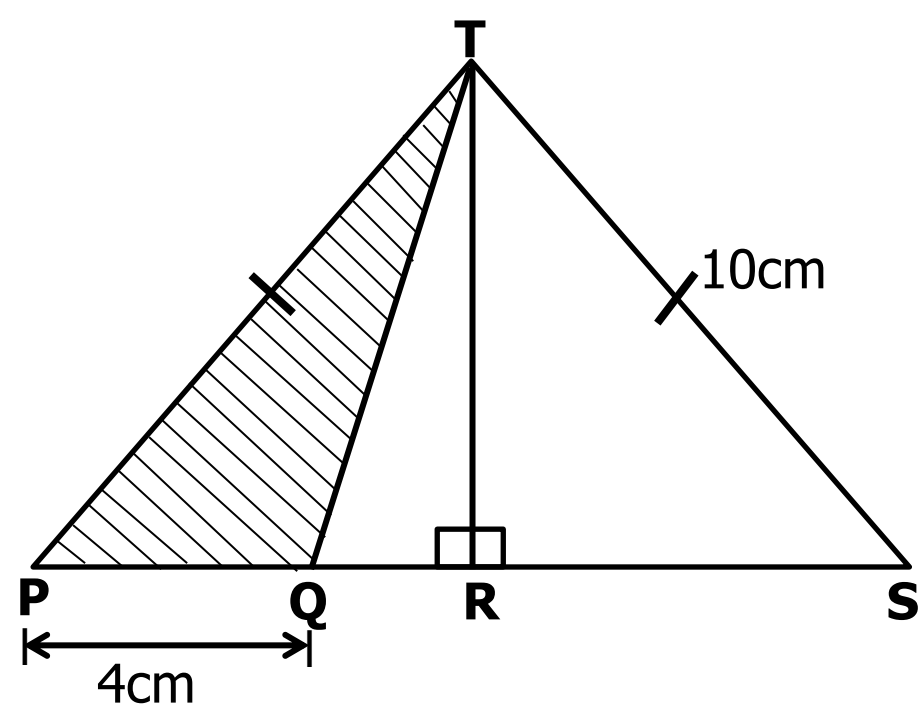
(b) If Nantongo was given a discount of 10%, how much discount was she given? (01 Mark)

$$\begin{aligned} &\frac{10}{100} \times \text{sh. } 38000 \\ &10 \times \text{sh. } 380 \\ &\text{Sh. } 3800 \\ &\text{She was given sh. } 3800 \end{aligned}$$

25. The interior angle of a regular polygon is 20% more than its exterior angle. Name the polygon. (05 Marks)

<u>Let the exterior angle be y</u>  <u>Interior angle will be;</u> $y + 20\%$  $y + y + 20\% = 100\%$ $2y + 20\% = 100\%$ $2y + 20\% - 20\% = 100\% - 20\%$ $2y = 80\%$ $\frac{2y}{2} = \frac{80\%}{2}$ $y = 40\%$	<u>Exterior angle</u>  $\frac{40}{100} \times 180^\circ$ $4 \times 18$ $72^\circ$  <u>Number of sides</u> $\frac{360^\circ}{72^\circ}$ $5 \text{ sides}$ <u>Pentagon</u>
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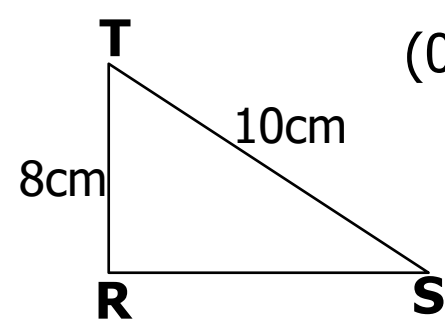
26. PST is an isosceles triangle. The area of the shaded part is 16cm<sup>2</sup>. Study and carefully use it to answer the questions that follow.



(a) Find the length of **QR**. (04 Marks)

Height (TR)

$\frac{b \times h}{2}$	=	A
$\frac{4cm \times h}{2}$	=	16cm <sup>2</sup>
$\frac{4cm \times h}{2} \times 2$	=	16cm <sup>2</sup> x 2
4cm x h	=	32cm <sup>2</sup>
$\frac{4cm \times h}{4cm}$	=	$\frac{32cm \times cm}{4cm}$
h	=	8cm



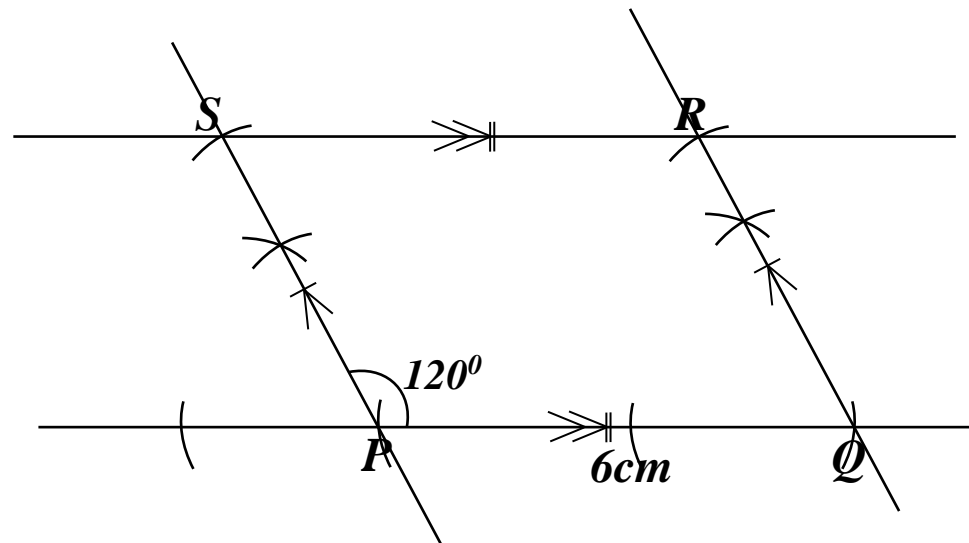
a <sup>2</sup>	=	c <sup>2</sup> - b <sup>2</sup>
a <sup>2</sup>	=	(10cm) <sup>2</sup> - (8cm) <sup>2</sup>
a <sup>2</sup>	=	(10 x 10) - (8 x 8)
a <sup>2</sup>	=	100 - 64
$\frac{a^2}{\sqrt{a^2}}$	=	$\frac{36}{\sqrt{36}}$
a	=	6cm
RS	=	6cm
RS	=	PR
PR	=	6cm
QR	=	6cm - 4cm
	=	<u>2cm</u>

(b) Workout the perimeter of triangle **PST**. (02 Marks)

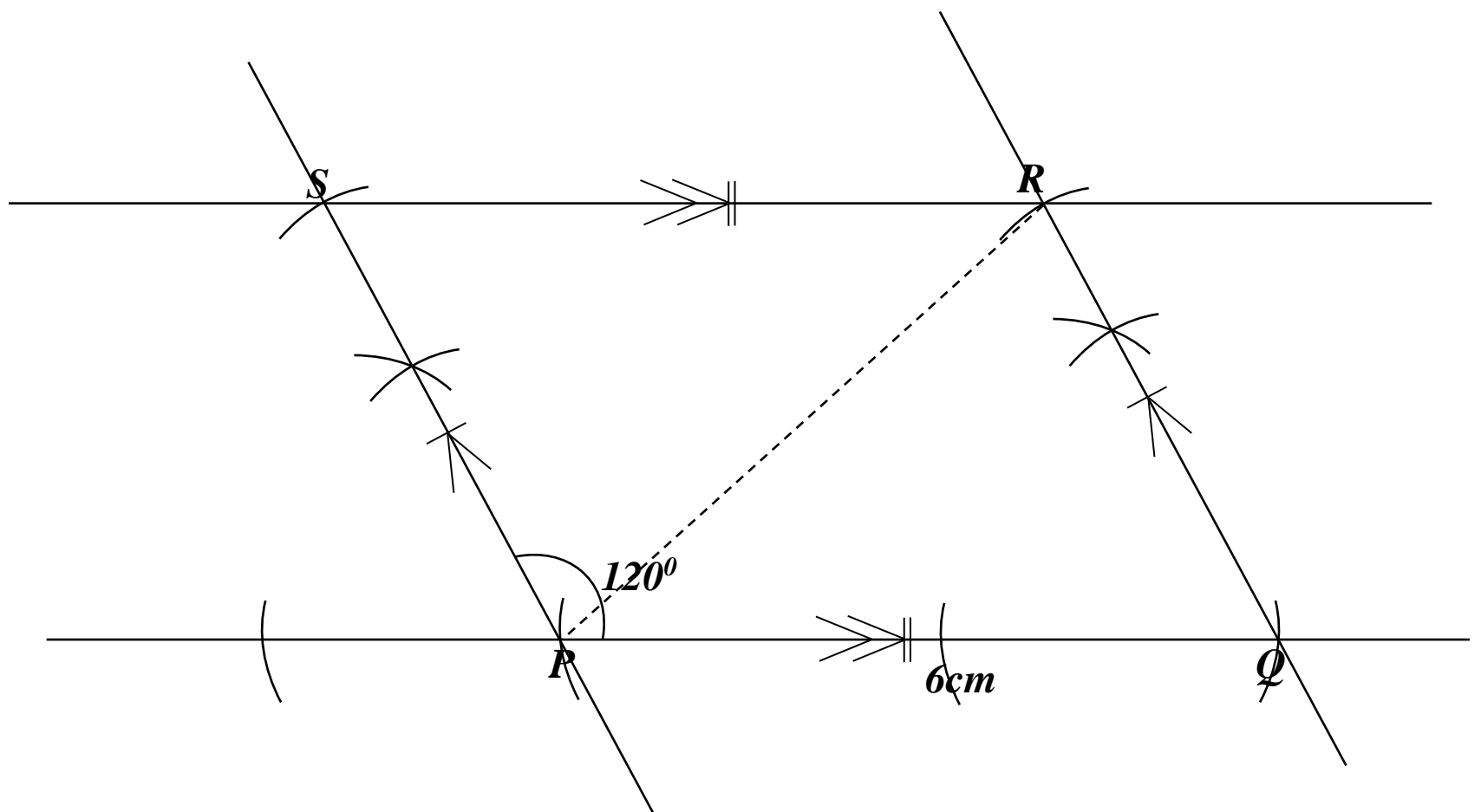
Perimeter	=	sum of all sides
	=	10cm + 10cm + (6cm + 6cm)
	=	20cm + 12cm
	=	32cm

27. (a) Using a pair of compasses, a ruler and a pencil only, construct a parallelogram PQRS where PQ = 6cm, angle SPQ =  $120^\circ$  and QR = 4cm. (04 Marks)

**SKETCH**



**ACCURATE DRAWING**



- (b) Draw diagonal PR and measure angle PRQ. ....  $79^\circ$ ,  $80^\circ$ ,  $81^\circ$  (01 Mark)

28. (a) Solve for  $x$ :  $\frac{3x}{5} + 7 = x - 9.$  (03 Marks)

$$\begin{aligned} \frac{3x}{5} \times 5 + 7 \times 5 &= 5(x - 9) \\ 3x + 35 &= 5x - 45 \\ 3x + 35 - 35 &= 5x - 45 - 35 \\ 3x &= 5x - 80 \\ 3x - 5x &= 5x - 5x - 80 \\ \frac{+2x}{+2} &= \frac{+80}{+2} \\ x &= 40 \end{aligned}$$

(a) Find the solution set for  $t$ :  $2 - 2t \leq 8.$  (03 Marks)

$$\begin{aligned} 2 - 2 - 2t &\leq 8 - 2 \\ -2t &\leq 6 \\ \frac{+2t}{+2} &\geq \frac{6}{2} \\ t &\geq -3 \\ t:t &= \{-3, -2, -1, \dots\} \end{aligned}$$

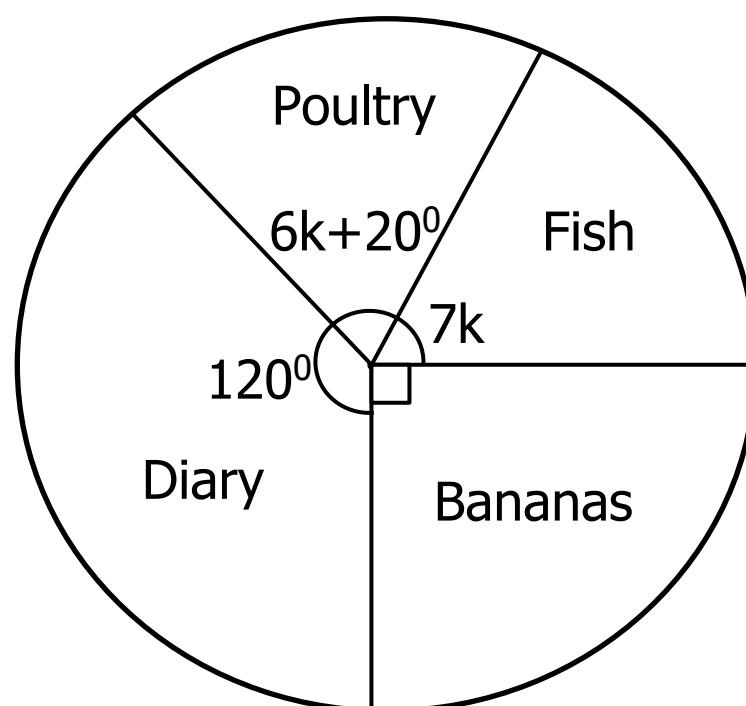
29. (a) Workout:  $3.61 - 0.89$  (02 Marks)

$\begin{array}{r} \overset{2}{3}.\overset{51}{61} \\ - 0.89 \\ \hline 2.72 \end{array}$		$\begin{array}{r} \text{OR} \\ \underline{361} - \underline{89} \\ 100 \quad 100 \\ \underline{361 - 89} \\ 100 \\ 272 \\ 100 \\ \underline{2.72} \end{array}$
---	--	--

(b) Simplify:  $\frac{3}{4} \div 1\frac{1}{2} - \frac{1}{4}$  (03 Marks)

$$\begin{aligned} \frac{3}{4} \div \frac{3}{2} - \frac{1}{4} \\ \overset{1}{\frac{3}{4}} \times \overset{2}{\frac{2}{3}} - \frac{1}{4} \\ \frac{1}{2} - \frac{1}{4} \\ \frac{2-1}{4} \\ \frac{1}{4} \end{aligned}$$

30. The Pie-Chart below shows how a farmer earns from his farm monthly.



(a) Find the value of  $k$ . (02 Marks)

$$\begin{aligned}
 (6k + 20^\circ) + 7k + 120^\circ + 90^\circ &= 360^\circ \\
 6k + 7k + 20^\circ + 120^\circ + 90^\circ &= 360^\circ \\
 13k + 230^\circ &= 360^\circ \\
 13k + 230^\circ - 230^\circ &= 360^\circ - 230^\circ \\
 13k &= 130^\circ \\
 \frac{13k}{13} &= \frac{130^\circ}{13} \\
 k &= 10^\circ
 \end{aligned}$$

(b) If he earns Sh.630,000 from dairy and bananas. Calculate his monthly earnings. (02 Marks)

diary + bananas

$$\begin{aligned}
 90^\circ + 120^\circ \\
 210^\circ
 \end{aligned}$$

monthly earning

$$\text{sh. } 630000 \div \frac{210^\circ}{360^\circ}$$

$$\text{sh. } 630000 \times \frac{360^\circ}{210^\circ}$$

$$\text{sh. } 3000 \times 360$$

$$\text{sh. } 1080000$$

Accept other approaches

31. Sulaiman drove from Kampala to Mbale at an average speed of 72km/hr for  $2\frac{1}{2}$  hrs. He then drove back to Kampala using the same route at a speed which was 18km/hr more than the first journey.

(a) How far is Mbale from Kampala?

(02 Marks)

Distance from Kampala to Mbale

$$\begin{aligned}
 &= S \times T \\
 &= \frac{72\text{km}}{\text{hr}} \times 2\frac{1}{2} \text{ hr} \\
 &= 72 \times \frac{5}{2} \\
 &= 36 \times 5 \\
 &= \underline{\underline{180\text{km}}}
 \end{aligned}$$

(b) Calculate Sulaiman's average speed for the whole journey.

(03 Marks)

speed used on the second journey

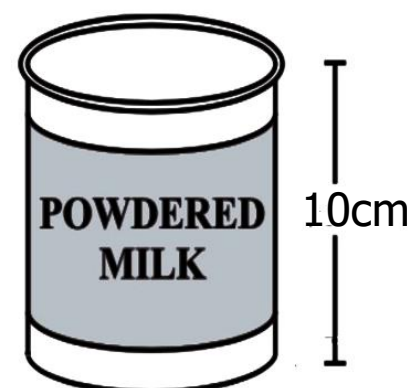
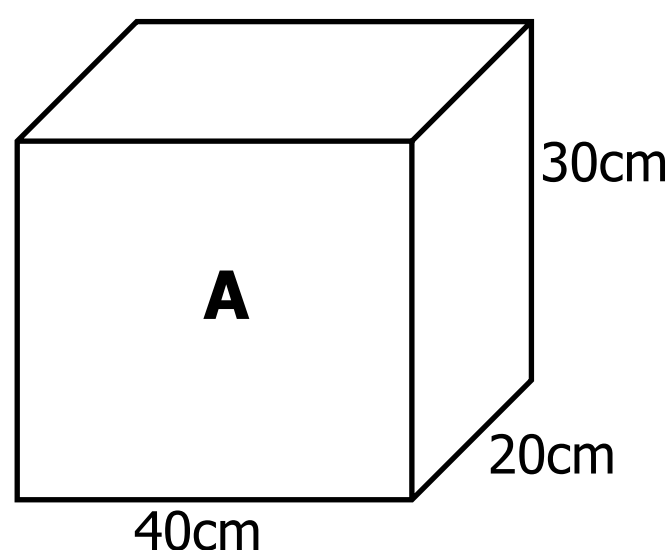
$$\begin{aligned}
 &= 72\text{km/hr} + 18\text{km/hr} \\
 &= 90\text{km/hr}
 \end{aligned}$$

time for the second journey

$$\begin{aligned}
 &= \frac{d}{s} \\
 &= \frac{180\text{km}}{90\text{km/hr}} \\
 &= 180\text{km} \times \frac{\text{hr}}{90\text{km}} \\
 &= 2\text{hrs}
 \end{aligned}$$

$$\begin{aligned}
 \text{average speed} &= \frac{TDC}{TTT} \\
 &= \frac{180\text{km} \times 2}{(2\text{hr} + 2\frac{1}{2}\text{hr})} \\
 &= 360\text{km} \div 4\frac{1}{2}\text{hr} \\
 &= 360\text{km} \div \frac{9\text{hr}}{2} \\
 &= 360\text{km} \times \frac{2}{9\text{hr}} \\
 &= 40\text{km} \times \frac{2}{\text{hr}} \\
 &= 80\text{km/hr}
 \end{aligned}$$

32. Box (**A**), 40cm long, 20cm wide and 30cm high was packed with 4 small cylindrical tins of powdered milk of height 10cm. After packing all the tins, a space of 17840cm<sup>3</sup> remained in the box.



- (a) Calculate the volume of each tin. (03 Marks)

Volume of Box A

$$\begin{aligned} V &= L \times W \times H \\ V &= 40\text{cm} \times 20\text{cm} \times 30\text{cm} \\ V &= 24000\text{cm}^3 \end{aligned}$$

Volume of 4 tins

$$\begin{array}{r} 24000\text{cm}^3 \\ - 17840\text{cm}^3 \\ \hline 6160\text{cm}^3 \end{array}$$

Volume of each tin

$$\begin{array}{r} 1540 \\ \underline{6160\text{cm}^3} \\ 4 \\ \hline 1540\text{cm}^3 \end{array}$$

- (b) Find the radius of the tin. (Use as  $\frac{22}{7}$ ) (02 Marks)

$$\begin{aligned} \pi r^2 h &= v \\ \frac{22r^2 \times 10\text{cm}}{7} &= 1540\text{cm}^3 \\ \frac{7 \times 220r^2}{7} &= 1540\text{cm}^3 \times 7 \\ \frac{220r^2 \text{cm}}{220\text{cm}} &= \frac{1540 \times 7 \times \text{cm} \times \text{cm} \times \text{cm}}{220\text{cm}} \\ \frac{r^2}{\cancel{\sqrt{r^2}}} &= \frac{7 \times 7\text{cm}^2}{\cancel{\sqrt{49\text{cm}^2}}} \\ r &= 7\text{cm} \end{aligned}$$

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