



**MAGIC EXAMINATIONS BOARD**  
**PRE PRIMARY LEAVING EXAMINATION**  
**2022**  
**MATHEMATICS**

**Time allowed: 2 hours 30 minutes**

Index No.	<b>Random No.</b>	<b>Personal No.</b>
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**Candidate's name :** .....

**Candidate's signature :** .....

**School Random number :** .....

**District No.**

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**Read the following instructions carefully:**

1. Do not write your **school** or **district name** anywhere on this paper.
2. This paper has two sections **A** and **B**.  
Section **A** has **20 questions** and Section **B** has **12 questions**. This paper has **15 printed pages** altogether.
3. Answer **all** questions. All the working for both sections **A** and **B** must be shown in the spaces provided.
4. **All** working must be done using a **blue** or **black** ball point pen or ink. Any work written in pencil will **NOT** be marked except drawings and diagrams.
5. **No calculators** are allowed in the examination room
6. Unnecessary **changes** in your work and handwriting that cannot be easily read may lead to **loss of marks**.
7. Do not fill anything in the table indicated:  
**"For Examiners' use only"** and the boxes inside the question paper.

FOR EXAMINERS' USE ONLY		
Qn. No.	MARKS	EXR'S No.
1 - 5		
6 - 10		
11 - 15		
16 - 20		
21 - 22		
23 - 24		
25 - 26		
27 - 28		
29 - 30		
31 - 32		
TOTAL		

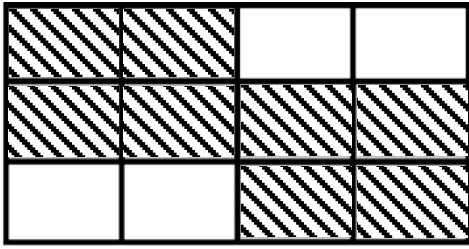
## SECTION A: 40 MARKS

*Answer **all** questions in this section*

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

1. Work out:  $34 \times 2$
  
  
  
  
  
  
  
  
  
  
2. Write "Ninety thousand, eight" in figures
  
  
  
  
  
  
  
  
  
  
3. Given that set P has 31 proper subsets. Find the number of subsets in set P.
  
  
  
  
  
  
  
  
  
  
4. Simplify:  $^+5 - ^+7$

5. Write in lowest term, the fraction of the un shaded parts in the drawing below.



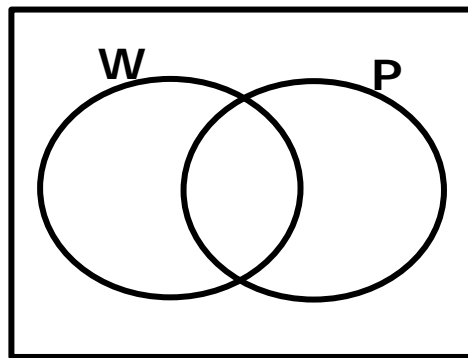
6. Convert 750 cubic centimetres into litres

7. Use distributive property to work out:  $(6 \div 7) + (134 \div 7)$

8. Ayo went sleeping at 25 minutes to midnight. Write this time in 24 hour clock system.

9. In a box, there are blue and red pens. The probability of picking a red pen from the box is  $\frac{3}{7}$ . The bag contains 24 blue pens. Find the total number of pens in the box.

10. On the Venn diagram below, shade  $(W \cap P)'$



11. Simplify:  $3k - 5f - 2k - 3f$

12. Find the next number in the sequence;

-3, -5, -8, -13, -20, .....

13. A tank was 0.8 full of water, 0.75 of the water in the tank was used. What fraction of water remained in the tank?
14. Calculate the circumference of a circle whose radius is 21m.  
(Take  $\pi = \frac{22}{7}$ )
15. Using a ruler, a pair of compasses and a pencil only, construct an angle of  $135^\circ$  in the space provided below.

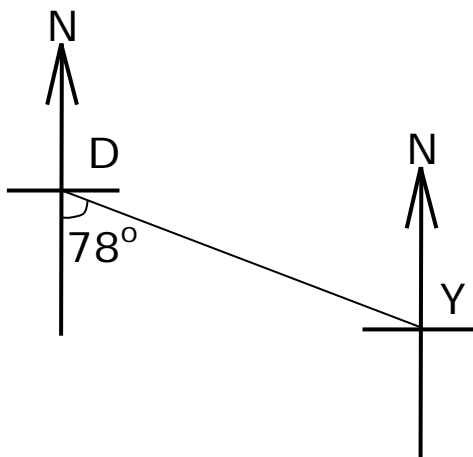


16. The average mass of 4 candidates is 34 kilogrammes. When Mr.Otayi joins them, the average mass becomes 40 kilogrammes. Find in kilogrammes Mr. Otayi's mass.

17. Solve the inequality:  $3 \geq 7 - 2h$

18. A pupil paid sh 5,000 for 3 pens and 4 books. The cost of each book was sh 800. Find the cost of each pen.

19. Use the diagram below to find the bearing of town **D** from town **Y**



20. A bus covered 126 kilometres in 1 hour 24 minutes. Express its speed in metres per second.



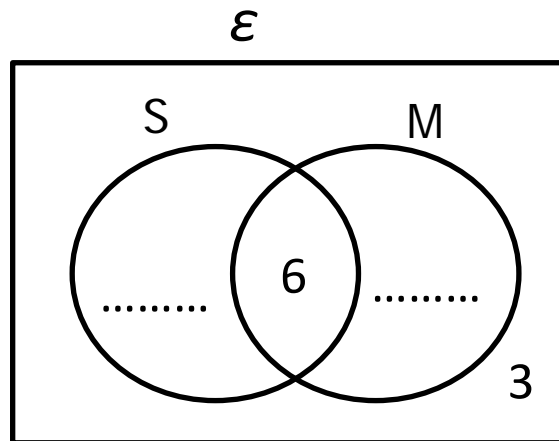
## SECTION B: 40 MARKS

*Answer all questions in this section*

*Marks for each question are indicated in brackets*

21. In a class, 10 pupils like science (S), 6 pupils like both science and mathematics (M), 4 like only one subject while 3 pupils like neither of the two subjects.

- (a) Use the given information to complete the Venn diagram below  
(02 marks)



- (b) Given that 10 pupils do not like science, find the number of pupils who like only one subject.  
(02 marks)

22. The table below shows how different types of crops are bought and sold on a certain village store. Use it to answer questions that follow.

Type of crop	Buying	Selling
1kg of coffee	sh. 3,550	sh. 3,600
1kg of maize	sh. 850	sh. 870
1kg of beans	sh. 1,250	sh. 1,300

- (a) One day, the store keeper made a profit of sh. 39000 on beans. Find in kilograms, the mass of beans sold. (02 marks)
- (b) Ruto had 174 kilograms of coffee. He exchanged them for maize. The maize was packed in sacks which hold 142kg each. How many sacks did he get? (03 marks)





23. (a) Given that:  $\frac{1.2 \times k}{3.2 - 2.96} = 0.8$

Find the value of k

(03 marks)

(b) Express 1.666... as a simplified common fraction.

(02 marks)

24. The least number that can be divided by either 18 or g leaving 4 as the remainder is 40. The greatest common factor (GCF) of the two numbers 18 and g is 6.

Find the sum of 18 and g.

(04 marks)



25. A man spent  $\frac{1}{4}$  of his salary on food,  $\frac{3}{8}$  on rent,  $83\frac{1}{3}\%$  of the remainder on fees and saved sh. 50,000.

How much money did he spend on fees?

(05 marks)

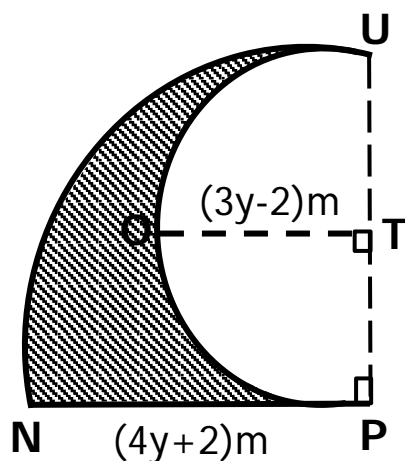
26. Town M is 240 kilometres away from town N. A bus and a taxi left town M for town N at 3:45p.m. The bus was moving at an average speed of 72 kilometres per hour. At 4:30p.m, the bus was 18 kilometres ahead of the taxi.

At what time did the taxi reach town N travelling at the same speed?

(06 marks)



27. In the figure below, the semicircle  $POU$  was cut from the quadrant  $PNU$ . Use the figure to answer questions that follow.



- (a) Find length  $NP$  in metres (03 marks)

- (b) Calculate the area of the shaded part. (Take  $\pi = \frac{22}{7}$ ) (03 marks)

28. (a) Using a ruler, a pencil and protractor only, draw a rectangle ABCD such that diagonal  $BD = 10\text{cm}$  and angle  $CBD = 30^\circ$  (04 marks)

(b) Measure length BC.

(01 mark)



29. (a) Find the number that has been expanded to give:  
 $(1 \times 2^3) + (1 \times 2^1) + (1 \times 2^0)$

(02 marks)

(b) Given that  $23_d = 33_{\text{four}}$ . Find the value of  $d$

(02 marks)

30. A kilogram of rice costs sh. 2,500 less than a bar of soap. A bar of soap costs two fifths of the cost of one kilogram of meat. L'okori paid sh. 32,000 for 3 bars of soap and 4 kilograms of rice.

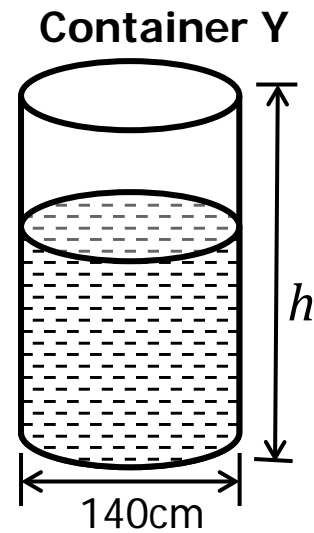
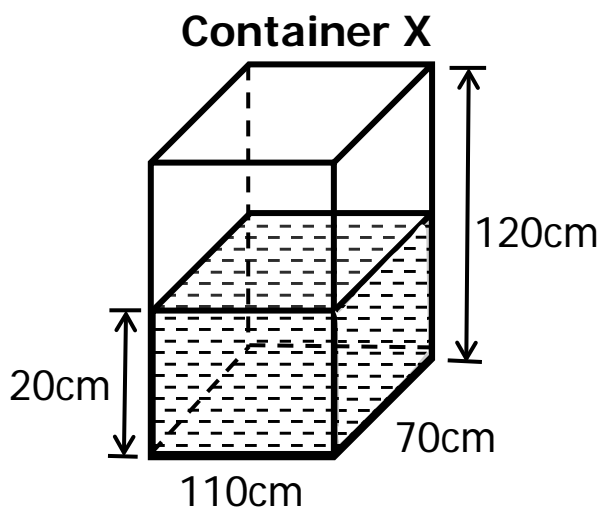
(a) Find the cost of one kilogram of meat.

(03 marks)

(b) How much would he pay for 5 kilograms of rice? (02 marks)



31. The amount water in the two **containers X** and **Y** is in the ratio of 2:5 respectively.



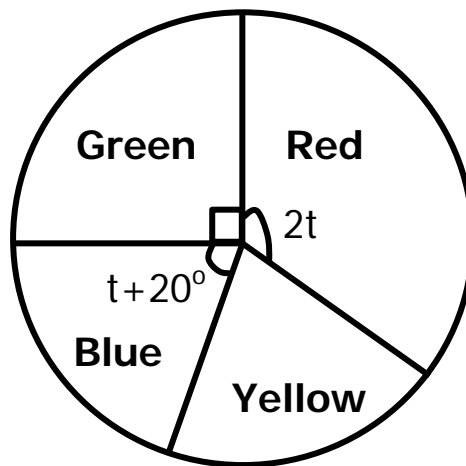
Given that container Y is  $\frac{5}{8}$  full.

(a) Solve for  $h$  (Take  $\pi = \frac{22}{7}$ )

(04 marks)

(b) Find the number of 750 millilitre bottles that are needed to make container Y full to its capacity. (02 marks)

32. The pie chart below shows 108 candidates in different streams at Bizonto Primary School. P.7 yellow has 21 candidates altogether. Use it to answer questions that follow.



- (a) Find the number of pupils in P.7 blue. (4 marks)

- (b) Express as a percentage, the number of candidates in P.7 Green. (01 mark)



# Magic



## Examinations Board - 2022

PRE

P

L

E



# MATHEMATICS

## Marking Guide

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*\*Let's Educate the Nation\**

By: Sseggyi Benjamin Kasuka



1. Work out:  $34 \times 2$

Approach 1

$$34 \times 2 = 68$$

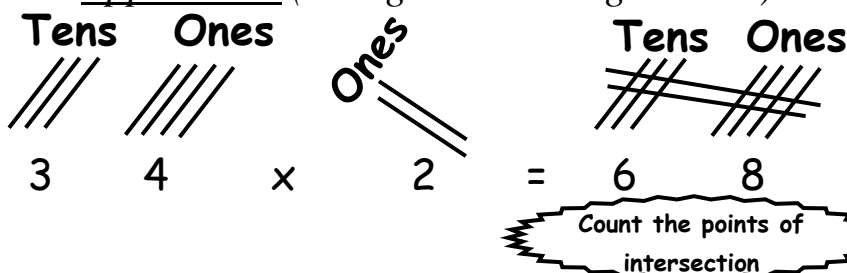
Approach 2

$$\begin{array}{r} 34 \\ \times 2 \\ \hline 68 \end{array}$$

Approach 3

$$\begin{aligned} 34 \times 2 \\ (30+4) \times 2 \\ 2(30+4) \\ (2 \times 30) + (2 \times 4) \\ 60 + 8 \\ 68 \end{aligned}$$

Approach 4 (Using counters e.g. straws)



2. Write "Ninety thousand, eight" in figures

Approach 1

90,008

Approach 2

$$\begin{array}{r} 90,000 \\ + 8 \\ \hline 90,008 \end{array}$$

Approach 3

Thousands			Units		
H	T	O	H	T	O
	9	0	0	0	0
					8

90,008

3. Given that set P has 31 proper subsets. Find the number of subsets in set P.

Approach 1

$$31+1 = 32 \text{ subsets}$$

Approach 2

$$\text{No. of proper subsets} = 2^n - 1$$

$$(2^n) - 1 = 31$$

$$(2^n) - 1 = 31$$

$$(2^n) - 1 + 1 = 31 + 1$$

$$2^n = 32$$

$$2^n = 2 \times 2 \times 2 \times 2 \times 2$$

$$2^n = 2^5$$

$$n = 5$$

No. of subsets

$$2^n$$

$$2^5$$

$$2 \times 2 \times 2 \times 2 \times 2$$

$$32 \text{ subsets}$$

4. Simplify:  $+5 - +7$

Approach 1

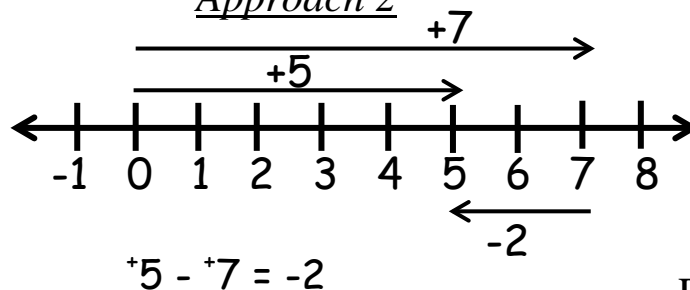
$$+5 - +7$$

$$+5 - (+7) \quad -x+ = -$$

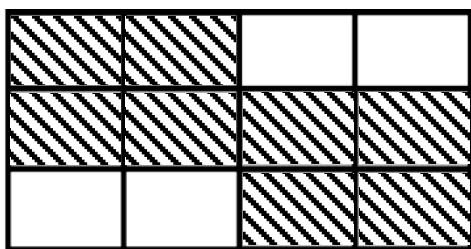
$$+5 - 7$$

$$-2$$

Approach 2



5. Write in lowest term, the fraction of the un shaded parts in the drawing below.



Approach 1

$$\frac{4 \div 4}{12 \div 4} = \frac{1}{3}$$

Approach 2

Shaded fraction

$$\frac{8 \div 4}{12 \div 4} = \frac{2}{3}$$

Un shaded fraction

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



6. Convert 750 cubic centimetres into litres

Approach 1

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

$$1\text{cm}^3 = \frac{1}{1000} \text{ litres}$$

$$750\text{cm}^3 = \frac{1}{1000} \times 750 \text{ litres}$$

$$750\text{cm}^3 = 0.75 \text{ litres}$$

Approach 2

$$1\text{cm}^3 = 1\text{ml}$$

$$750\text{cm}^3 = 750\text{ml}$$

$$1000\text{ml} = 1\text{litre}$$

$$750\text{ml} = \frac{750}{1000} \text{ litres}$$

$$750\text{ml} = 0.75 \text{ litres}$$

7. Use distributive property to work out:  $(6 \div 7) + (134 \div 7)$

Approach 1

$$(6 \div 7) + (134 \div 7)$$

$$(6+134) \div 7$$

$$140 \div 7$$

$$20$$

$$\begin{array}{r} 020 \\ 7 \overline{) 140} \\ \underline{- 0} \phantom{0} \downarrow \\ 14 \phantom{0} \downarrow \\ \underline{- 14} \phantom{0} \downarrow \\ 000 \end{array}$$

Approach 2

$$(6 \div 7) + (134 \div 7)$$

$$(6+134) \div 7$$

$$\frac{6+134}{7}$$

$$\frac{140}{7}$$

$$20$$

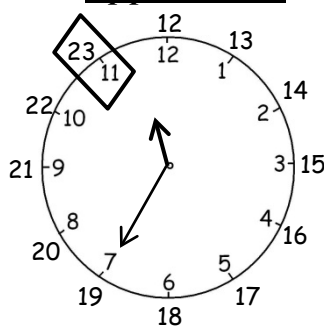
$$\begin{array}{r} 020 \\ 7 \overline{) 140} \\ \underline{- 0} \phantom{0} \downarrow \\ 14 \phantom{0} \downarrow \\ \underline{- 14} \phantom{0} \downarrow \\ 000 \end{array}$$

8. Ayo went sleeping at 25 minutes to midnight. Write this time in 24 hour clock system.

Approach 1

$$\begin{array}{r} 11\ 35 \\ +12\ 00 \\ \hline 23\ 35\text{HRS} \end{array}$$

Approach 2



23 35HRS

9. In a box, there are blue and red pens. The probability of picking a red pen from the box is  $\frac{3}{7}$ . The bag contains 24 blue pens. Find the total number of pens in the box.

Approach 1

$$\begin{aligned} \frac{7}{7} - \frac{3}{7} &= \frac{7-3}{7} \\ &= \frac{4}{7} \end{aligned}$$

Total number of pens

$$24 \div \frac{4}{7}$$

$$24 \times \frac{7}{4}$$

42pens

Approach 2

$$\begin{aligned} \frac{7}{7} - \frac{3}{7} &= \frac{7-3}{7} \\ &= \frac{4}{7} \end{aligned}$$

Total number of pens

4parts rep 24 pens

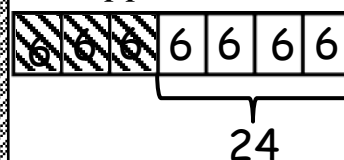
1part rep (24÷4)pens

1part rep 6pens

7parts rep 7x6pens

7parts rep 42pens

Approach 3



$$24 \div 4 = 6$$

$$6 \times 7 = 42\text{pens}$$

Approach 4

$$\frac{7}{7} - \frac{3}{7} = \frac{7-3}{7} = \frac{4}{7}$$

$$\frac{4}{7} = \frac{24}{\boxed{\phantom{00}}}$$

$$\frac{4}{7} = \frac{8}{14}, \frac{12}{21}, \frac{16}{28}, \frac{20}{35}, \frac{24}{\boxed{42}}$$

The box contains 42pens

Approach 5

$$\begin{aligned} \frac{7}{7} - \frac{3}{7} &= \frac{7-3}{7} \\ &= \frac{4}{7} \end{aligned}$$

Let the total

number of pens be p

$$\frac{4}{7} \times p = 24$$

$$\frac{4p}{7} = 24$$

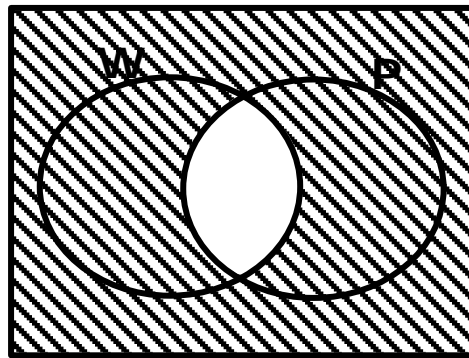
$$7 \times \frac{4p}{7} = 24 \times 7$$

$$4p = 24 \times 7$$

$$\frac{4p}{4} = \frac{24 \times 7}{4}$$

$$p = 42\text{pens}$$

10. On the Venn diagram below, shade  $(W \cap P)'$



11. Simplify:  $3k - 5f - 2k - 3f$

$$3k - 5f - 2k - 3f$$

$$3k - 2k - 5f - 3f$$

$$k - 8f$$

12. Find the next number in the sequence;

$$\begin{array}{ccccccccc}
 -3, & -5, & -8, & -13, & -20, & \dots & -31 & \dots & \\
 \swarrow & \swarrow & \swarrow & \swarrow & \swarrow & & & & \\
 -2 & -3 & -5 & -7 & -11 & \text{(Prime numbers)} & & & \\
 & & & & & & -20 - 11 = -31 & & 
 \end{array}$$

13. A tank was 0.8 full of water, 0.75 of the water in the tank was used. What fraction of water remained in the tank?

<u>Fraction used</u>	<u>Fraction remained</u>
0.75 of 0.8	0.8
$\frac{75}{100} \times \frac{8}{10}$	$\frac{-0.6}{0.2}$
$\frac{600}{1000}$	
0.6	

### Approach 2

$$0.8 - (0.75 \text{ of } 0.8)$$

$$\frac{8}{10} - \left(\frac{75}{100} \times \frac{8}{10}\right)$$

$$\frac{4}{5} - \left(\frac{3}{4} \times \frac{4}{5}\right)$$

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

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

$$0.2$$

$$\begin{array}{r} 0.2 \\ 5 \overline{) 1.0} \\ \underline{- 0} \downarrow \\ 10 \\ \underline{- 10} \\ 00 \end{array}$$

14. Calculate the circumference of a circle whose radius is 21 metres.  
(Take  $\pi = \frac{22}{7}$ )

### Approach 1

$$C = 2\pi r$$

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

$$C = 2 \times 22 \times 3\text{m}$$

$$C = 132\text{m}$$

### Approach 2

$$\begin{aligned} \text{Diameter} &= 21\text{m} + 21\text{m} \\ &= 42\text{m} \end{aligned}$$

$$C = \pi d$$

$$C = \frac{22}{7} \times 42\text{m}$$

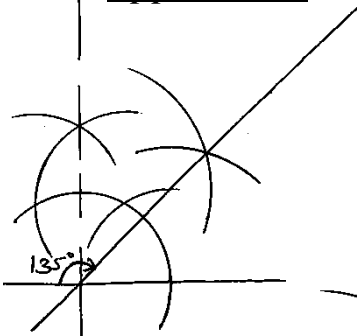
$$C = 22 \times 6\text{m}$$

$$C = 132\text{m}$$

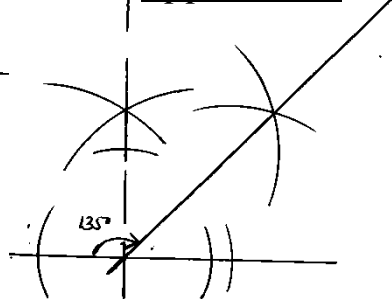


15. Using a ruler, a pair of compasses and a pencil only, construct an angle of  $135^\circ$  in the space provided below.

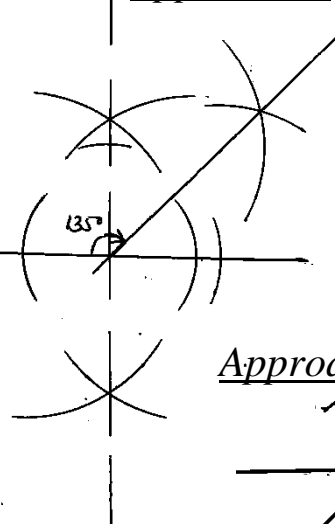
### Approach 1



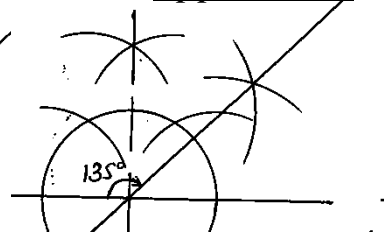
### Approach 2



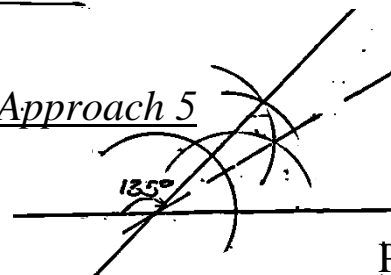
### Approach 3



### Approach 4



### Approach 5



16. The average mass of 4 candidates is 34 kilogrammes. When Mr. Otayi joins them, the average mass becomes 40 kilogrammes. Find in kilogrammes Mr. Otayi's mass.

Approach 1

Total mass of 4 candidates

$$34\text{kg} \times 4 = 136\text{kg}$$

Total mass of 5 people

$$40\text{kg} \times 5 = 200\text{kg}$$

Mr. Otayi's mass

$$200\text{kg} - 136\text{kg} = 64\text{kg}$$

Approach 2

Let Mr. Otayi's mass be  $y$

$$\frac{(34\text{kg} \times 4) + y}{5} = 40\text{kg}$$

$$\frac{136\text{kg} + y}{5} = 40\text{kg}$$

$$5 \times \left( \frac{136\text{kg} + y}{5} \right) = 40\text{kg} \times 5$$

$$136\text{kg} + y = 200\text{kg}$$

$$136\text{kg} - 136\text{kg} + y = 200\text{kg} - 136\text{kg}$$

$$y = 64\text{kg}$$

17. Solve the inequality:  $3 \geq 7 - 2h$

Approach 1

$$3 \geq 7 - 2h$$

$$3 - 7 \geq 7 - 7 - 2h$$

$$-4 \geq -2h$$

$$\frac{-4}{-2} \leq \frac{-2h}{-2}$$

$$\underline{2 \leq h}$$

Approach 2

$$3 \geq 7 - 2h$$

$$3 + 2h \geq 7 - 2h + 2h$$

$$3 + 2h \geq 7$$

$$3 - 3 + 2h \geq 7 - 3$$

$$2h \geq 4$$

$$\frac{2h}{2} \geq \frac{4}{2}$$

$$\underline{h \geq 2}$$

Approach 3

$$3 \geq 7 - 2h$$

$$\frac{3}{-1} \leq \frac{7}{-1} - \frac{2h}{-1}$$

$$-3 \leq -7 + 2h$$

$$-3 + 7 \leq -7 + 7 + 2h$$

$$4 \leq 2h$$

$$\frac{4}{2} \leq \frac{2h}{2}$$

$$\underline{2 \leq h} \text{ or } h \geq 2$$

18. A pupil paid sh 5,000 for 3 pens and 4 books. The cost of each book was sh 800. Find the cost of each pen.

Amount spent on books

sh800

$\times \quad 4$

sh.3200

Amount spent on pens

sh 5000

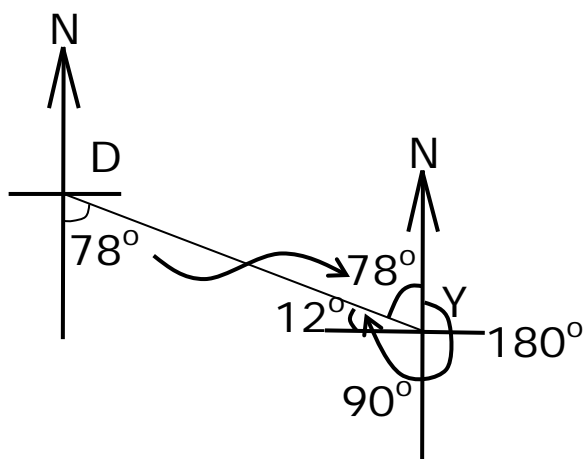
$-\text{sh } 3200$

sh.1800

Cost of each pen

sh  $1800 \div 3 = \text{sh } 600$

19. Use the diagram below to find the bearing of town D from town Y



Approach 1

$$90^\circ - 78^\circ = 12^\circ$$

$$180^\circ + 90^\circ + 12^\circ$$

$$282^\circ$$

Approach 2

$$90^\circ - 78^\circ = 12^\circ$$

$$90^\circ + 90^\circ + 90^\circ + 12^\circ$$

$$282^\circ$$

Approach 3

$$360^\circ$$

$$- 78^\circ$$

$$282^\circ$$

20. A bus covered 126 kilometres in 1 hour 24 minutes. Express its speed in metres per second.

Approach 1

Distance in metres

$$1\text{km} = 1000\text{m}$$

$$126\text{km} = 126 \times 1000\text{m}$$

$$126\text{km} = 126000\text{m}$$

Time in seconds

$$1\text{ hour} = 3600\text{sec}$$

$$1\text{h } 24\text{min} = (1 \times 3600\text{s}) + (24 \times 60\text{s})$$

$$1\text{h } 24\text{min} = 3600\text{s} + 1440\text{s}$$

$$1\text{h } 24\text{min} = 5040\text{s}$$

Speed in m/s

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

$$S = \frac{126000\text{m}}{5040\text{s}}$$

$$S = 25\text{m/s}$$

Approach 2

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

$$S = \frac{126\text{km}}{1\text{h } 24\text{min}}$$

$$S = \frac{126 \times 1000\text{m}}{(1 \times 3600\text{s}) + (24 \times 60\text{s})}$$

$$S = \frac{126000\text{m}}{3600\text{s} + 1440\text{s}}$$

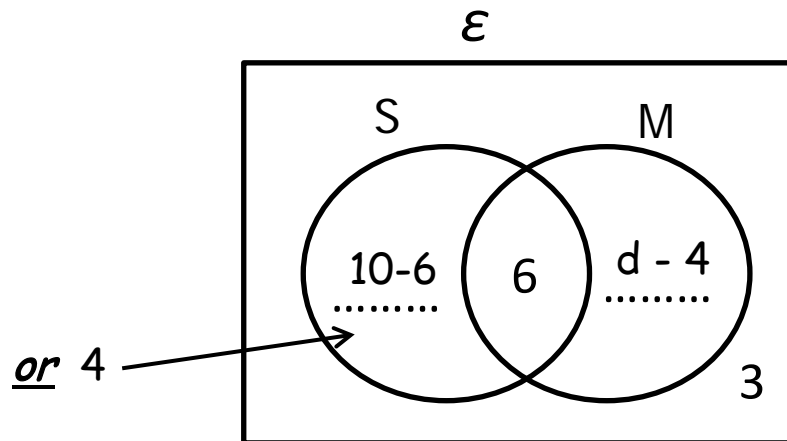
$$S = \frac{126000\text{m}}{5040\text{s}}$$

$$S = 25\text{m/s}$$



21. In a class, 10 pupils like science (S), 6 pupils like both science and mathematics (M),  $d$  like only one subject while 3 pupils like neither of the two subjects.

- (a) Use the given information to complete the Venn diagram below (02 marks)



- (b) Given that 10 pupils do not like science, find the number of pupils who like only one subject. (02 marks)

Approach 1

$n(S)$  only

$$10 - 6 = 4$$

$n(M)$  only

$$10 - 3 = 7$$

Number of pupils who like only one subject

$$4 + 7 = 11 \text{ pupils}$$

Approach 2

Value of  $d$

$$d - 4 + 3 = 10$$

$$d - 1 = 10$$

$$d - 1 + 1 = 10 + 1$$

$$d = 11$$

11 pupils

Approach 3

Value of  $d$

$$d - 4 = 10 - 3$$

$$d - 4 = 7$$

$$d - 4 + 4 = 7 + 4$$

$$d = 11$$

11 pupils

Approach 4

Value of  $d$

$$10 - (d - 4) = 3$$

$$10 - d + 4 = 3$$

$$10 + 4 - d = 3$$

$$14 - d = 3$$

$$14 - 14 - d = 3 - 14$$

$$-d = -11$$

$$\frac{-d}{-1} = \frac{-11}{-1}$$

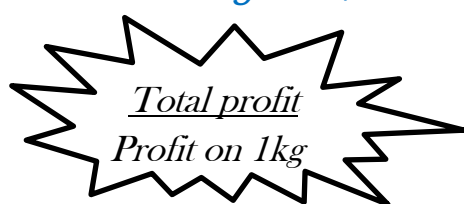
$$d = 11 \text{ pupils}$$



22. The table below shows how different types of crops are bought and sold on a certain village store. Use it to answer questions that follow.

Type of crop	Buying	Selling
1kg of coffee	sh. 3,550	sh. 3,600
1kg of maize	sh. 850	sh. 870
1kg of beans	sh. 1,250	sh. 1,300

- (a) One day, the store keeper made a profit of sh. 39000 on beans. Find in kilograms, the mass of beans sold. (02 marks)



Profit made on 1kg

sh. 1300

- sh. 1250

sh. 50

Mass sold in kg

sh. 50 made by 1kg

sh. 1 made by  $\frac{1}{50}$ kg

sh. 39000 made by  $(\frac{1}{50} \times 39000)$ kg

sh. 39000 made by 780kg

- (b) Ruto had 174 kilograms of coffee. He exchanged them for maize. The maize was packed in sacks which hold 142kg each. How many sacks did he get? (03 marks)

Approach 1

Amount he got after  
selling coffee

174xsh. 3550

sh 617700

Kg of maize he bought

sh 617700 ÷ sh. 870

710kg

Sacks of maize

710kg ÷ 142kg = 5sacks

Approach 2

$(\frac{174 \times 3550}{870 \times 142})$  sacks

$\frac{617700}{123540}$  sacks

5 sacks



23. (a) Given that:  $\frac{1.2 \times k}{3.2 - 2.96} = 0.8$

Find the value of  $k$

(03 marks)

Approach 1

$$\begin{array}{r} 3.20 \\ -2.96 \\ \hline 0.24 \end{array}$$

$$\frac{1.2 \times k}{0.24} = 0.8$$

$$0.24 \times \frac{1.2k}{0.24} = 0.8 \times 0.24$$

$$1.2k = 0.8 \times 0.24$$

$$\frac{1.2k}{1.2} = \frac{0.8 \times 0.24}{1.2}$$

$$k = \left( \frac{8}{10} \times \frac{24}{100} \right) \div \left( \frac{12}{10} \right)$$

$$k = \frac{8}{10} \times \frac{24}{100} \times \frac{10}{12}$$

$$k = \frac{16}{100}$$

$$k = 0.16$$

Approach 2

$$\begin{array}{r} 3.20 \\ -2.96 \\ \hline 0.24 \end{array}$$

$$\frac{1.2 \times k}{0.24} = 0.8$$

$$\left( \frac{12}{10} \times \frac{k}{1} \right) \div \left( \frac{24}{100} \right) = \frac{8}{10}$$

$$\frac{12}{10} \times \frac{k}{1} \times \frac{100}{24} = \frac{8}{10}$$

$$\frac{10k}{2} = \frac{8}{10}$$

$$20 \times \frac{10k}{2} = \frac{8}{10} \times 20$$

$$100k = 16$$

$$\frac{100k}{100} = \frac{16}{100}$$

$$k = 0.16$$

(b) Express 1.666... as a simplified common fraction.

(02 marks)

Approach 1

Let the fraction be  $m$  |  $9m = 15$

$$m = 1.666... \text{ (i)} \quad \begin{array}{r} 9 \quad 9 \end{array}$$

$$10 \times m = 10 \times 1.666...$$

$$10m = 16.666... \text{ (ii)}$$

$$\text{(ii)} - \text{(i)}$$

$$10m = 16.666...$$

$$- m = 1.666...$$

$$9m = 15.000$$

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

$$1.666... = 1\frac{2}{3}$$

Approach 2

$$\boxed{1.6}66...$$

$$\underline{16} - 1 \leftarrow \text{Non recurring number}$$

$$10 - 1 \leftarrow \text{Place value}$$

$$\frac{15 \div 3}{9 \div 3}$$

$$\frac{5}{3} \text{ or } 1\frac{2}{3}$$

$$1.666... = 1\frac{2}{3}$$

24. The least number that can be divided by either 18 or  $g$  leaving 4 as the remainder is 40. The greatest common factor (GCF) of the two numbers 18 and  $g$  is 6.

Find the sum of 18 and  $g$ .

(04 marks)

LCM of 18 and  $g$

$$\text{LCM} = 40 - 4$$

$$\text{LCM} = 36$$

**Remember**

Least no. = LCM + Rem

Value of  $g$

$$\text{Product} = \text{LCM} \times \text{GCF}$$

$$18 \times g = 36 \times 6$$

$$\frac{18g}{18} = \frac{36 \times 6}{18}$$

$$g = 12$$

Sum

$$18 + g$$

$$18 + 12$$

$$30$$



25. A man spent  $\frac{1}{4}$  of his salary on food,  $\frac{3}{8}$  on rent,  $83\frac{1}{3}\%$  of the remainder on fees and saved sh. 50,000.

How much money did he spend on fees?

(05 marks)

$$\text{Food} \rightarrow \frac{1}{4}$$

$$\text{Rent} \rightarrow \frac{3}{8}$$

Food + Rent

$$\frac{1}{4} + \frac{3}{8}$$

$$\frac{2}{8} + \frac{3}{8}$$

$$\frac{5}{8}$$

$$\frac{5}{8}$$

Remainder

$$\frac{8}{8} - \frac{5}{8} = \frac{3}{8}$$

Fees

$$83\frac{1}{3}\% \text{ of } \frac{3}{8}$$

$$\left(\frac{250}{3} \div \frac{100}{1}\right) \times \frac{3}{8}$$

$$\frac{250}{3} \times \frac{1}{100} \times \frac{3}{8}$$

$$\frac{5}{16}$$

$$\text{Fees} \rightarrow \frac{5}{16}$$

Saving

$$\frac{3}{8} - \frac{5}{16}$$

$$\frac{6}{16} - \frac{5}{16}$$

$$\frac{1}{16}$$

$$\frac{1}{16}$$

$$\text{Saving} \rightarrow \frac{1}{16}$$

Total salary

$$\text{sh. } 50,000 \div \frac{1}{16}$$

$$\text{sh. } 50,000 \times 16$$

$$\text{sh. } 800,000$$

Amount spent on fees

$$\frac{5}{16} \times \text{sh. } 800,000$$

$$5 \times \text{sh. } 50,000$$

$$\text{sh. } 250,000$$

Use algebra or proportions to find the man's total salary

26. Town M is 240 kilometres away from town N. A bus and a taxi left town M for town N at 3:45p.m. The bus was moving at an average speed of 72 kilometres per hour. At 4:30p.m, the bus was 18 kilometres ahead of the taxi.

At what time did the taxi reach town N travelling at the same speed?

(06 marks)

Duration

Hrs Min

4 30

- 3 45

0 45

T = 45minutes or  $\frac{3}{4}$ h

Distance covered by the bus in 45 minutes

$D = S \times T$

$D = \frac{72\text{km}}{1\text{h}} \times \frac{45\text{h}}{60}$

D = 54km

Distance covered by the taxi in 45 minutes

54km - 18km = 36km

Speed of the taxi

$S = D \div T$

$S = 36\text{km} \div \frac{45\text{h}}{60}$

$S = 36\text{km} \times \frac{60}{45\text{h}}$

S = 48km/h

Time taken by the taxi to cover the whole journey

$T = D \div S$

$T = 240\text{km} \div \frac{48\text{km}}{1\text{h}}$

$T = 240\text{km} \times \frac{1\text{h}}{48\text{km}}$

T = 5 hours

Arrival time

Hrs Min

3 45

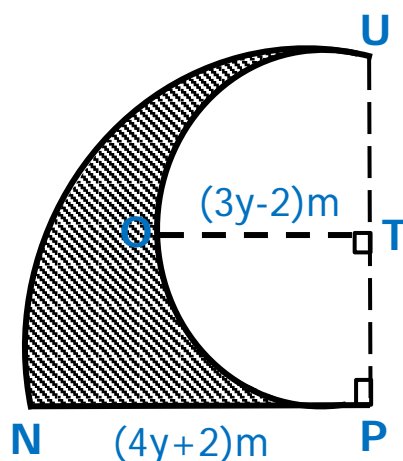
+ 5 00

8 45

At 8:45p.m



27. In the figure below, the semicircle POU was cut from the quadrant PNU. Use the figure to answer questions that follow.



From the figure,

NP = PU

PT = TU = OT

So,

$(PT+TU) = PU = NP$

$(PT+TU) = 2 \times OT$

$2 \times OT = NP$

$NP \div 2 = PU \div 2 = PT = TU = OT$

(a) Find length NP in metres

(03 marks)

Approach 1

Value of y

$$2r = d$$

$$\frac{2(3y-2)m}{m} = \frac{(4y+2)m}{m}$$

$$2(3y-2) = (4y+2)$$

$$6y-4 = 4y+2$$

$$6y-4+4 = 4y+2+4$$

$$6y = 4y+6$$

$$6y-4y = 4y-4y+6$$

$$2y = 6$$

$$\frac{2y}{2} = \frac{6}{2}$$

$$y = 3$$

Length NP

$$(4y+2)m$$

$$(4 \times 3 + 2)m$$

$$(12+2)m$$

$$14m$$

$$14m$$

Approach 2

Value of y

$$r = d - r$$

$$(3y-2) = (4y+2) - (3y-2)$$

$$3y-2 = 4y+2-3y+2$$

$$3y-2 = 4y-3y+2+2$$

$$3y-2 = y+4$$

$$3y-y-2 = y-y+4$$

$$2y-2 = 4$$

$$2y-2+2 = 4+2$$

$$2y = 6$$

$$\frac{2y}{2} = \frac{6}{2}$$

$$y = 3$$

Length NP

$$(4y+2)m$$

$$(4 \times 3 + 2)m$$

$$(12+2)m$$

$$14m$$

$$14m$$

Approach 3

Value of y

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

$$(3y-2)cm = \frac{(4y+2)cm}{2}$$

$$2 \times (3y-2)cm = \left(\frac{(4y+2)cm}{2}\right) \times 2$$

$$\frac{2(3y-2)m}{m} = \frac{(4y+2)m}{m}$$

$$2(3y-2) = (4y+2)$$

$$6y-4 = 4y+2$$

$$6y-4+4 = 4y+2+4$$

$$6y = 4y+6$$

$$6y-4y = 4y-4y+6$$

$$2y = 6$$

$$\frac{2y}{2} = \frac{6}{2}$$

$$y = 3$$

Length NP

$$(4y+2)m$$

$$(4 \times 3 + 2)m$$

$$(12+2)m$$

$$14m$$

(b) Calculate the area of the shaded part. (Use  $\pi = \frac{22}{7}$ )

(03 marks)

Area of the quadrant

$$A = \frac{1}{4} \pi r^2$$

$$A = \frac{1}{4} \times \frac{22}{7} \times 14m \times 14m$$

$$A = 11 \times 2m \times 7m$$

$$A = 154m^2$$

Area of the semi-circle

$$A = \frac{1}{2} \pi r^2$$

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

$$A = 11 \times 1m \times 7m$$

$$A = 77m^2$$

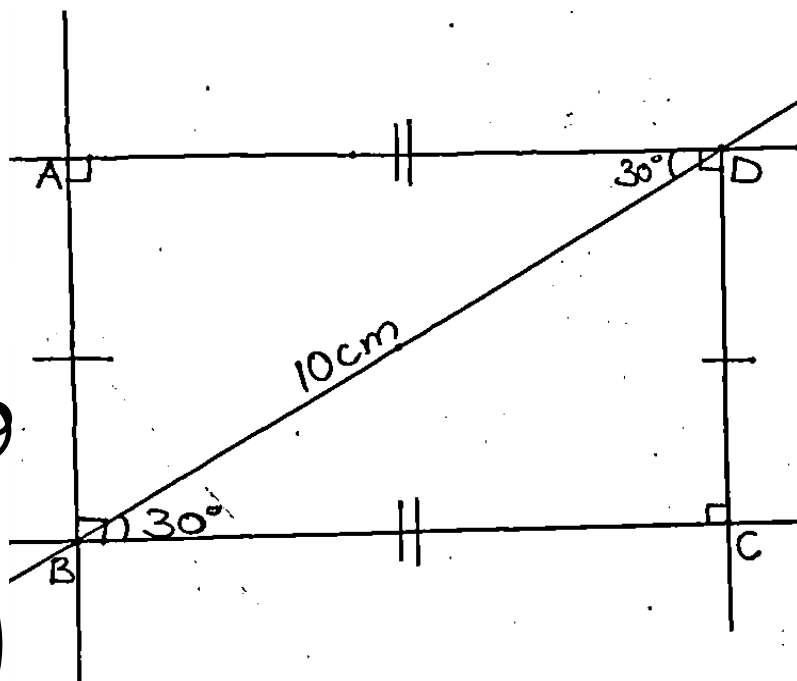
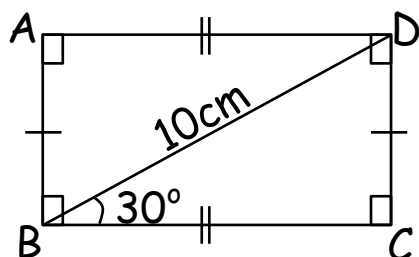
Area of the shaded part

$$154m^2 - 77m^2$$

$$= 77m^2$$

28. (a) Using a ruler, a pencil and protractor only, draw a rectangle ABCD such that diagonal BD = 10cm and angle CBD = 30° (04 marks)

Sketch



- Draw the angles 90° and 30° at point B
- Locate point D such that B and D are 10cm apart.
- Use a protractor to draw an angle of 30° at point D such that angles CBD and BDA become alternate interior angles
- Draw a perpendicular line from point D to meet the base line at C.

- (b) Measure length BC.

$$BC = 8.7\text{cm} (\pm 0.1\text{cm})$$

(01 mark)



29. (a) Find the number that has been expanded to give:  
 $(1 \times 2^3) + (1 \times 2^1) + (1 \times 2^0)$

Approach 1

$$(1 \times 2^3) + (1 \times 2^1) + (1 \times 2^0)$$

$$(1 \times 2 \times 2 \times 2) + (1 \times 2) + (1 \times 1)$$

$$8 + 2 + 1$$

$$11_{\text{ten}}$$

11<sub>ten</sub> to base two

B	N	R
2	11	1
2	5	1
2	2	0
	1	

1011<sub>two</sub>

(02 marks)

Approach 2

$2^3$	$2^2$	$2^1$	$2^0$
1	0	1	1

1011<sub>two</sub>

(b) Given that  $23_d = 33_{\text{four}}$ . Find the value of  $d$

(02 marks)

$$23_d = 33_{\text{four}}$$

$d^1$	$d^0$
2	3

$4^1$	$4^0$
3	3

$$(2 \times d^1) + (3 \times d^0) = (3 \times 4^1) + (3 \times 4^0)$$

$$(2 \times d) + (3 \times 1) = (3 \times 4) + (3 \times 1)$$

$$2d + 3 = 12 + 3$$

$$2d + 3 = 15$$

$$2d + 3 - 3 = 15 - 3$$

$$\underline{2d = 12}$$

$$\underline{2} \quad \underline{2}$$

$$d = 6$$

$d$  is base six

30. A kilogram of rice costs sh. 2,500 less than a bar of soap. A bar of soap costs two fifths as much as a kilogram of meat. L'okori paid sh. 32,000 for 3 bars of soap and 4 kilograms of rice.

(a) Find the cost of one kilogram of meat.

(03 marks)

Approach 1

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

Let the cost of

Soap be 2p

Meat be 5p

Rice be (2p-sh.2500)

Value of p

$$3(\text{soap}) + 4(\text{rice}) = \text{sh. } 32000$$

$$(3 \times 2p) + 4(2p - \text{sh. } 2500) = \text{sh. } 32000$$

$$6p + 8p - \text{sh. } 10000 = \text{sh. } 32000$$

$$14p - \text{sh. } 10000 = \text{sh. } 32000$$

$$14p - \text{sh. } 10000 + \text{sh. } 10000 = \text{sh. } 32000 + \text{sh. } 10000$$

$$14p = \text{sh. } 42000$$

$$\underline{14p = \text{sh. } 42000}$$

$$\underline{14} \quad \underline{14}$$

$$p = \text{sh. } 3000$$

Cost of 1kg of meat

5p

5xp

5xsh. 3000

sh. 15000



### Approach 2

Let the cost of Meat be m

Meat	Soap	Rice
m	$\frac{2}{5}m$	$\frac{2}{5}m - \text{sh. } 2500$

$$(3 \times \frac{2}{5}m) + 4(\frac{2}{5}m - \text{sh. } 2500) = \text{sh. } 32,000$$

$$\frac{6m}{5} + \frac{8m}{5} - \text{sh. } 10000 = \text{sh. } 32,000$$

$$\frac{6m}{5} + \frac{8m}{5} - \text{sh. } 10000 = \text{sh. } 32,000$$

$$\frac{14m}{5} - \text{sh. } 10000 = \text{sh. } 32,000$$

$$\frac{14m}{5} - \text{sh. } 10000 + \text{sh. } 10000 = \text{sh. } 32,000 + \text{sh. } 10000$$

$$\frac{14m}{5} = \text{sh. } 42,000$$

$$5 \times \frac{14m}{5} = \text{sh. } 42,000 \times 5$$

$$\frac{14m}{14} = \frac{\text{sh. } 42,000 \times 5}{14}$$

$$m = \text{sh. } 15,000$$

### Approach 3

Let the cost of Meat be y

Meat	Soap	Rice
y	$\frac{2}{5}y$	$\frac{2}{5}y - \text{sh. } 2500$

$$(3 \times \frac{2}{5}y) = \text{sh. } 32,000 - 4(\frac{2}{5}y - \text{sh. } 2500)$$

$$\frac{6y}{5} = \text{sh. } 32,000 - \frac{8y}{5} + \text{sh. } 10000$$

$$\frac{6y}{5} = \text{sh. } 32,000 + \text{sh. } 10000 - \frac{8y}{5}$$

$$\frac{6y}{5} = \text{sh. } 42,000 - \frac{8y}{5}$$

$$\frac{6y}{5} + \frac{8y}{5} = \text{sh. } 42,000 - \frac{8y}{5} + \frac{8y}{5}$$

$$\frac{14y}{5} = \text{sh. } 42,000$$

$$5 \times \frac{14y}{5} = \text{sh. } 42,000 \times 5$$

$$\frac{14y}{14} = \frac{\text{sh. } 42,000 \times 5}{14}$$

$$y = \text{sh. } 15,000$$

### Approach 4

Let the cost of rice be r

Rice	Soap
r	$r + \text{sh. } 2500$

Value of r

$$(4 \times r) + 3(r + \text{sh. } 2500) = \text{sh. } 32000$$

$$4r + 3r + \text{sh. } 7500 = \text{sh. } 32000$$

$$7r + \text{sh. } 7500 = \text{sh. } 32000$$

$$7r + \text{sh. } 7500 - \text{sh. } 7500 = \text{sh. } 32000 - \text{sh. } 7500$$

$$7r = \text{sh. } 24500$$

$$\frac{7r}{7} = \frac{\text{sh. } 24500}{7}$$

$$r = \text{sh. } 3500$$

Cost of 1kg of soap

$$r + \text{sh. } 2500$$

$$\text{sh. } 3500 + \text{sh. } 2500$$

$$\text{sh. } 6000$$

Cost of 1kg of meat

$$2 \text{ parts rep sh. } 6000$$

$$1 \text{ part rep sh. } 6000$$

$$2$$

$$5 \text{ parts rep sh. } 6000 \times 5$$

$$2$$

$$5 \text{ parts rep sh. } 15000$$

### Approach 5

Let the cost of soap be n

Soap	Rice
n	$n - \text{sh. } 2500$

Value of r

$$(3 \times n) + 4(n - \text{sh. } 2500) = \text{sh. } 32000$$

$$3n + 4n - \text{sh. } 10000 = \text{sh. } 32000$$

$$7n - \text{sh. } 10000 = \text{sh. } 32000$$

$$7n - \text{sh. } 10000 + \text{sh. } 10000 = \text{sh. } 32000 + \text{sh. } 10000$$

$$7n = \text{sh. } 42000$$

$$\frac{7n}{7} = \frac{\text{sh. } 42000}{7}$$

$$n = \text{sh. } 6000$$

Cost of 1kg of meat

$$\text{sh. } 6000 \div \frac{2}{5}$$

$$\text{sh. } 6000 \times \frac{5}{2}$$

$$\text{sh. } 3000 \times 5$$

$$\text{sh. } 15000$$



(b) How much would he pay for 5 kilograms of rice? (02 marks)

Approach 1

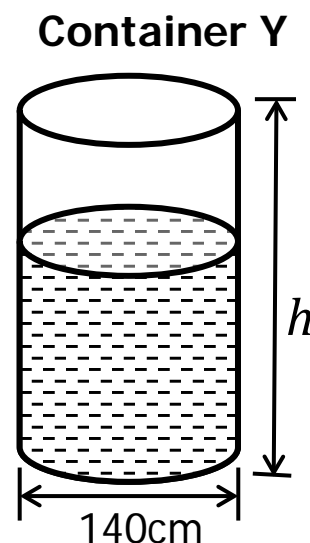
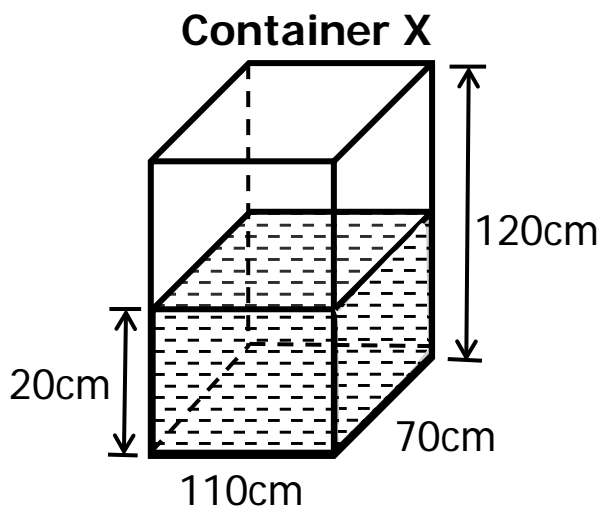
$$\begin{aligned}
 &5(2p - \text{sh. } 2500) \\
 &5(2 \times \text{sh. } 3000 - \text{sh. } 2500) \\
 &5(\text{sh. } 6000 - \text{sh. } 2500) \\
 &5 \times \text{sh. } 3500 \\
 &\text{sh. } 17500
 \end{aligned}$$

Approach 2

$$\begin{aligned}
 &5\left(\frac{2}{5}m - \text{sh. } 2500\right) \\
 &5\left(\frac{2}{5} \times \text{sh. } 15000 - \text{sh. } 2500\right) \\
 &5(\text{sh. } 6000 - \text{sh. } 2500) \\
 &5 \times \text{sh. } 3500 \\
 &\text{sh. } 17500
 \end{aligned}$$



31. The amount water in the two containers X and Y is in the ratio of 2:5 respectively.



Given that container Y is  $\frac{5}{8}$  full.

(a) Solve for  $h$  (Take  $\pi = \frac{22}{7}$ )

(04 marks)

Volume of water in container X

$$\begin{aligned}
 V &= L \times W \times H \\
 V &= 110\text{cm} \times 70\text{cm} \times 20\text{cm} \\
 V &= 154000\text{cm}^3
 \end{aligned}$$

Volume of water in container Y

$$\begin{aligned}
 &2\text{parts rep } 154000\text{cm}^3 \\
 &1\text{prt rep } \frac{154000\text{cm}^3}{2} \\
 &5\text{parts rep } \frac{154000\text{cm}^3}{2} \times 5 \\
 &5\text{parts rep } 385000\text{cm}^3
 \end{aligned}$$

Volume of container Y

Let the volume be g

$$\frac{5}{8} \text{ of } g = 385000\text{cm}^3$$

$$\frac{5g}{8} = 385000\text{cm}^3$$

$$8 \times \frac{5g}{8} = 385000\text{cm}^3 \times 8$$

$$\frac{5g}{5} = \frac{385000\text{cm}^3}{5} \times 8$$

$$g = 616000\text{cm}^3$$

Value of h

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

$$\frac{22}{7} \times \frac{140\text{cm}}{2} \times \frac{140\text{cm}}{2} \times h = 616000\text{cm}^3$$

$$22 \times 10\text{cm} \times 70\text{cm} \times h = 616000\text{cm}^3$$

$$15400\text{cm}^2 \times h = 616000\text{cm}^3$$

$$\frac{15400\text{cm} \times \text{cm} \times h}{15400\text{cm} \times \text{cm}} = \frac{616000\text{cm} \times \text{cm} \times \text{cm}}{15400\text{cm} \times \text{cm}}$$

$$h = 40\text{cm}$$

- (b) Find the number of 750 millilitre bottles that are needed to make container Y full to its capacity. (02 marks)

Volume of water needed to fill container Y

$$616000\text{cm}^3 - 385000\text{cm}^3$$
$$231000\text{cm}^3$$

$$1\text{cm}^3 = 1\text{ml}$$

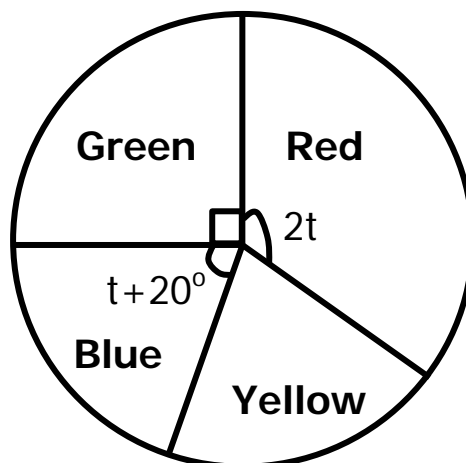
$$231000\text{cm}^3 = 231000\text{ml}$$

Number of bottles needed

$$(231000\text{ml} \div 750\text{ml}) \text{ bottles}$$

$$308 \text{ bottles}$$

32. The pie chart below shows 108 candidates in different streams at Bizonto Primary School. P.7 yellow has 21 candidates altogether. Use it to answer questions that follow.



(a) Find the number of pupils in P.7 blue.

(4 marks)

Angle sector for P.7 yellow

$$\frac{21}{108} \times 360^\circ = 70^\circ$$

Or

$$108 \text{ pupils} \rightarrow 360^\circ$$

$$1 \text{ pupil} \rightarrow \left(\frac{360}{108}\right)^\circ$$

$$21 \text{ pupils} \rightarrow \left(\frac{360}{108} \times 21\right)^\circ$$

$$21 \text{ pupils} \rightarrow 70^\circ$$

Value of t

$$2t + t + 20^\circ + 70^\circ + 90^\circ = 360^\circ$$

$$3t + 180^\circ = 360^\circ$$

$$3t + 180^\circ - 180^\circ = 360^\circ - 180^\circ$$

$$3t = 180^\circ$$

$$\frac{3t}{3} = \frac{180^\circ}{3}$$

$$t = 60^\circ$$

Angle sector for P.7 blue

$$t + 20^\circ$$

$$60^\circ + 20^\circ$$

$$80^\circ$$

Number of pupils in P.7 blue

$$\frac{80}{360} \times 108 = 24 \text{ pupils}$$

(b) Express as a percentage, the number of candidates in P.7 Green.

(01 mark)

Approach 1

$$\frac{90}{360} \times 100\% = 25\%$$

Approach 2

$$90^\circ = \frac{90}{360}$$

$$= \frac{90 \times 10}{360 \times 10}$$

$$= \frac{900}{3600}$$

$$= \frac{900 \div 36}{3600 \div 36}$$

$$= \frac{25}{100}$$

$$= 25\%$$

Approach 3

Number of pupils in P.7 Green

$$\frac{90}{360} \times 108 = 27 \text{ pupils}$$

Percentage of pupils in P.7 Green

$$\frac{27}{108} \times 100\% = 25\%$$

Or

$$\frac{27}{108} = \frac{1}{4} = \frac{1 \times 25}{4 \times 25} = \frac{25}{100} = 25\%$$

Approach 4

$$\frac{90}{360} = \frac{\square}{100}$$

$$\frac{1}{4} = \frac{\square}{100}$$

$$100 \div 4 = 25$$

$$\frac{1}{4} = \frac{25}{100} = 25\%$$

END



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Beginning of term III	5 <sup>th</sup> Sept, 2022
Midterm III	25 <sup>th</sup> Sept, 2022
Pre PLE Special exam	7 <sup>th</sup> Oct, 2022
End of term III	4 <sup>th</sup> Nov, 2022

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