Magic

Examinations Board - 2022

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MATHEMATICS

Marking Guide

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Let's Educate the Nation

1. *Work out:* 34 x 2

Approach 1

34 x 2 = 68

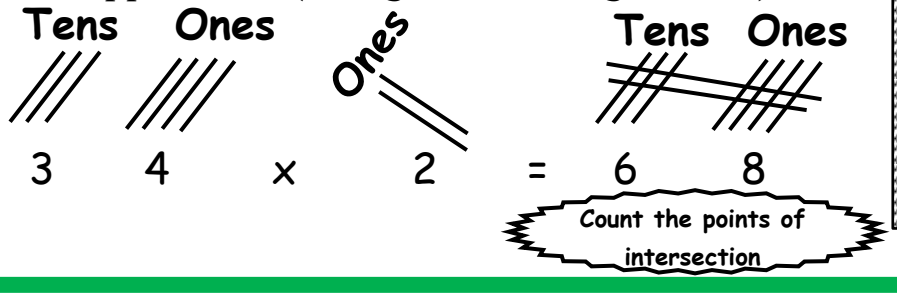
Approach 2

3 4
x 2
6 8

Approach 3

34 x 2
(30+4)x2
2(30+4)
(2x30)+(2x4)
60 + 8
68

Approach 4 (Using counters e.g. straws)



2. *Write "Ninety thousand, eight" in figures*

Approach 1

90,008

Approach 2

90,000
+ 8
90,008

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 subsets

Approach 2

No. of proper subsets = $2^n - 1$

$(2^n) - 1 = 31$

$(2^n) - 1 = 31$
$(2^n) - 1+1 = 31+1$
$2^n = 32$
$2^n = 2x2x2x2x2$
$2^n = 2^5$
$n = 5$

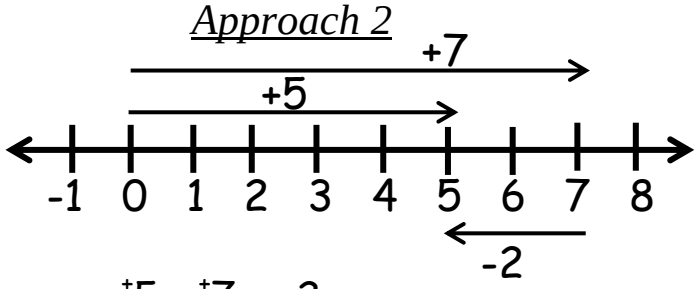
No. of subsets
2^n
2^5
2x2x2x2x2
32 subsets

4. *Simplify:* $^+5 - ^+7$

Approach 1

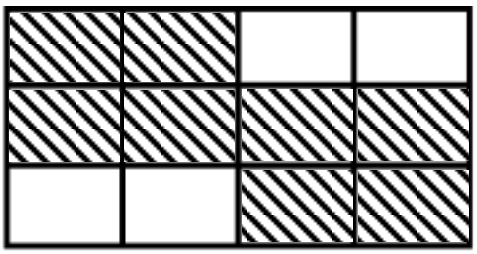
$^+5 - ^+7$
$^+5 - (^+7)$ -x+ = -
$^+5 - 7$
$^-2$

Approach 2



$^+5 - ^+7 = -2$

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

$1000cm^3 = 1litre$

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

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

$750cm^3 = 0.75$ litres

Approach 2

$1cm^3 = 1ml$

$750cm^3 = 750ml$

$1000ml = 1litre$

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

$750ml = 0.75$ litres

7. *Use distributive property to work out: (6÷7) + (134÷7)*

Approach 1

(6÷7) + (134÷7)

(6+134)÷7

140÷7

20

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

Approach 2

(6÷7) + (134÷7)

(6+134)÷7

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

$\frac{140}{7}$

20

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

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

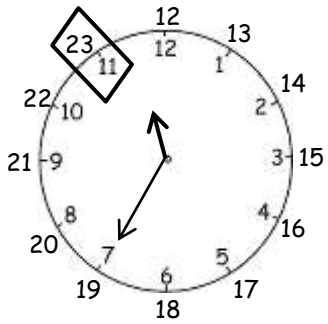
Approach 1

11 35

+12 00

23 35HRS

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

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

$= \frac{4}{7}$

Total number of pens

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

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

42pens

Approach 2

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

$= \frac{4}{7}$

Total number of pens

4parts rep 24 pens

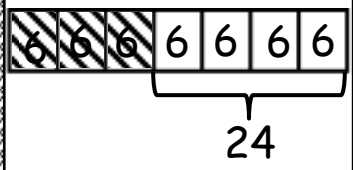
1part rep (24÷4)pens

1part rep 6pens

7parts rep 7x6pens

7parts rep 42pens

Approach 3



24÷4 = 6

6x7 = 42pens

Approach 4

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

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

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

The box contains 42pens

Approach 5

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

$= \frac{4}{7}$

Let the total number of pens be p

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

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

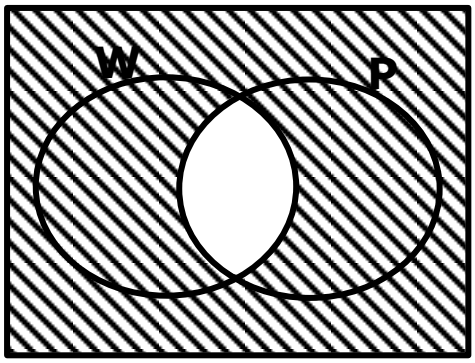
$7 \times \frac{4p}{7} = 24 \times 7$

$4p = 24 \times 7$

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

p = 42pens

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;*

-3, -5, -8, -13, -20, ... -31

-2 -3 -5 -7 -11 (Prime numbers)

-20-11 = -31

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?*

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

Approach 2

0.8 – (0.75 of 0.8)

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

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

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

$\frac{1}{5}$

0.2

$$5\overline{)1.0}\quad 0.2$$
$$-\underline{0}\downarrow$$
$$10$$
$$-\underline{10}$$
$$00$$

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

Approach 1

$C = 2\pi r$

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

$C = 2 \times 22 \times 3m$

$C = 132m$

Approach 2

Diameter = 21m + 21m

= 42m

$C = \pi d$

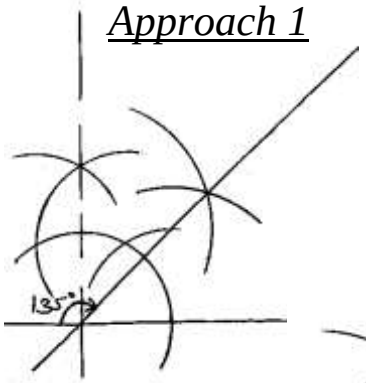
$C = \frac{22}{7} \times 42m$

$C = 22 \times 6m$

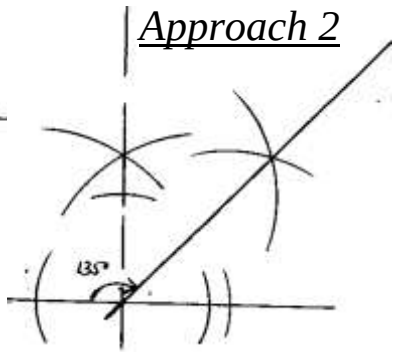
$C = 132m$

15. *Using a ruler, a pair of compasses and a pencil only, construct an angle of 135° in the space provided below.*

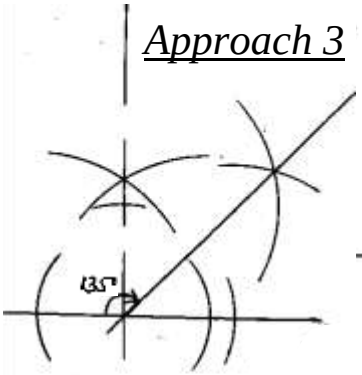
Approach 1



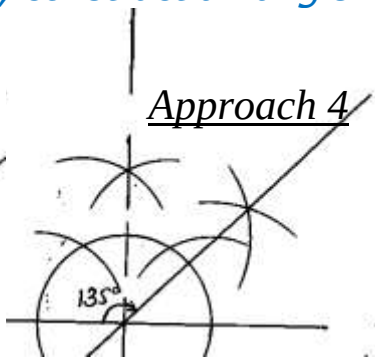
Approach 2



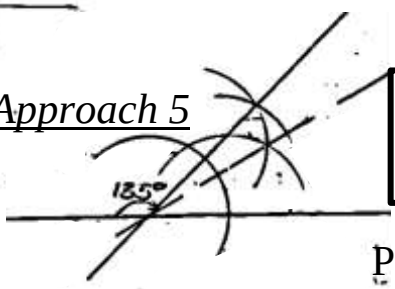
Approach 3



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

34kg x 4 = 136kg

Total mass of 5 people

40kg x 5 = 200kg

Mr. Otayi's mass

200kg – 136kg = 64kg

Approach 2

Let Mr. Otay's mass be y

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

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

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

$$136kg + y = 200kg$$

$$136kg - 136kg + y = 200kg - 136kg$$

$$y = 64kg$$

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

Approach 1

$3 \geq 7 - 2h$

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

$-4 \geq -2h$

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

$2 \leq h$

Approach 2

$3 \geq 7 - 2h$

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

$3+2h \geq 7$

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

$2h \geq 4$

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

$h \geq 2$

Approach 3

$3 \geq 7 - 2h$

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

$-3 \leq -7 + 2h$

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

$4 \leq 2h$

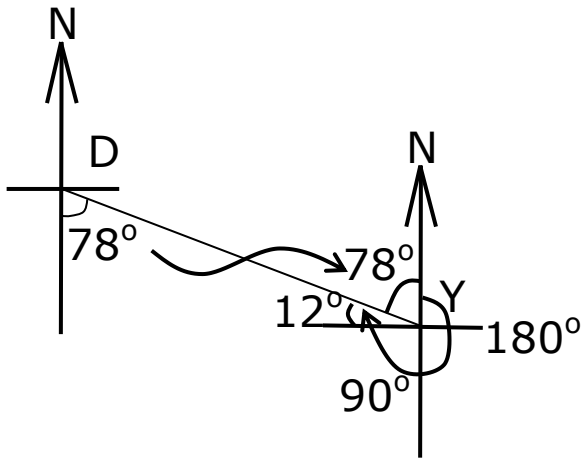
$\frac{4}{2} \leq \frac{2h}{2}$

$2 \leq h$ 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	Amount spent on pens	Cost of each pen
sh800	sh 5000	sh 1800÷3 = sh 600
x 4	-sh 3200	
sh.3200	sh.1800	

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



Approach 1

$90° - 78° = 12°$

$180° + 90° + 12°$

$282°$

Approach 2

$90° - 78° = 12°$

$90° + 90° + 90° + 12°$

$282°$

Approach 3

$360°$

$- 78°$

$282°$

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

Approach 1

Distance in metres

1km = 1000m

126km = 126x1000m

126km = 126000m

Time in seconds

1 hour = 3600sec

1h 24min = (1x3600s)+(24x60s)

1h 24min = 3600s + 1440s

1h 24min = 5040s

Speed in m/s

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

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

$S = 25m/s$

Approach 2

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

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

$S = \frac{126x1000m}{(1x3600s)+(24x60s)}$

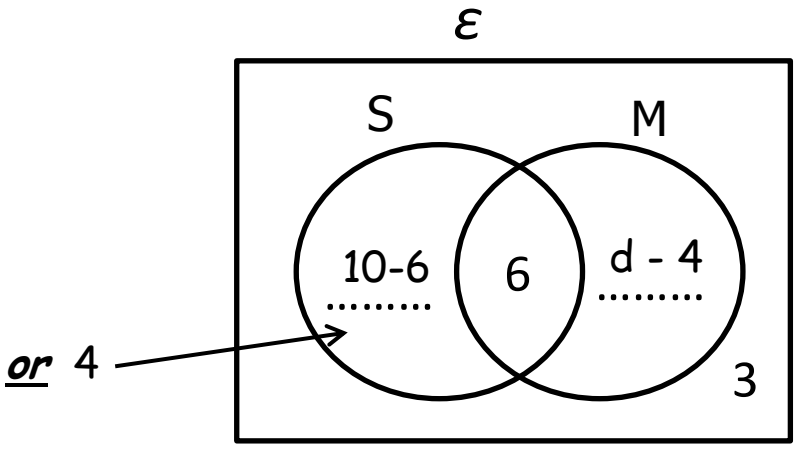
$S = \frac{126000m}{3600s + 1440s}$

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

$S = 25m/s$

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 = 11pupils

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 = 11pupils

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

3.20
-2.96
0.24

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

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

$1.2k = 0.8 \times 0.24$

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

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

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

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

$k = 0.16$

Approach 2

3.20
-2.96
0.24

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

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

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

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

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

$100k = 16$

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

$k = 0.16$

(b) Express 1.666... as a simplified common fraction. (02 marks)

Approach 1

Let the fraction be m

m = 1.666... (i)

10 × m = 10 × 1.666...

10m = 16.666... (ii)

(ii) – (i)

10m = 16.666...

– m = 1.666...

9m = 15.000

$\frac{9m}{9} = \frac{15}{9}$

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

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

Approach 2

1 . 6 6 6...

16 – 1 ← *Non recurring number*

10 – 1 ← *Place value*

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

$\frac{5}{3}$ 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

LCM = 40-4

LCM = 36

Remember
Least no. = LCM+Rem

Value of g

Product = LCM×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)

Food → $\frac{1}{4}$

Rent → $\frac{3}{8}$

Food + Rent

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

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

$\frac{5}{8}$

Remainder

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

Fees

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

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

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

$\frac{5}{16}$

Fees → $\frac{5}{16}$

Saving

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

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

$\frac{1}{16}$

Saving → $\frac{1}{16}$

Total salary

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

sh. 50,000×16

sh. 800,000

Amount spent on fees

$\frac{5}{16}$ × sh. 800,000

5 × sh. 50,000

sh. 25,000

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 = SxT

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

D = 54km

Distance covered by the taxi in 45 minutes

54km – 18km = 36km

Speed of the taxi

S = D÷T

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

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

S = 48km/h

Time taken by the taxi to cover the whole journey

T = D÷S

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

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

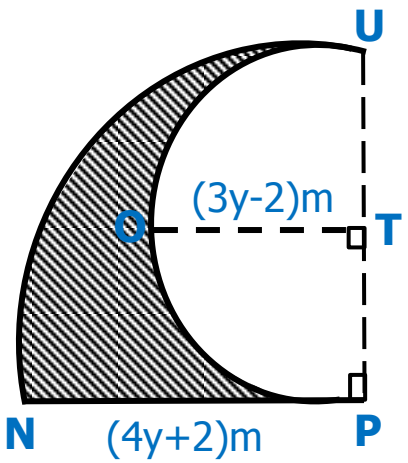
T = 5 hours

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) = 2xOT

2xOT = NP

NP÷2 = PU÷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

$(4y+2)m$

$(4xy+2)m$

$(4x3+2)m$

$(12+2)m$

$14m$

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

$(4y+2)m$

$(4xy+2)m$

$(4x3+2)m$

$(12+2)m$

$14m$

Approach 3

Value of y

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

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

$2x(3y-2)cm = (\frac{(4y+2)cm}{2})x2$

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

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

$6y-4 = 4y+2$

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

$6y = 4y+6$

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

$2y = 6$

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

$y = 3$

Length NP

$(4y+2)m$

$(4xy+2)m$

$(4x3+2)m$

$14m$

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

Area of the quadrant

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

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

$A = 11x2m x 7m$

$A = 154m^2$

Area of the semi-circle

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

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

$A = 11x1m x 7m$

$A = 77m^2$

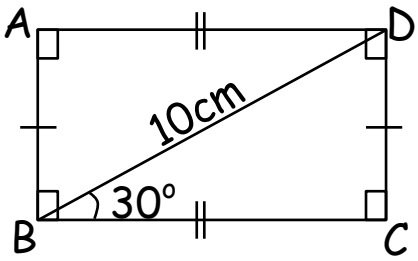
Area of the shaded part

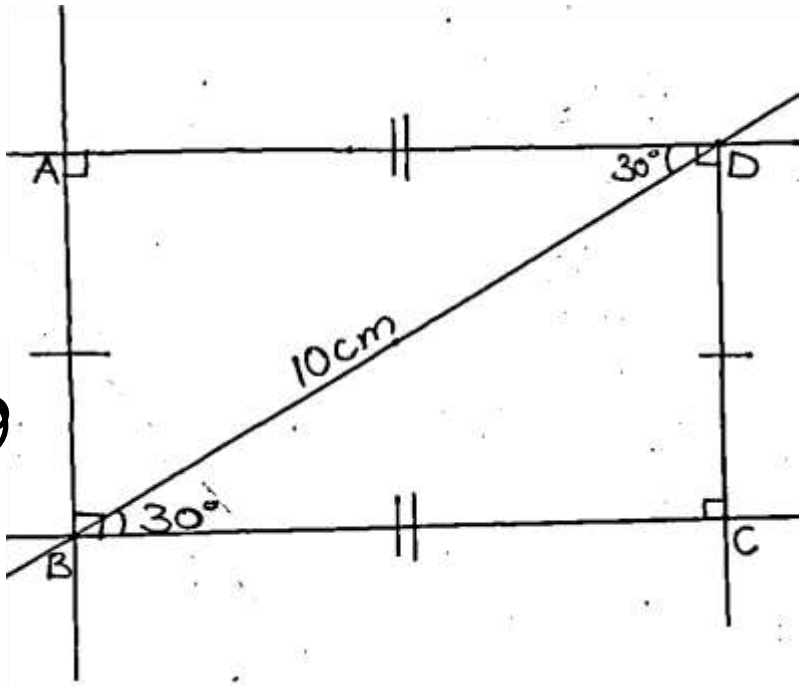
$154m^2 - 77m^2$

$= 77m^2$

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.* (01 mark)

BC = 8.7cm (± 0.1cm)

29. (a) *Find the number that has been expanded to give:*
$(1x2^3) + (1x2^1) + (1x2^0)$ (02 marks)

Approach 1

$(1x2^3) + (1x2^1) + (1x2^0)$

$(1x2x2x2)+(1x2)+(1x1)$

8+2+1

11_{ten}

11_{ten} to base two

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

1011_{two}

Approach 2

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

1011_{two}

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

(02 marks)

$23_d = 33_{four}$

d^1	d^0
2	3

4^1	4^0
3	3

$(2xd^1)+(3xd^0) = (3x4^1)+(3x4^0)$

$(2xd)+(3x1) = (3x4)+(3x1)$

$2d+3 = 12+3$

$2d+3 = 15$

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

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

$d = 6$

d is base six

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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(soap) + 4(rice) = sh. 32000

(3x2p) + 4(2p-sh.2500) = sh. 32000

6p+8p-sh. 10000 = sh. 32000

14p-sh. 10000 = sh. 32000

14p-sh. 10000+sh.10000 = sh.32000+sh.10000

14p = sh. 42000

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

p = 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 – sh. 2500

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

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

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

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

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

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

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

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

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

Approach 3

Let the cost of Meat be y

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

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

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

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

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

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

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

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

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

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

Approach 4

Let the cost of rice be r

Rice	Soap
r	r + sh. 2500

Value of r

$(4xy) + 3(y + \text{sh. } 2500) = \text{sh. } 32000$

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

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

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

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

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

$y = \text{sh. } 3500$

Cost of 1kg of soap

r + sh. 2500

sh. 3000 + sh. 2500

sh. 6000

Cost of 1kg of meat

2parts rep sh. 6000

1 part rep $\frac{\text{sh. } 6000}{2}$

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

5 parts rep sh. 15000

Approach 5

Let the cost of soap be n

Soap	Rice
n	n - sh. 2500

Value of r

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

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

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

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

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

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

$y = \text{sh. } 6000$

Cost of 1kg of meat

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

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

sh. 3000×5

sh. 15000

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

Approach 1

5(2p - sh. 2500)

5(2xsh. 3000 - sh. 2500)

5(sh. 6000 - sh. 2500)

5 x sh. 3500

sh. 17500

Approach 2

$5(\frac{2}{5}m$ - sh. 2500)

$5(\frac{2}{5}x$ sh. 15000 - sh. 2500)

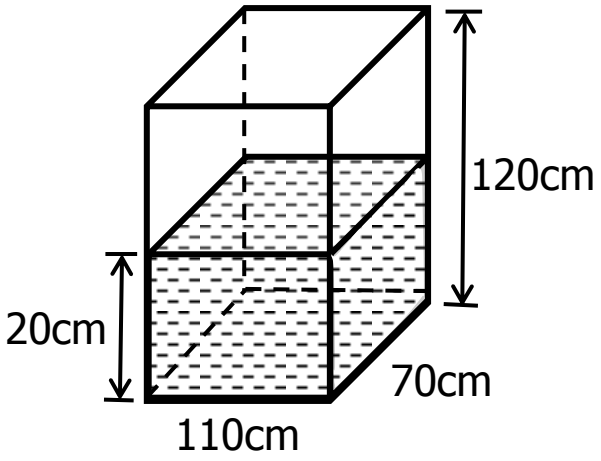
5(sh. 6000 - sh. 25000)

5 x sh. 3500

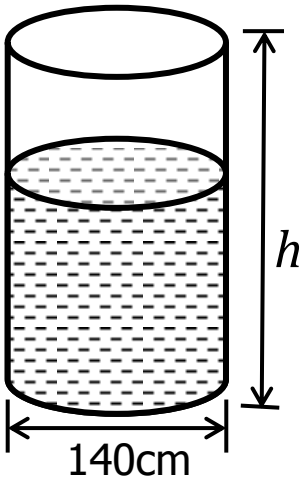
sh. 17500

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

Container X



Container Y



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

V = LxWxH

V = 110cmx70cmx20cm

V = 154000cm^3

Volume of water in container Y

2parts rep 154000cm^3

1prt rep $\frac{154000cm^3}{2}$

5parts rep $\frac{154000cm^3}{2} \times 5$

5parts rep 385000cm^3

Volume of container Y

Let the volume be g

$\frac{2}{5}$ of $g = 385000cm^3$

$\frac{2g}{5} = 385000cm^3$

$5 \times \frac{2g}{5} = 385000cm^3 \times 5$

$\frac{2g}{2} = \frac{385000cm^3}{2} \times 5$

$g = 616000cm^3$

Value of h

$\pi r^2 h = V$

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

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

$15400cm^2 \times h = 616000cm^3$

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

$h = 40cm$

(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

$616000cm^3 - 385000cm^3$

$231000cm^3$

$1cm^3 = 1ml$

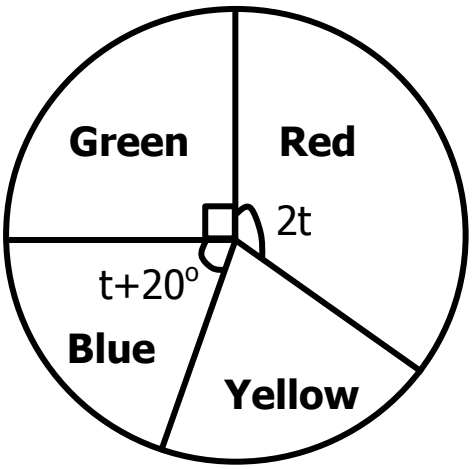
$231000cm^3 = 231000ml$

Number of bottles needed

(231000ml ÷ 750ml)bottles

308 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 pupils → 360°

1 pupil → $(\frac{360}{108})^\circ$

21 pupils → $(\frac{360}{108} \times 21)^\circ$

21 pupils → 70°

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°

Number of pupils in P.7 blue

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

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

Percentage of pupils in P.7 Green

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

Or

$\frac{27}{108} = \frac{1}{4} = \frac{1x25}{4x25} = \frac{25}{100} = 25\%$

END

Approach 4

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

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

$100 \div 4 = 25$

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

$= 25\%$