SUREKEY EXAMINATIONS BOARD

PRE-PLE MAGIC SERIES EXAMINATION

2023

MATHEMATICS GUIDE

PREPARED BY:

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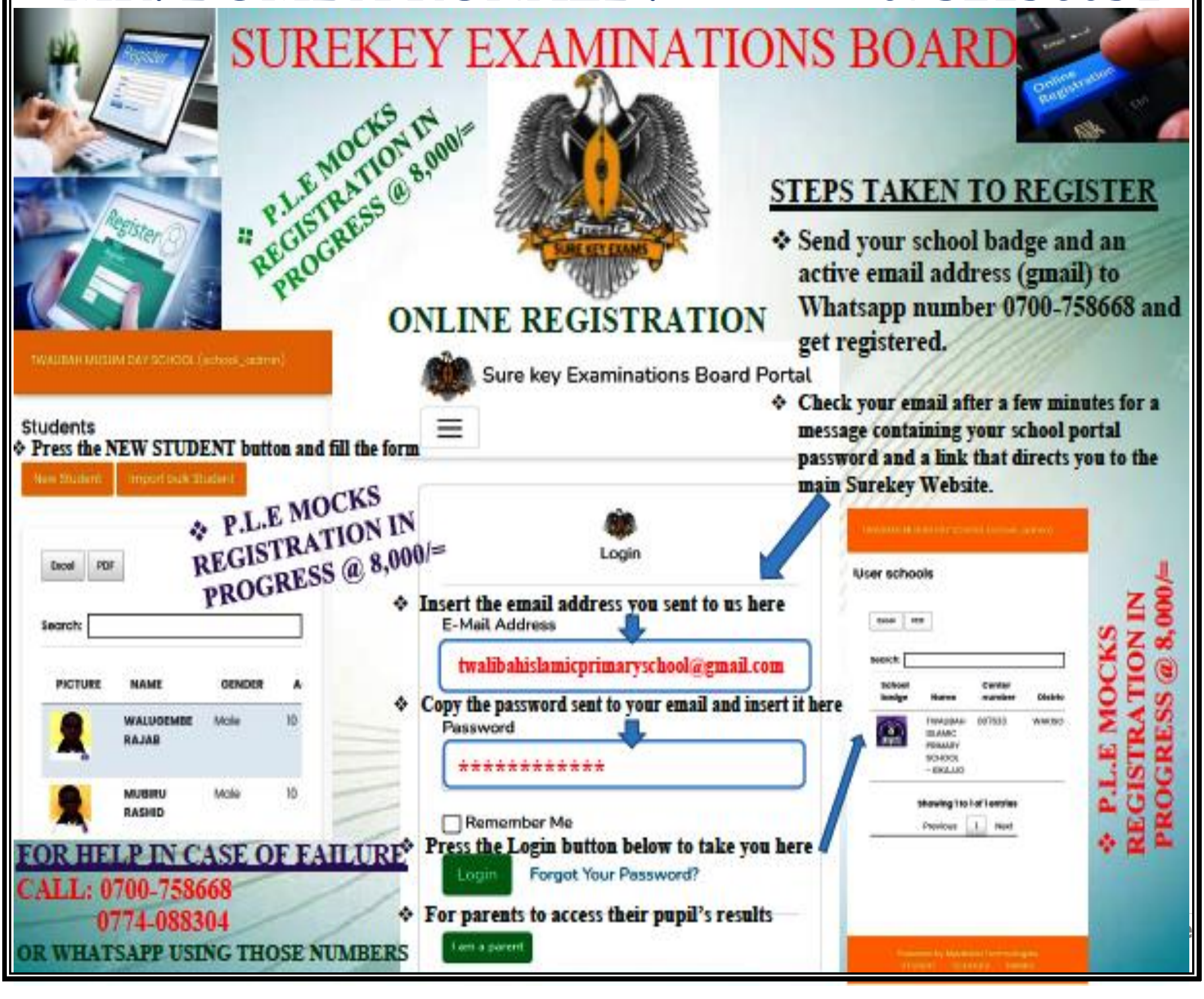


SECTION A: 40 MARKS

Answer **all** questions in this Section

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

1. Workout: $\frac{1}{3} \div \frac{1}{24}$

$\frac{1}{\cancel{3}_{1}} \times \frac{\cancel{24}^{8}}{1}$

$\frac{1 \times 8}{1 \times 1}$

$\underline{8}$

OR

$\frac{1}{\cancel{3}_{1}} \times \cancel{24}^{8} \div \frac{1}{\cancel{24}_{1}} \times \cancel{24}^{1}$

$8 \div 1$

$\underline{8}$

2. Write 124 in Roman Numerals.

100	*C*
20	*XX*
+ 4	*IV*
124	*CXXIV*

OR

$124 \longrightarrow 100 + 20 + 4$

$C \quad XX \quad IV$

CXXIV

3. Given that P n Q = { a,e,f }, P U Q = {a,b,c,d,e,f,g} and Q′ = {b,c}.
Find the number of subsets that can be formed from members of set Q.

$Q = \{ a, \textcircled{b}, \textcircled{c}, d, e, f, g \}$

$Q' = \{ \textcircled{b}, \textcircled{c} \}$

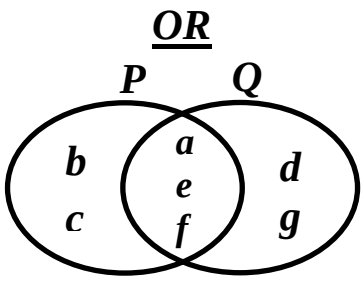
$Q = \{ a, d, e, f, g \}$

Number of subsets $= 2n$

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

$= 32$ *subsets*

OR



$Q = \{ a, d, e, f, g \}$

Number of subsets $= 2n$

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

$= 32$ *subsets*

4. A dice is rolled once, what is the probability that a triangular number will show up?

$P = \frac{n(E)}{n(SS)}$

$= \frac{\{\textcircled{1}, 2, \textcircled{3}, 4, 5, \textcircled{6}\}}{\{1, 2, 3, 4, 5, 6\}}$

$= \frac{\{1, 3, 6\}}{6}$

$= \frac{3}{6}$

5. Round off 0.849 to the nearest hundredths.

$$\begin{array}{r} 0.849 \\ +0.01 \\ \hline 0.85 \end{array}$$

$0.849 \approx 0.85$

---

6. Magomu is thrice as old as Nancy. The difference in their age is 20 years. How old is Nancy?

Let Nancy's age be p

Nancy	Magomu	Diff (-)
p	3p	20

$3p - p = 20$

$2p = 20$

$\frac{2p}{2} = \frac{20}{2}$

$P = 10$

Nancy is 10 years.

OR

Let Magomu's age be p

Nancy	Magomu	Diff (-)
$\frac{p}{3}$	p	20

$p - \frac{p}{3} = 20$

$\frac{(3 \times p) - p \times 3}{3} = (20 \times 3)$

$3p - p = 60$

$\frac{2p}{2} = \frac{60}{2}$

$P = 30$

Nancy

$\frac{30}{3}$

10

Nancy is 10 years.

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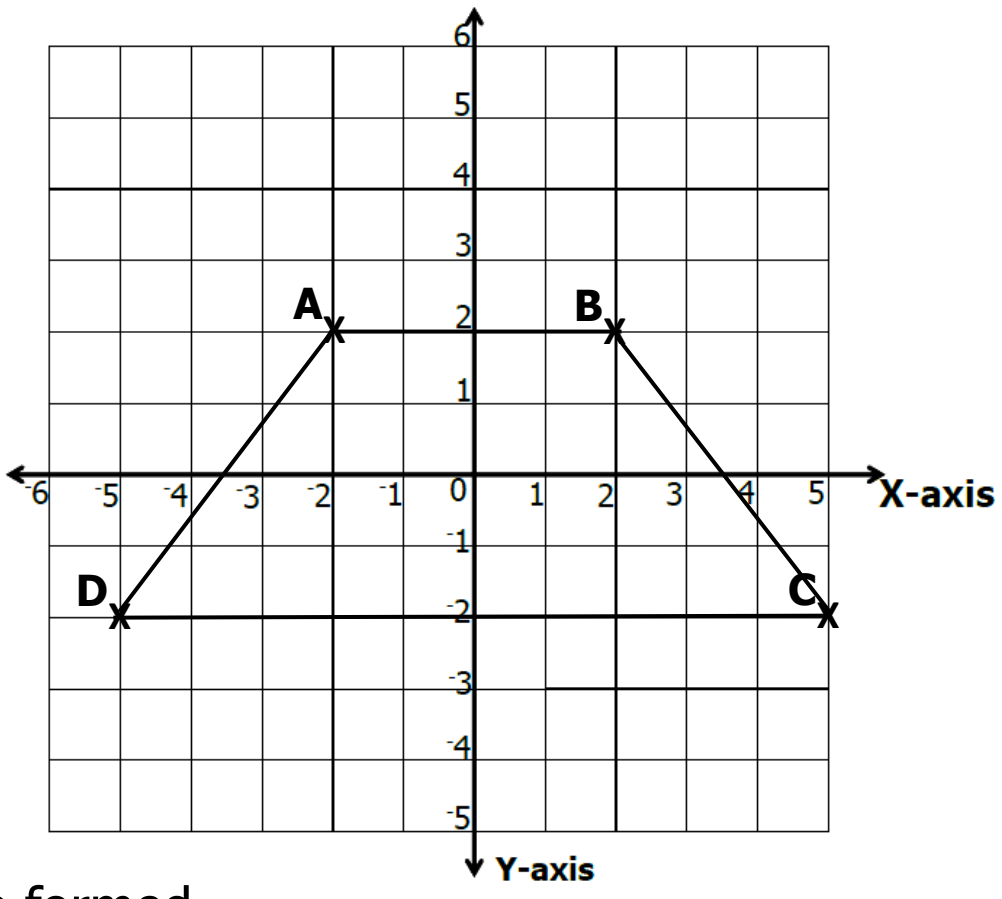
7. On the coordinate graph below, plot points B(2,2) and C(5,-2) and then join points A to B, B to C, C to D and D to A



Name the figure formed.

Isosceles trapezium Or trapezium

8. Decrease sh. 18000 in the ratio of 2:3.

$\frac{2}{3} \times sh.\overset{6000}{\cancel{18000}}$

$2 \times sh.\ 6000$

$sh.\ 12000$

OR

$3 \text{ parts} = sh.18000$

$2 \text{parts} = \frac{2}{3} \times sh.\overset{6000}{\cancel{18000}}$

$= 2 \times sh.\ 6000$

$= sh.\ 12000$

9. Find the square root of 0.16.

$\sqrt{0.16}$

$\sqrt{\frac{16}{100}}$

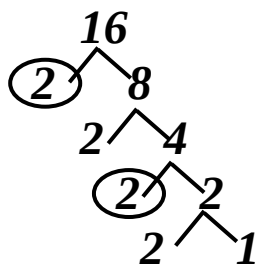
$\frac{\sqrt{16}}{\sqrt{100}}$

$\sqrt{4 \times 4}$

$\sqrt{10 \times 10}$

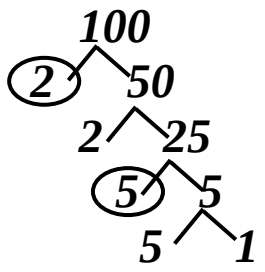
$\frac{4}{10}$

0.4



$= 2 \times 2$

$= 4$



$= 2 \times 5$

$= 10$

10. Solve for x: $2x - 3 = 3$ (finite 5)

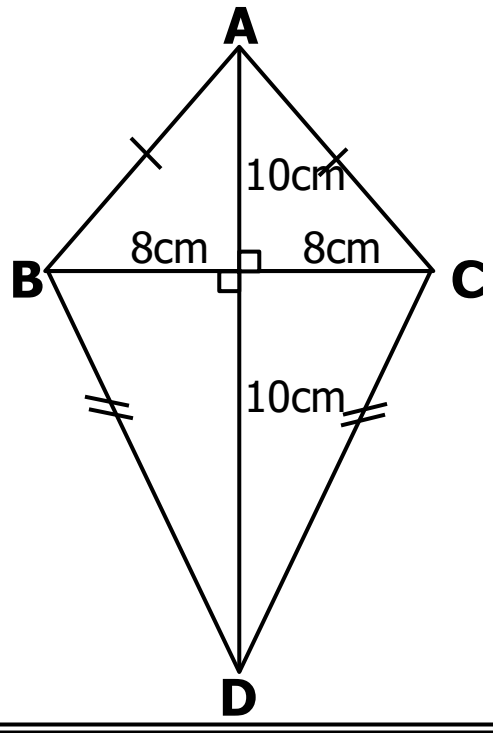
$2x - 3 + 3 = 3 + 3$ (finite 5)

$2x = 6$ (finite 5)

$\frac{2x}{2} = \frac{6}{2}$ (3)

$x = 3$ (finite 5)

11. Below is a kite ABDC whose diagonals are AD = 20cm and BC = 16cm. Workout its area.



$A = \frac{d_1 \times d_2}{2}$

$= \frac{20cm \times 16cm}{2}$

$= 10cm \times 16cm$

$= 160cm^2$

OR

$A = 2(b \times h)$

$= 2(10cm \times 8cm)$

$= 2 \times 80cm^2$

$= 160cm^2$

OR

$A = \frac{b \times h}{2} \times 4$ (2)

$= \frac{10cm \times 8cm}{2} \times \frac{4}{2}$

$= 2 \times 10cm \times 8cm$

$= 160cm^2$

12. Solve and state the solution set for the inequality: $3 < 2t - 5 < 7$.

$3 + 5 < 2t - 5 + 5 < 7 + 5$

$8 < 2t < 12$

$\frac{8}{2} < \frac{2t}{2} < \frac{12}{2}$ (4) (6)

$4 < t < 6$

$t: t = \{5\}$

13. When 144 porters are increased by m%, they become 180 porters. Calculate the value of m.

Increase

180

- 144

36

144 parts $\rightarrow$ 100%

1 part $\rightarrow \frac{36}{144} \times \frac{100\%}{4}$ (25)

$= 25\%$

$\frac{m\%}{1\%} = \frac{25\%}{1\%}$

$m = 25$

OR

Increase

$(100 + m)\%$

$\frac{(100 + m)}{100} \times 144 = 180$

$\frac{14400 + 144m}{100} = 180$

$\frac{14400 + 144m}{100} \times \frac{100}{100} = 180 \times 100$

$14400 + 144m = 18000$

$144m = 18000 - 14400$

$\frac{144m}{144} = \frac{36000}{144}$ (25)

$m = 25$

14. What single numeral has been expanded as shown below?

$(3 \times 10^4) + (2 \times 10^1) + (4 \times 10^{-2})$

$(3 \times 10000) + (2 \times 10) + (4 \times \frac{1}{100})$

$30000 + 20 + 0.04$

30000
20
$+ \quad 0.04$
30020.04

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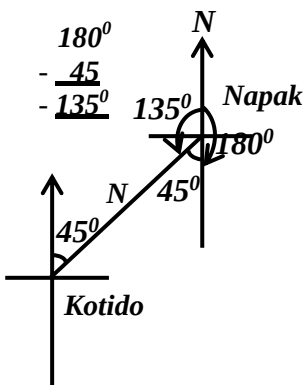
15. The bearing of Napak from Kotido is 045^0. What is the bearing of Kotido from Napak?



Bearing of Kotido from Napak.

180^0
$+ 045^0$
225^0

OR

360^0
$- \quad 135^0$
225^0

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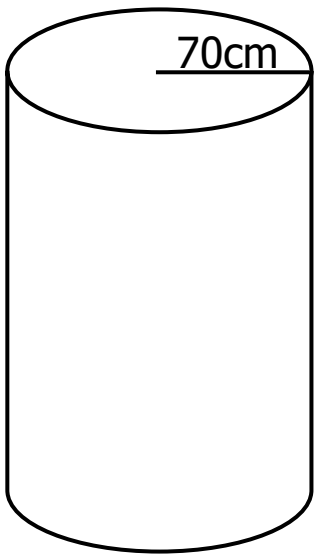
16. The cylindrical tank below holds 1078 litres and a radius of 70cm. How high is the tank? (Use π as $\frac{22}{7}$)



$V = C \times 1000cm^3$
$= 1078 \times 1000cm^3$
$= 1078000cm^3$

Height

$BA \times H = V$

$\pi r^2 h = V$

$\frac{22}{7} \times \overset{10}{\cancel{70}}cm \times 70m \times h = 1078000cm^3$

$\frac{\cancel{15400cm^2} \times h}{\cancel{15400cm^2}} = \frac{\overset{70}{\cancel{1078000cm^3}}}{\cancel{154000cm^2}}$

$h = 70cm$

OR

$V = C \times 1000cm^3$
$= 1078 \times 1000$
$= 1078000cm^3$

Height

$h = \frac{V}{BA}$

$h = 1078000cm^3 \div \frac{22}{\cancel{7}} \times \overset{10}{\cancel{70}}cm \times 70cm$

$= \frac{\overset{70}{\cancel{1078000cm}} \times \cancel{cm} \times \cancel{cm} \times cm}{\cancel{154000} \times \cancel{cm} \times \cancel{cm}}$

$h = 70cm$

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17. Simplify: $\frac{12a^2 - 4a^2}{2a}$

$= \frac{8a^2}{2a}$

$= \frac{\overset{4}{\cancel{8}} \times \cancel{a} \times a}{\cancel{2} \times \cancel{a}}$

$= 4a$

OR

$= \frac{12a^2}{2a} - \frac{4a^2}{2a}$

$= \frac{\overset{6}{\cancel{12}} \times a \times \cancel{a}}{\cancel{2} \times \cancel{a}} - \frac{\overset{2}{\cancel{4}} \times \cancel{a} \times a}{\cancel{2} \times \cancel{a}}$

$= 6a - 2a$

$= 4a$

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18. Simplify: $^-4 - {}^-8$

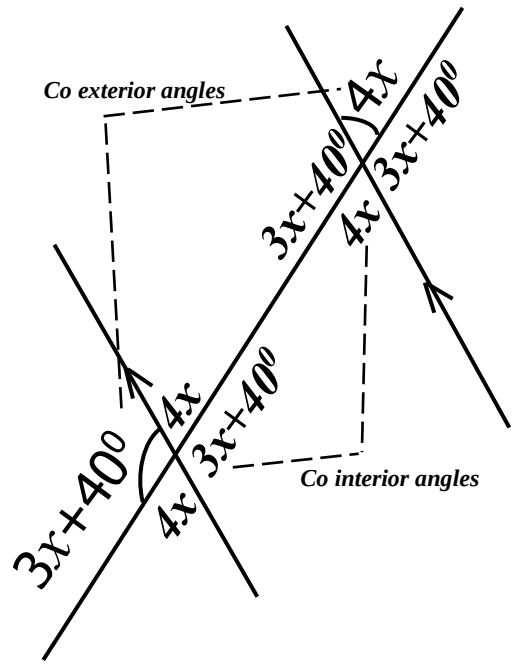
$^-4 - (^-8)$

$^-4 + 8$

$8 - 4$

4

19. Find the value of x in the figure below.



$3x + 40^0 + 4x = 180^0$ *(co interior angles)/ Co exterior angles*

$3x + 4x + 40^0 = 180^0$ *Angles on a straight line*

$7x + 40^0 = 180^0$

$7x + 40^0 - 40^0 = 180^0 - 40^0$

$7x = 140^0$

$\frac{7x}{7} = \frac{140^0}{7}$

$\underline{x = 20^0}$

20. A motorist covered a distance of 90km between 12:15 a.m. and 1:45 a.m. Find the speed in km/hr.

12:15 – 12:00
= 15 minutes
Duration
ET – ST
1:45 – 15
1:30
= 1 hr and 30 minutes

$Speed = D \div T$

$= 90km \div 1\frac{30}{60}\ hrs$

$= 90km \div 1\frac{1}{2}\ hrs$

$= 90km \div \frac{3}{2}\ hr$

$= \frac{\overset{30}{\cancel{90}}km}{\cancel{3}\ hr} \times \frac{2}{}$

$= 60km/hr$

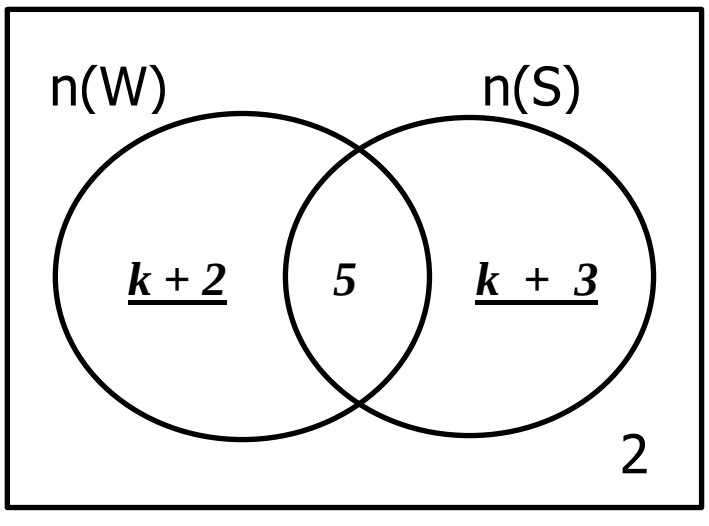
SECTION B: 60 MARKS

Answer **all** questions in this section

Marks for each question are indicated in brackets.

21. At a wedding party, k+2 guests drank Water (W) only, k+3 drank Soda(S) only and 5 drank both water and soda while two guests did not drink any of the two drinks.

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



(b) If 13 guests drank soda, find the number of guests who took water only. (02 Marks)

Value of k

$k + 3 + 5 = 13$
$k + 8 = 13$
$k + 8 - 8 = 13 - 8$
$k = 5$

Water only

$(k + 2)$ guests
$5 + 2$
7guests

(c) How many guests attended the wedding party? (02 Mark)

$13 + k + 2 + 2$
$13 + 5 + 2 + 2$
22guests

OR

$k + 2 + 5 + k + 3 + 2$
$5 + 2 + 5 + 5 + 3 + 2$
22guests

22. Madam Suzan went with forty thousand shillings to Daniel's shop and bought the items shown on the table below.

Item	Quantity	Unit Cost	Total Cost
Sugar	2kg	sh. 4000 per kg	sh. 8,000
Meat	3 kg	sh. 8,000	sh. 24,000
Rice	$\frac{1}{2}$ or 0.5 kg	sh. 4,000 per kg	sh. 2000
Total Expenditure			sh. 34,000

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

Sugar
Sh. $\frac{8000^{4000}}{2}$
Sh.4000

Meat
Sh.24000
Sh. 8000
3kg

sh. 8000
+ sh.24000
sh.32000

Rice
sh. 34000
- sh. 32000
sh. 2000

sh. 2000
sh. $\frac{4000^{1}}{2}$

(b) How much change did Daniel give her? (01 Mark)

$$\begin{array}{r} sh.\ {}^{3}{}^{1}40000 \\ -\ sh.\ 34000 \\ \hline sh.\ 6000 \end{array}$$

23. (a) Work out: $11_{two} \times 10_{two}$ (02 Marks)

$$\begin{array}{r} 1\ 1_{two} \\ \times\ 1\ 0_{two} \\ \hline 0\ 0 \\ +\ 1\ 1 \\ \hline 1\ 1\ 0_{two} \end{array}$$

(b) Solve for w: $2\ w\ 4_{five} = 59_{ten}$ (02 Marks)

$(2 \times 5^2) + (w \times 5^1) + (4 \times 5^0) = 59$
$(2 \times 5 \times 5) + (w \times 5) + (4 \times 1) = 59$
$(2 \times 25) + 5w + 4 = 59$
$50 + 5w + 4 = 59$
$5w + 54 = 59$
$5w + 54 - 54 = 59 - 54$
$\frac{5w}{5} = \frac{5^1}{5}$
$w = 1$

24. A group of twenty-six ladies started a weekly cash round of 30 shares. 25 of the ladies had one share each in the cash round while Hajjat was paying for 5 shares every week.

(a) If each share was worth sh.7,000 and a member was supposed to be paid off each week. How much was the pay off? (02 Marks)

sh. 7000 x 30
sh. 210000

(b) How much money did Hajjat contribute for the 25 ladies in the full cash round? (02 Marks)

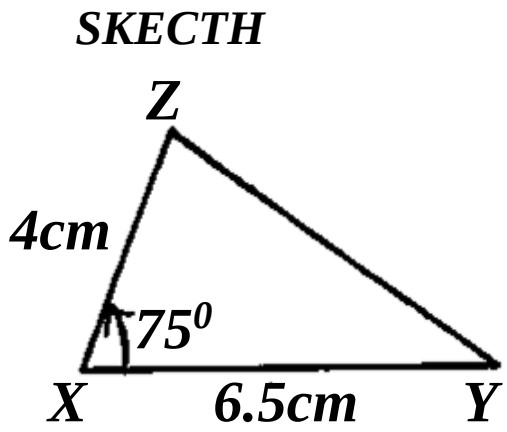
Weekly contribution
sh.7000 x 5
sh. 35000
Total contribution
sh. 35000 x 25
sh. 875000

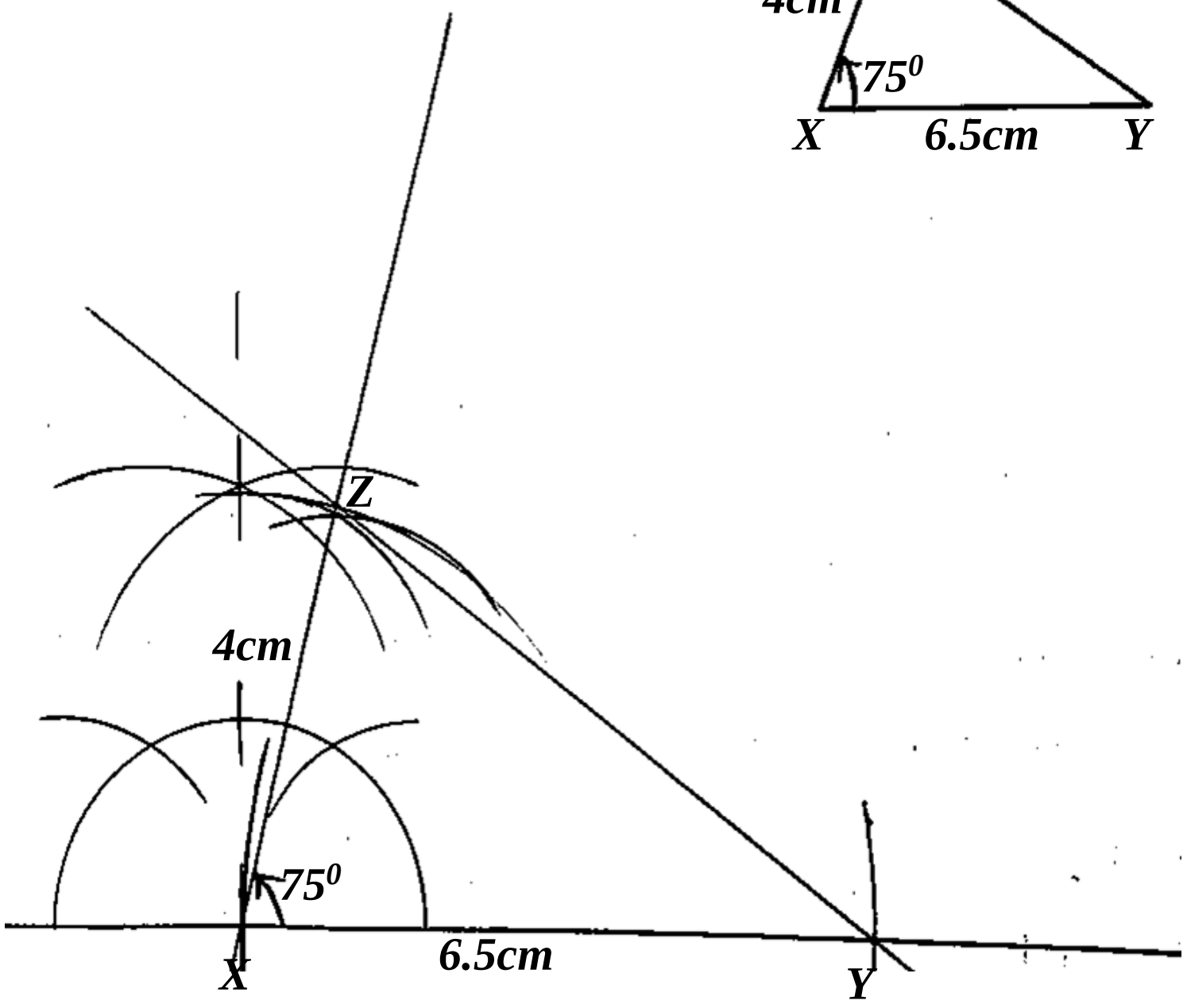
(c) Calculate the total amount Hajjat received from the cash round if she was paid off on her fifth share. (02 Marks)

1 share → sh. 210000
5shares → sh. 210000 x 5
sh. 1050000

25. (a) Using a ruler, pencil and a pair of compasses only, construct triangle XYZ where length XY = 6.5cm, angle ZXY = 75^0 and length XZ = 4cm. (04 Marks)

SKECTH





(b) Measure; (02 Marks)

i) angle XYZ ***$34^0/35^0/36^0$***.....

ii) length YZ ***6.5/6.6/6.7***.....cm.

26. A group of P.7 candidates scored marks in a testing exam as shown on the table below.

No. of candidates	4	2	2	3
Marks scored	60	80	m	70

(a) Find the value of m if the average mark was 62. (03 Marks)

$$\frac{S.O.D}{N.O.D} = Average$$

$$\frac{(4 \times 60) + (2 \times 80) + (2 \times m) + (3 \times 70)}{4 + 2 + 2 + 3} = 62$$

$$\frac{240 + 160 + 2m + 210}{11} = 62$$

$$\frac{610 + 2m}{\cancel{11}} \times \cancel{11} = 62 \times 11$$

$$610 + 2m = 682$$

$$610 - 610 + 2m = 682 - 610$$

$$\frac{2m}{\cancel{2}} = \frac{\cancel{72}^{36}}{\cancel{2}}$$

$$m = 36$$

(b) Find the difference between the highest and lowest mark. (01 Mark)

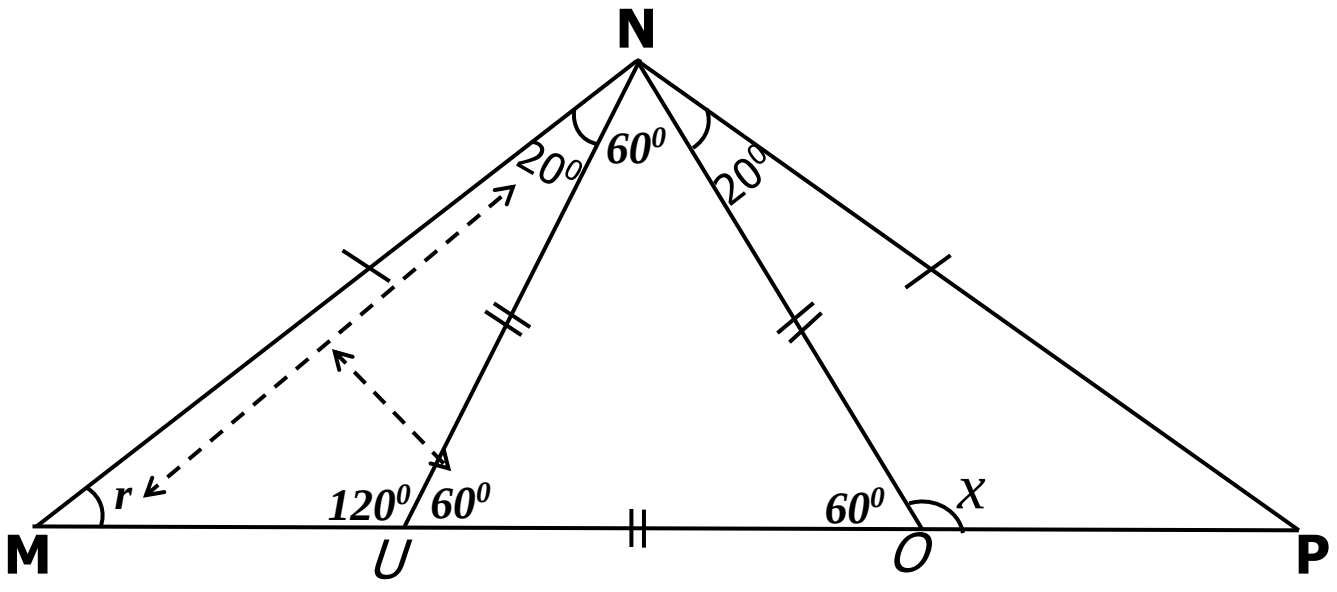
$$\begin{array}{r} 80 \\ -\ 36 \\ \hline 44 \end{array}$$

(c) Workout the median of the scores. (02 Marks)

36, 36, 60, 60, 60, 60, 70, 70, 70, 80, 80

60

27. In the figure below, angle MNU = PNO = 20^0. NMP is an isosceles triangle while NUO is an equilateral triangle. Use it to answer the questions about it.



(a) Find the value of x in degrees. (02 Marks)

$x + 60^0 = 180^0$ *(angles on a straight line)*

$x + 60^0 - 60^0 = 180^0 - 60^0$

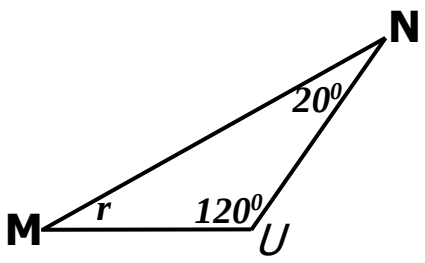
$x = 120^0$

OR

$x = 60^0 + 60^0$ *(sum of two interior angles = 1 opp ext angle)*

$= 120^0$

(b) Calculate the size of angle NMU. (02 Marks)



$r + 20^0 + 120^0 = 180^0$

$r + 140^0 = 180^0$

$r + 140^0 - 140^0 = 180^0 - 140^0$

$r = 40^0$

$<NMU = 40^0$

OR

$r + 20^0 = 60^0$

$r + 20^0 - 20^0 = 60^0 - 20^0$

$r = 40^0$

$<NMU = 40^0$

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28. Mane, Salah and Farminho scored 18 goals in the ratio of 3:4:2 respectively.

(a) How many more goals did Salah score than Farminho? (02 Marks)

Total ratio

$3 + 4 + 2$

9parts

goals scored by Salah

$\frac{4}{\cancel{9}} \times \cancel{18}^{2}$

4×2

8 goals

goals scored by Farminho

$\frac{2}{\cancel{9}} \times \cancel{18}^{2}$

2×2

4 goals

More goals scored

2×2

= 4more goals

Difference in ratio

$4 - 2$

2 parts

More goals scored

9 parts 18 goals

2 parts $\frac{2}{\cancel{9}} \times \cancel{18}^{2}$

4more goals

(b) Express Mane's goals as a percentage of the total goals scored. (02 Mark)

$\frac{\cancel{3}^{1}}{\cancel{9}_{3}} \times 100\%$ *33 rem 1*

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

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

Goals scored by Manne

$\frac{3}{\cancel{9}} \times \cancel{18}^{2}$

6 goals

Percentage

$\frac{\cancel{6}^{1}}{\cancel{18}_{3}} \times 100\%$ *33 rem 1*

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

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

29. Japan produced y cars and China produced 60 cars less than Japan. Germany then produced half as many cars as China and Japan. If the three countries produced 6300 cars altogether. How many more cars did Japan produce than Germany? (05 Marks)

Japan	China	Germany	Total cars
y	$y - 60$	$\frac{1}{2}(y + y - 60)$	6300

$y + y - 60 + \frac{1}{2}(y + y - 60) = 6300$

$(2 \times y) + 2(y - 60) + \frac{1(y + y - 60)}{2} \times 2 = 6300 \times 2$

$2y + 2y - 120 + y + y - 60 = 12600$

$6y - 120 - 60 = 12600$

$6y - 180 = 12600$

$6y - 180 + 180 = 12600 + 180$

$\frac{6y}{6} = \frac{12780}{6}$ (2130)

$y = 2130$

Cars produced by Germany

$\frac{1}{2} \times (y + y - 60)$

$\frac{1}{2}(2130 + (2130 - 60)$

$\frac{1}{2} \times (2130 + 2070)$

$\frac{1}{2} \times \frac{4200}{2}$ (2100)

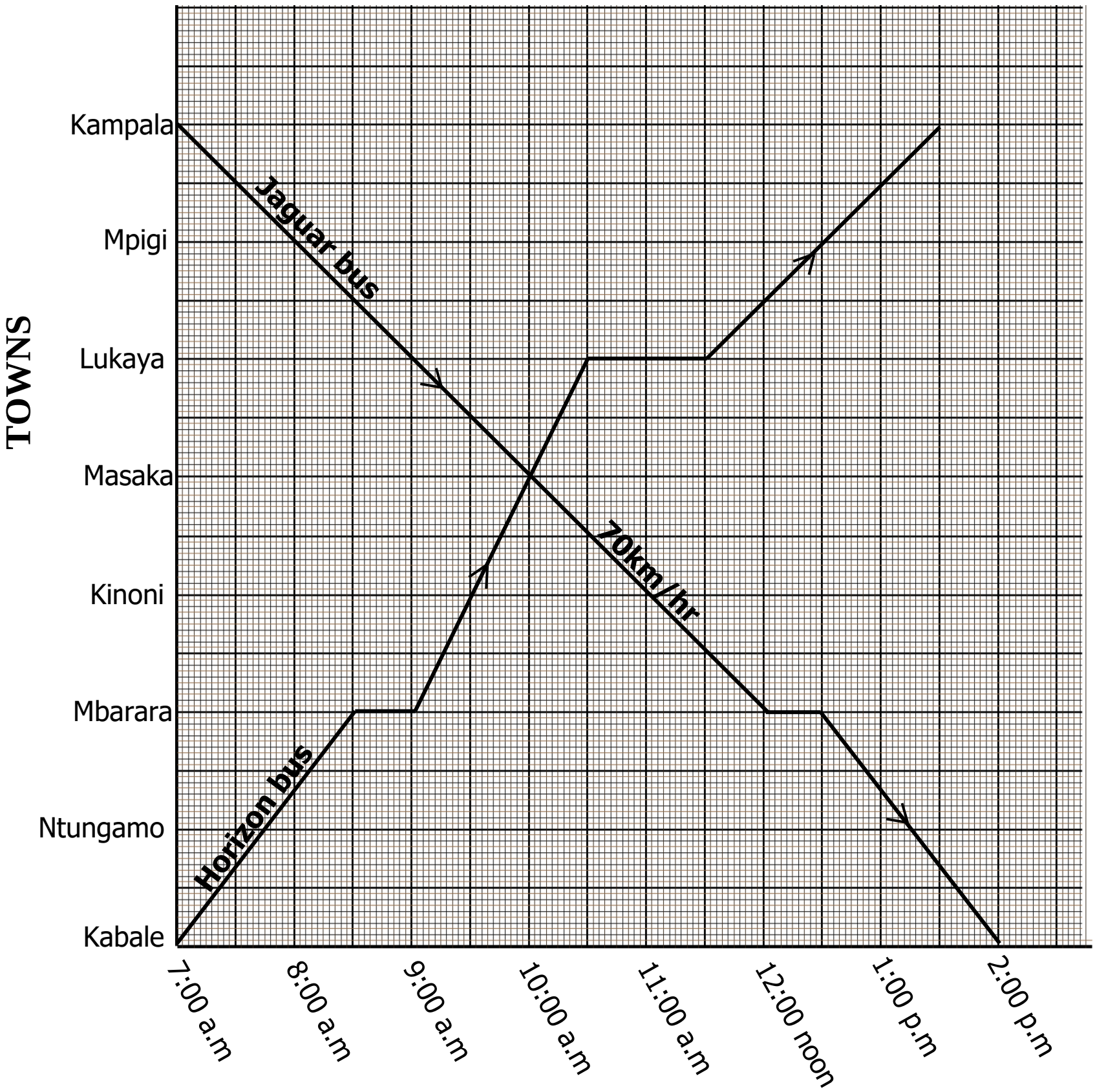
2100 cars

More cars produced by Japan

(2130 – 2100cars)

30 more cars

30. The graph below shows the journey of two buses. Horizon bus travelling from Kabale to Kampala and Jaguar bus travelling from Kampala to Kabale. Study it carefully and answer the questions that follow.



(a) At what time did the two buses meet? (01 Mark)

The two buses met at 10:00a.m.

.....

(b) What distance does the Jaguar bus cover between Masaka and Mbarara? (02 Marks)

$$\textit{Distance} = S \times T$$
$$= \underline{70km} \times \cancel{2hr}$$
$$\cancel{hr}$$
$$= \underline{140km}$$

(c) Calculate the average speed at which Horizon bus was travelling if the total distance between Kabale and Kampala is 403km. (03 Marks)

$$AVS = \frac{T.D}{T.T.T}$$
$$= 403km \div 5hrs$$
$$80 \text{ rem } 3$$
$$= \frac{\cancel{403}km}{\cancel{5}hr}$$
$$= 80\frac{3}{5}m/hr$$

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31. A tank was $\frac{2}{3}$ full of water. When it rained, the tank became $\frac{11}{12}$ full. Makedo used $\frac{1}{3}$ of the added water after raining to make bricks, if he used 100 litres, find the tank's full capacity. (04marks)

Fraction of water added after raining

$\frac{11}{12} - \frac{2}{3}$ $\quad LCD = 12$

$\frac{11-8}{12}$

$\frac{\cancel{3}^{1}}{\cancel{12}_{4}}$

$\frac{1}{4}$

Number of litres added after raining

$\frac{1}{12} \rightarrow 100litres$

$100\ litres \div \frac{1}{12}$

$100 \times \frac{12}{1}$

$1200litres$

Fraction used by Makedo

$\frac{1}{3}$ *of* $\frac{1}{4}$

$\frac{1}{3} \times \frac{1}{4}$

$\frac{1}{12}$

Capacity of full tank

$\frac{1}{4} \rightarrow 1200litres$

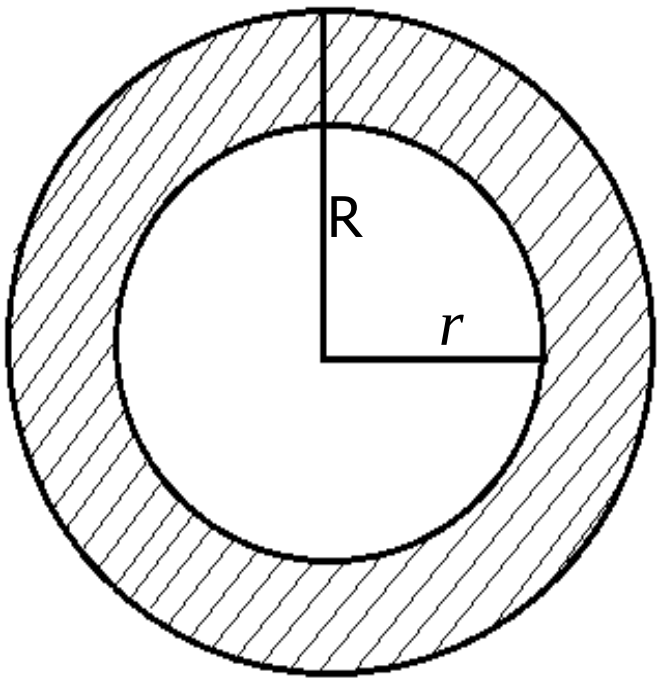
$1200\ litres \div \frac{1}{4}$

$1200 \times \frac{4}{1}$

$4800litres$

Accept any other correct approaches leading to the answer

32. The figure below shows two circles. The outer shaded circle has a radius of (R)cm while the inner circle has a radius of (r)cm and a total area of 154cm^2. Use it to answer the questions that follow.



(a) Calculate the circumference of the inner circle. (Use π as $\frac{22}{7}$)

Radius of inner circle

$\pi r^2 = A$

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

$\frac{22}{7}r^2 \times \frac{1}{7} = 154cm^2 \times \frac{7}{7}$

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

$\sqrt{r^2} = \sqrt{(7 \times 7)cm^2}$

$r = 7cm$

Circumference if inner circle (03 Marks)

$C = 2\pi r$

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

$= 2 \times 22cm$

$= 44cm$

Diameter $= 2r$

$= 2 \times 7cm$

$= 14cm$

$C = \pi d$

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

$= 22 \times 2cm$

$= 44cm$

(b) Find the circumference of the outer circle if its radius is twice that of the inner circle. (02 Marks)

Radius of outer circle

Radius $= 2r$

$= 2 \times 7cm$

$= 14cm$

Circumference of outer circle

$C = 2\pi r$

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

$= 22 \times 2 \times 2cm$

$= 88cm$

END

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