

# STEM EXAMINATIONS BOARD

## PRE-PRIMARY LEAVING EXAMINATION SET XIII, 2024

### MATHEMATICS

Time Allowed: 2 hours 30 minutes

Index No.	Random No.					Personal No.		

Candidate's Name: .....

Candidate's Signature: .....

District ID 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. The paper has **8 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 done in pencil other than graphs and diagrams will **not** be marked.
5. **No calculators** are allowed in the examination room.
6. Unnecessary **changes** in your work and handwriting that cannot easily be read may lead to loss of marks.
7. Do not fill anything in the table indicated: **"For Examiners' use only"** and 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.

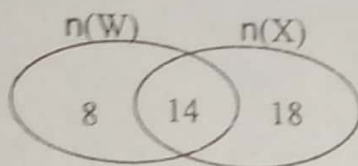
Questions 1 to 20 carry two marks each.

1. Work out:

$$\begin{array}{r} 203 \\ \times 3 \\ \hline \end{array}$$

2. Simplify:  $7y + x - 3y - 5x$

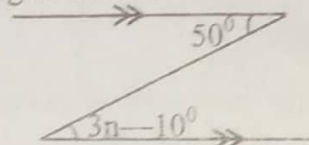
3. Use the Venn diagram below to find  $n(W \cup X)$



4. Express  $\frac{9}{11}$  as a repeating decimal.

5. A blue band tin of 500gms costs Shs. 4500. How much will Sarah pay for  $1\frac{1}{2}$  kg tin of similar blue band?

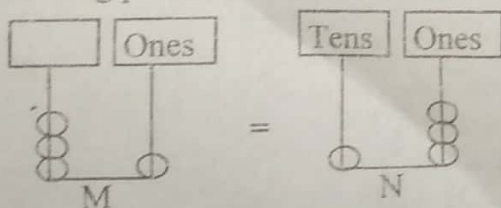
6. Solve for the value of  $n$  in degrees from the figure below.



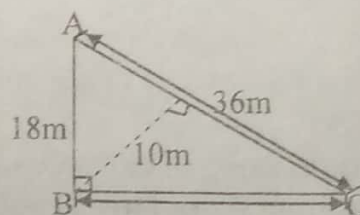
7. The sum of three consecutive even numerals is 60.  
Work out the least numeral.

8. After selling his cow, John was given a bundle of twenty thousand shilling notes numbered consecutively from AX 771690 to AX 771779. How much did he sell his cow?

9. From the abaci M and N below, find the missing place value on abacus M.



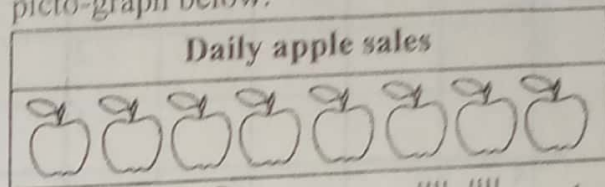
10. In the figure below, calculate the base BC in metres.





11. In a school of 680 pupils, 70% of them are girls and the rest are boys. How many boys are in the school?
12. What numeral has been expanded to give?  
 $(3 \times 10^3) + (9 \times 10^2) + (4 \times 10^1) + (3 \times 10^0)$

13. The prime factors of P and Q are as shown below;  
 $F_P = \{2_1, 2_2, y, 3_1\}$   
 $F_Q = \{2_1, y, 3_1, 3_2\}$   
 If the Highest Common Factor (HCF) of P and Q is 18, find the value of P.

14. Joan sells apples as shown on the picto-graph below.



Given that  stands for  apples, how many apples does she sell daily?

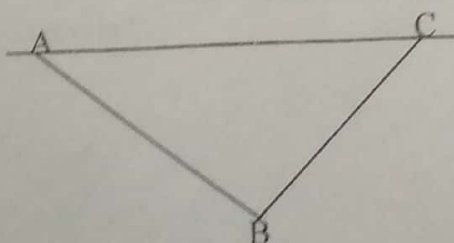
15. Express  $3^2 \times 21 + 2^3$  as a single numeral.

16. Work out  $4 + 4 = \square$  (finite 5) using a dial.

17. Solve the inequality:  $y - 9 \leq 3 - y$

18. Andrew will celebrate his 9<sup>th</sup> birthday next week. What is the probability that he will celebrate it on a day starting with letter "S"?

19. With the help of a ruler, a pencil and a pair of compasses only, bisect angle ABC in the figure below.



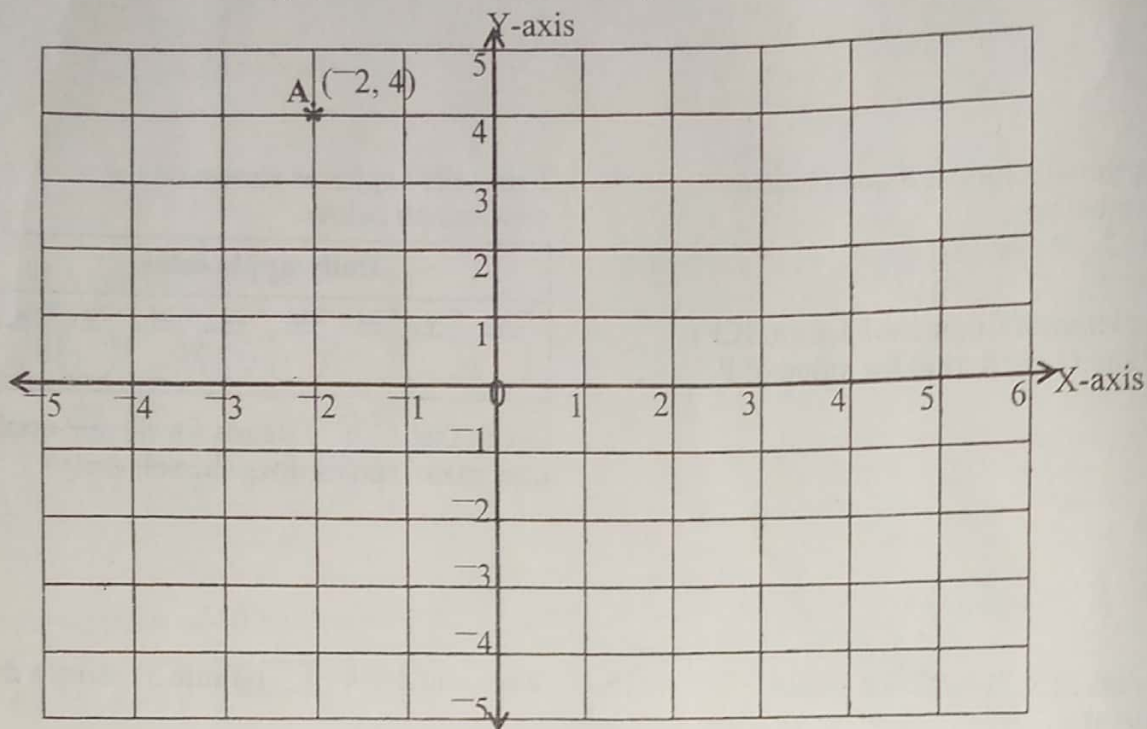
20. Express the morning time shown on the digital watch below to 24-hour clock system.



# SECTION B : 60 MARKS

Answer **all** questions in this section.  
Marks for each question are indicated in the brackets.

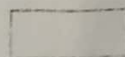
21. Use the co-ordinate graph below to answer the questions that follow.



- (a) Plot the following co-ordinates on the co-ordinate graph above;  
B (4, 4) C (4, -2) (2 marks)
- (b) Find the co-ordinates for point D so that when ABCD is joined together, it forms a square. (1 mark)
- (c) Show all lines of folding symmetry in the figure formed when ABCD is joined together. (1 mark)

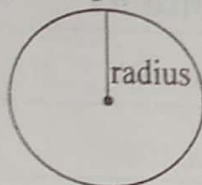
22. (a) Solve for t:  $3^{t+1} = 9 \times 9$  (2 marks)
- (b) Express 0.0308 in standard form. (2 marks)

- (c) How many groups of tens represent the value 8 in the numeral 1853? (2 marks)





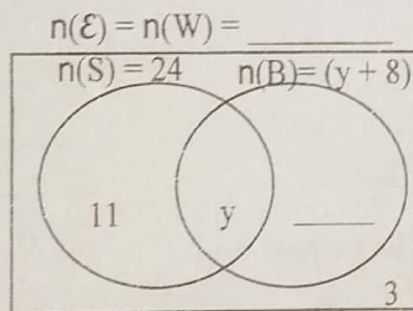
23. Forty four poles were planted 5-metres apart round the field below.



- (a) Find the radius of the field above. (3 marks)      (b) Calculate the area covered by the field above. (2 marks)

24. At a birthday picnic, all  $(y + 27)$  guests were served with water (W), 24 of them served with soda (S),  $(y + 8)$  served with beer (B),  $y$  guests served with all the three drinks while 3 guests were served with water only.

- (a) Use the above information to complete the Venn diagram below. (2 marks)



- (b) How many guests attended the birthday picnic? (3 marks)

25. (a) Find the median of  $\frac{1}{5}$ ,  $\frac{3}{4}$ , and  $\frac{1}{2}$ . (2 marks)

- (b) Divide:  $0.36 \div 1.8$ .

(2 marks)

- (c) There are 304 pupils in a class. If the ratio of boys to girls is 3 : 5 respectively, how many more girls than boys are in the class? (2 marks)

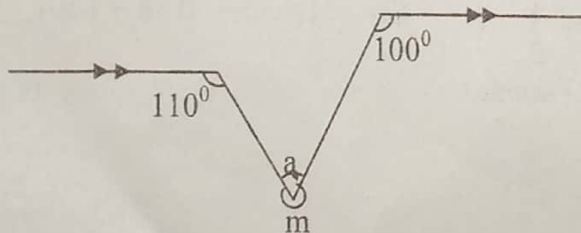
26. (a) Complete Tom's shopping bill table below correctly. (4 marks)

S/NO	ITEM	QUANTITY	UNIT COST	AMOUNT
(i)	Sugar	$1\frac{1}{2}$ kg	Shs. 4000 per kg	Shs. ....
(ii)	Salt	.....gms	Shs. 2000 per kg	Shs. 1000
(iii)	Onions	.....heaps	Shs. 1000 per heap	Shs. ....
(iv)	TOTAL EXPENDITURE			Shs. 10,000

- (b) If Tom paid Shs. 9000 for all the items, what percentage discount was he given? (2 marks)

27. (a) Calculate the interior angle sum of a regular octagon. (2 marks)

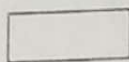
- (b) Use the figure below to find the size of angles marked **a** and **m** in degrees.



- (i) **a** (2 marks) (ii) **m** (2 marks)

28. A mango costs three times as much as a tomato. Moneck bought 3 mangoes and 5 tomatoes at a total cost Shs. 14000.  
Find the cost of each mango and a tomato.

(4 marks)



29. A chef prepared milk tea such that he used 20% more milk than water.

(a) What percentage of water did he use?

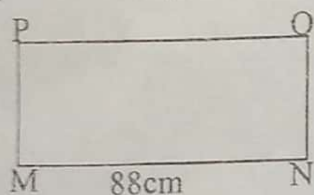
(2 marks)

(b) If he used 30 litres of milk, how many litres of milk tea did he prepare?

(2 marks)

30. A rectangular sheet of metal MNOP below was folded to form a hollow cylinder.

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

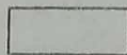


(a) Work out the diameter of the cylinder formed.

(2 marks)

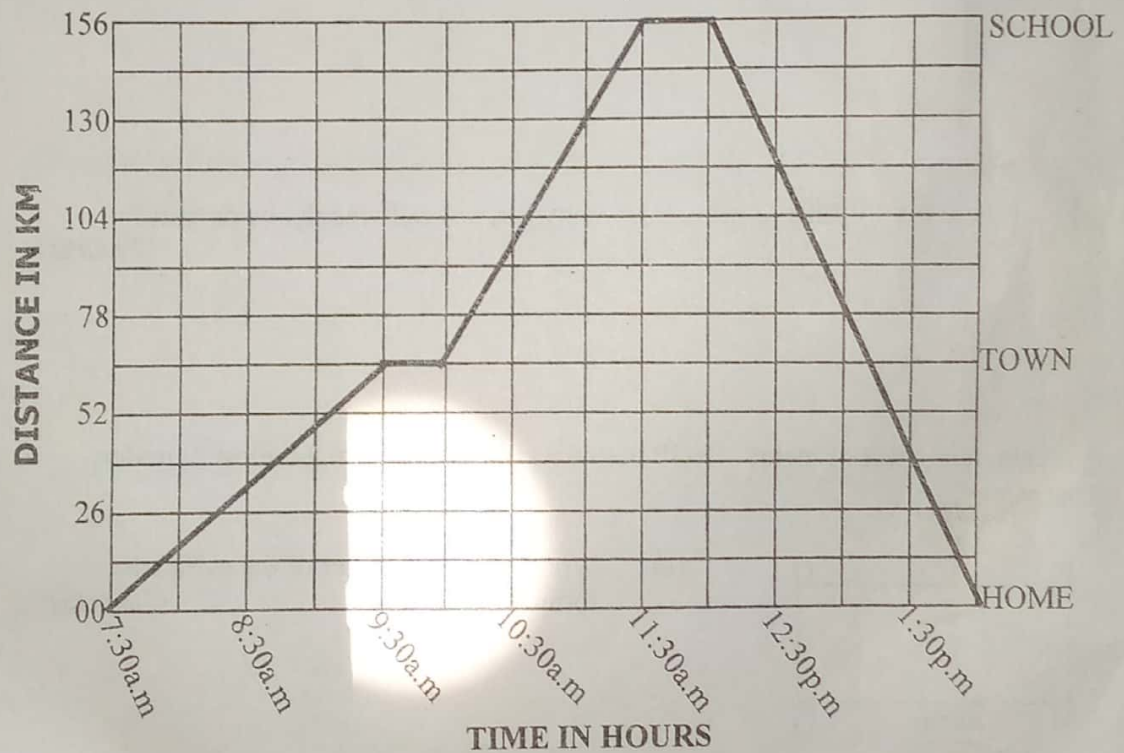
(b) If the area of the sheet MNOP above is  $1760\text{cm}^2$ , calculate the volume of the cylinder formed.

(3 marks)



31. With the help of a ruler, a sharp pencil and a pair of compasses only construct an isosceles trapezium PQRS where  $PQ = 8\text{cm}$  and  $QR = 4\text{cm}$  while angle  $PQR = QPS = 60^\circ$ .  
(4 marks)

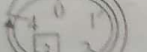
32. The travel graph below shows a parent's journey from home via town to school and then back home.

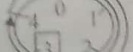


- (a) For how long did he take travelling from town to school? (1 mark)
- (b) At what time did he depart school back home? (1 mark)
- (c) What distance had he covered by 11 O'clock in the morning? (1 mark)
- (d) Calculate his average speed for the whole journey. (2 marks)


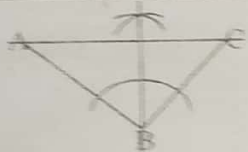
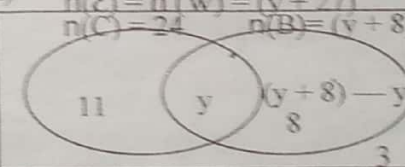
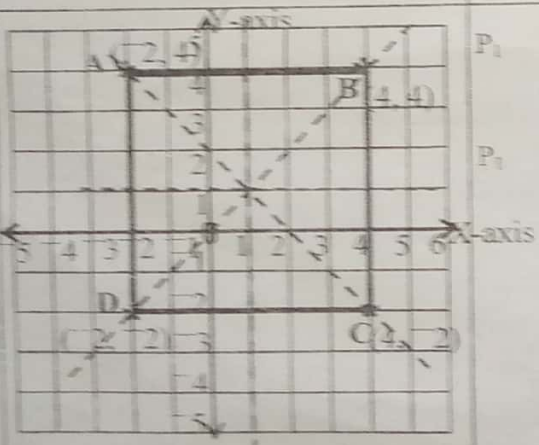


## P.7 PRE-PLE SET XII MATHS MARKING GUIDE, 2014

S/N	SOLUTION	MRKS	COMMENTS	S/N	SOLUTION	MRKS	COMMENTS					
16.	$4 + 4 = \square$ (finite 5) Dial 	B <sub>1</sub>	For correct use of dial		(b) $D = (-2, -2)$	B <sub>1</sub>	For $D = (-2, -2)$					
	$4 + 4 = \boxed{3}$ (finite 5)	B <sub>1</sub>	For $4 + 4 = \boxed{3}$ (finite 5)		(c) As on the graph	B <sub>1</sub>	For all 4 lines of folding symmetry shown					
						04						
17.	$y = -y \leq 3 - y$ $0 + 0 \leq 3 - y + y$ $y = 6$	M <sub>1</sub>	For collection of like terms together	22.	(a) $\frac{3^{t+1}}{3^{t+1}} = \frac{9 \times 9}{3 \times 3 \times 3 \times 3}$ $\frac{t+1}{t+1} = 4$ $t+1-1 = 4-1$ $t = 3$	M <sub>1</sub>	For correct use of laws of indices					
		A <sub>1</sub>	For $y \leq 6$		(b) $0.0308 = \frac{0.0308 \times 10}{0.0308 \times 10}$ $3.08 \times 10$	A <sub>1</sub>	For $t = 3$					
					(c) Value = <table data-bbox="1285 1560 1467 1576"><tr><td>1</td><td>1</td><td>1</td><td>1</td><td>0</td></tr></table>	1	1	1	1	0	M <sub>1</sub>	For correct method
1	1	1	1	0								
						A <sub>1</sub>	For $3.08 \times 10$					

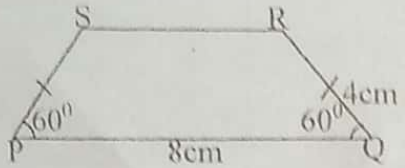
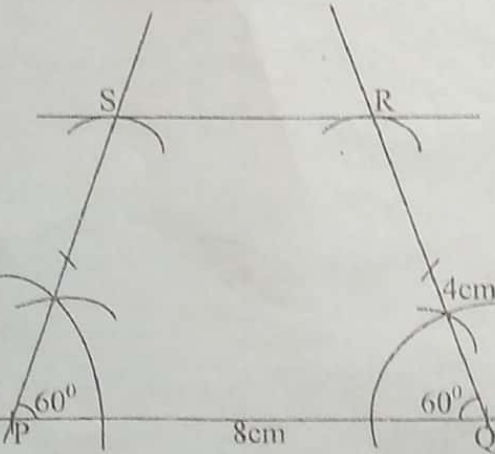
S/N	SOLUTION	MRKS	COMMENTS	S/N	SOLUTION	MRKS	COMMENTS				
16.	$4 + 4 = \boxed{\phantom{00}}$ (finite 5) Dial  $4 + 4 = \boxed{3}$ (finite 5)	B <sub>1</sub>	For correct use of dial		(b) $D = (-2, -2)$ (c) As on the graph	B <sub>1</sub>	For $D (-2, -2)$ For all 4 lines of folding symmetry shown				
		B <sub>1</sub>	For $4 + 4 = \boxed{3}$ (finite 5)			04					
17.	$y = \frac{y+3}{0+9} = \frac{y}{9} - y + y$ $y = \frac{y+3}{9}$ $y \leq 6$ Probability = $\frac{1}{9}$	M <sub>1</sub>	For collection of like terms together	22.	(a) $\frac{3^{t+1}}{3^{t+1}} = \frac{9 \times 9}{3 \times 3 \times 3 \times 3}$ $\frac{3^{t+1}}{3^{t+1}} = \frac{3}{3} \times \frac{3}{3} \times \frac{3}{3} \times \frac{3}{3}$ $\frac{t+1}{t+1} = 4$ $\frac{t+1}{t} = 4 - 1$ $\frac{t+1}{t} = 3$	M <sub>1</sub>	For correct use of laws of indices				
		A <sub>1</sub>	For $y \leq 6$		(b) $0.0308 = \frac{0.0308 \times 10}{0.0308 \times 10}$ $3.08 \times 10^{-4}$	A <sub>1</sub>	For $t = 3$				
					(c) Value = <table border="1" data-bbox="1263 1572 1471 1588"><tr><td>TH</td><td>TH</td><td>1</td><td>0</td></tr></table>	TH	TH	1	0	M <sub>1</sub>	For correct method
TH	TH	1	0								
						A <sub>1</sub>	For $3.08 \times 10^{-4}$				

8	Notes = AX 771779 — AX 771690 89 + 1 = 90 notes Amount = 90 x Shs. 20,000 = Shs. 1,800,000	B <sub>1</sub> B <sub>1</sub>	For 90 notes For Shs. 1,800,000	15	$\frac{3^2 \times 21 + 2^2}{(3 \times 5 \times 21) + 2 \times 2 \times 2}$ $= \frac{189 + 8}{189 + 8}$ $= 197$	M <sub>1</sub> A <sub>1</sub>	For using MDAS For 197.
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S/N	SOLUTION	MRKS	COMMENTS	S/N	SOLUTION	MRKS	COMMENTS								
16.	$4 + 4 = \square$ (finite 5) Dial  $4 + 4 = \boxed{3}$ (finite 5)	B <sub>1</sub> B <sub>1</sub>	For correct use of dial For $4 + 4 = \boxed{3}$ (finite 5)		(b) $D = (-2, -2)$ (c) As on the graph	B <sub>1</sub> B <sub>1</sub> 04	For D $(-2, -2)$ For all 4 lines of folding symmetry shown								
17.	$\begin{array}{r} y - 9 < 3 - y \\ y - 9 \neq 9 < 3 - y + y \\ y + y < 3 + 9 \\ 2y < 12 \\ y < 6 \end{array}$	M <sub>1</sub> A <sub>1</sub>	For collection of like terms together For $y \leq 6$	22.	(a) $\begin{array}{l} 3^{t+1} = 9 \times 9 \\ 3^{t+1} = 3 \times 3 \times 3 \times 3 \\ 3^{t+1} = 3^4 \\ t+1 = 4 \\ t = 3 \end{array}$ (b) $0.0308 = \frac{0.0308 \times 10}{0.0308 \times 10}$ $= \frac{3.08 \times 10^{-2}}{10^{-2}}$ (c) Value = <table border="1" data-bbox="1308 612 1554 700"><tr><td>TH</td><td>H</td><td>T</td><td>O</td></tr><tr><td>1</td><td>8</td><td>5</td><td>3</td></tr></table> $\frac{8 \times 100}{100} = 800$ Groups of tens = $\frac{800}{10} = 80$ groups of tens	TH	H	T	O	1	8	5	3	M <sub>1</sub> A <sub>1</sub> M <sub>1</sub> A <sub>1</sub> B <sub>1</sub> B <sub>1</sub> 06	For correct use of laws of indices For $t = 3$ For correct method For $3.08 \times 10^{-2}$ For 800 For 80 groups of tens
TH	H	T	O												
1	8	5	3												
18.	Probability = $\frac{EOC}{POC}$ = Days = {M, T, W, T, F, S, S} = Probability = $\frac{S, S}{7 \text{ days}} = \frac{2}{7}$ = Probability = $\frac{2}{7}$	M <sub>1</sub> A <sub>1</sub>	For identifying days of the week For probability = $\frac{2}{7}$	23.	(a) Distance = Poles x Distance apart $= 44 \times 5m$ $= 220m$ Circumference = $2\pi r$ $44 \times 2 \times \frac{22}{7} \times r = 220m \times 7$ $\frac{44 \times 2 \times 22 \times r}{44} = \frac{220m \times 7}{44}$ Radius = $35m$ (b) Area = $\pi r^2$ $= \frac{22}{7} \times 35m \times 35m$ $= 110m \times 35m$ $= 3850m^2$	B <sub>1</sub> M <sub>1</sub> A <sub>1</sub> M <sub>1</sub> A <sub>1</sub> 05	For 220m For correct method For radius = 35m For correct multiplying For $3850m^2$								
19.		C <sub>1</sub> L <sub>1</sub>	For accurate arcs For bisecting line from B through line AC	24.	(a) $\begin{array}{l} n(E) = n(W) = (y + 27) \\ n(C) = 24 \\ n(B) = (y + 8) \end{array}$  (b) $\frac{y + 11}{y + 11} - 11 = 24 - 11$ $\frac{y}{y} = 13$	B <sub>1</sub> B <sub>1</sub> M <sub>1</sub> A <sub>1</sub>	For $n(E) = y + 27$ For 8 For forming equation For $y = 13$								
20.	Time = 12 : 01am $\begin{array}{r} 12 : 01 \\ - 12 : 00 \\ \hline 00 : 01 \text{Hrs} \end{array}$	M <sub>1</sub> A <sub>1</sub>	For correct conversion For 0001Hrs												
21.		P <sub>1</sub> P <sub>1</sub>	For plotting B (4, 4) correctly For plotting C (4, -2) correctly												

S/N	SOLUTION	MRKS	COMMENTS	S/N	SOLUTION	MRKS	COMMENTS
	Total = $y + 27$ = $13 + 27$ = 40 guests	B <sub>1</sub> 05	For 40 guests	27.	(a) Octagon = 8 sides Interior angle sum = $180^\circ (n - 2)$ = $180^\circ (8 - 2)$ = $180^\circ \times 6$ = $1080^\circ$  (b) (i) $a = 180^\circ - (70^\circ + 80^\circ)$ $a = 180^\circ - 150^\circ$ $a = 30^\circ$  (ii) $m + a = 360^\circ$ $m + 30^\circ = 360^\circ$ $m + 30^\circ - 30^\circ = 360^\circ - 30^\circ$ $m = 330^\circ$	M <sub>1</sub> A <sub>1</sub> M <sub>1</sub> A <sub>1</sub> M <sub>1</sub> A <sub>1</sub> 06	For correct method For $1080^\circ$ For correct use of angle properties For $a = 30^\circ$ For correct method For $m = 330^\circ$
25.	(a) $1 \times 20^2 = 4 \times 1 = 4$ ..... ① $3 \times 20^5 = 5 \times 3 = 15$ ..... ③ $1 \times 20^{10} = 10 \times 1 = 10$ ..... ② Median = $1, \frac{1}{2}, \frac{3}{2}$  Median = $\frac{1}{2}$  (b) $0.36 \div 1.8$ = $\frac{36}{100} \div \frac{18}{10}$ = $\frac{36}{100} \times \frac{10}{18}$ = $\frac{2}{10}$ = 0.2  (c) More ratio = $5 - 3 = 2$ More girls = $\frac{2}{5+3} \times 304$ pupils = $\frac{2}{8} \times 304$ = 76 more girls	B <sub>1</sub> M <sub>1</sub> A <sub>1</sub> M <sub>1</sub> A <sub>1</sub> 06	For correct arrangement of fractions For median = $\frac{1}{2}$ For correct division For 0.2 For correct method For 76 more girls				
26.	(a) (i) Sugar = $1\frac{1}{2} \text{ kg} \times \text{Shs. } 4000$ $3 \times \text{Shs. } 4000$ = Shs. 6000 (ii) Salt = $\frac{\text{Shs. } 1000}{\text{Shs. } 2000} \times 500$ 1000gms = 500gms (iii) Onions = $\frac{\text{Shs. } 10,000}{\text{Shs. } 10,000 - (6000 + 1000)}$ = $\frac{\text{Shs. } 10,000}{\text{Shs. } 10,000 - 7000}$ = $\frac{\text{Shs. } 10,000}{\text{Shs. } 3000}$ (iv) Onions = $\frac{\text{Shs. } 3000}{\text{Shs. } 1000}$ = 3 heaps  (b) %age discount = $\frac{\text{Discount}}{\text{Cost price}} \times 100\%$ = $\frac{10000 - 9000}{10000} \times 100\%$ = $\frac{1000}{10000} \times 100\%$ = 10%	B <sub>1</sub> B <sub>1</sub> B <sub>1</sub> B <sub>1</sub> M <sub>1</sub> A <sub>1</sub> 06	For Shs. 6000 For 500gms For Shs. 3000 For Shs. 3 heaps For correct method For 10%				
28.	Mango Tomato $x$ $x$ $3x$ $x$ $3(3x)$ $5 \times x$ $9x$ $5x$ Sum = $9x + 5x = \text{Shs. } 14000$ = $14x = \text{Shs. } 14000$ = $x = \text{Shs. } 1000$  Tomato costs Shs. 1000 Mango costs Shs. $1000 \times 3$ = Shs. 3000	M <sub>1</sub> A <sub>1</sub> B <sub>1</sub> B <sub>1</sub> 04	For forming equation For Shs. 1000 For tomato = Shs. 1000 For mango = Shs. 3000				
29.	(a) Milk Water $x$ $x$ $x + 20\%$ $x$ $x + x + 20\% = 100\%$ $2x = 100\% - 20\%$ $2x = 80\%$ $x = 40\%$ Water = 40%  (b) Milk = $40\% + 20\% = 60\%$ 60% take 30 litres 1% take $\frac{30}{60\%}$ 100% take $\frac{30}{60\%} \times 100\%$ = 50 litres	M <sub>1</sub> A <sub>1</sub> M <sub>1</sub> A <sub>1</sub> 04	For correct method For $x = 40\%$ For correct use of percentages For 50 litres				



Q/N	SOLUTION	MARKS	COMMENTS	S/N	SOLUTION	MARKS	COMMENTS
30.	<p>(a) Circumference = <math>\pi D</math>  <math>\frac{22}{7} \times 28 \times D = 88\text{cm} \times 7</math>  <math>\frac{22D}{7} = \frac{88\text{cm} \times 7}{7}</math>  Diameter = 28cm</p> <p>(b) Area of sheet = L x W  <math>88\text{cm} \times w = \frac{1760\text{cm}^2}{88\text{cm}}</math>  <math>88\text{cm} w = \frac{1760\text{cm}^2}{88}</math>  Width = 20cm</p> <p>Volume = <math>\pi r^2 h</math>  <math>= \frac{22}{7} \times 14\text{cm} \times 14\text{cm} \times 20</math>  <math>= 44\text{cm} \times 280\text{cm}</math>  <math>= 12320\text{cm}^3</math></p>	<p>M<sub>1</sub></p> <p>A<sub>1</sub></p> <p>B<sub>1</sub></p> <p>M<sub>1</sub></p> <p>A<sub>1</sub></p> <p>05</p>	<p>For correct method</p> <p>For diameter = 28cm</p> <p>For width = 20cm</p> <p>For correct multiplication</p> <p>For volume = 12320cm<sup>3</sup></p>	32.	<p>(a) 11 : 30a.m  — 10 : 00a.m  1 : 30 Hrs  1 hour 30 minutes</p> <p>(b) At 12:00p.m</p> <p>(c) 130km</p>	<p>B<sub>1</sub></p> <p>B<sub>1</sub></p> <p>B<sub>1</sub></p>	<p>For 1 hour 30 minutes</p> <p>For 12 : 00p.m</p> <p>For 130km</p>
31.	<p>SKETCH</p>  <p>ACCURATE DIAGRAM</p> 	<p>S<sub>1</sub></p> <p>L<sub>1</sub></p> <p>L<sub>1</sub></p> <p>C<sub>1</sub></p> <p>04</p>	<p>For correct sketch</p> <p>For side PQ = 8cm</p> <p>For two sides QR = PS = 4cm</p> <p>For accurate angles 60°</p>		<p>(d) Average speed = <math>\frac{TDT}{TTT}</math>  <math>= \frac{156\text{km} + 156\text{km}}{6\frac{1}{2}\text{hr}}</math>  <math>= \frac{312\text{km} \times 2}{13\text{hr}}</math>  <math>= \frac{312\text{km} \times 2}{13}</math>  <math>= 24\text{km} \times 2\text{hr}</math>  <math>= 48\text{km/hr}</math></p>	<p>M<sub>1</sub></p> <p>A<sub>1</sub></p> <p>05</p>	<p>For correct method</p> <p>For 48km/hr</p>

32x  
11x  
7x