Name.....MARKING SCHEME....................... ADM Number:.........................

School:...................................... Candidate's Signature:...........................

121/1
Mathematics Alt.A
FORM FOUR.
11th MARCH 2025.
2 ½ Hours.

URANGA MATHEMATICS ASSOCIATION-2025.

Kenya Certificate of Secondary Education
MATHEMATICS
121/1
FORM FOUR
TIME: 2 ½ HOURS

INSTRUCTIONS TO CANDIDATES:

- Write your name, school, admission number and sign in the spaces provided above.
- This paper contains **TWO** sections: Section **I** and Section **II**.
- Answer **ALL** the questions in Section **I** and **FIVE** questions from section **II**.
- All answers and working **MUST** be written on the question paper in the spaces provided below each question.
- Marks may be given for correct working even if the answer is wrong.
- Non-programmable silent electronic calculators and KNEC Mathematical tables may be used, except where stated otherwise.

FOR EXAMINERS USE ONLY

SECTION I

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total

SECTION II

17	18	19	20	21	22	23	24	Total

Grand Total	

This paper consists of 15 printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions are missing.

SECTION I (50 MARKS)

MARKING SC **Answer all questions in this section**

1. Evaluate without using tables or calculator: $\dfrac{-2\left(-3^2 + 5\right) - 12 \div 3 \text{ of } 4\times(-2)^2}{5^{-1} - 12 \div 10 + 6}$ correct to 3 decimal places (3 marks)

$N = -2(-9+5) - 12 \div 3 \times 4 (4)$

$= -2(-4) - 12 \div 3 \times 4 (4)$

$= -2(-4) - 12 \div 12 \times 4$

$= 8 - 1 \times 4$

$= 8 - 4 = 4$

$D = \frac{1}{5} - \frac{12}{10} + 6$

$= \frac{1}{5} - \frac{6}{5} + \frac{6}{1}$

$= \frac{1-6+30}{5}$

$= \frac{25}{5} = 5$

$\frac{N}{D} = \frac{4}{5}$

2. Simplify

$\dfrac{6a^2 + 7ab + 2b^2}{4a^2 - b^2}$ (3 marks)

$N \Rightarrow S = 12, P = 7$

$N = 4, 3$

$6a^2 + 3ab + 4ab + 2b^2$

$3a(2a+b) + 2b(2a+b)$

$(3a+2b)(2a+b)$ ✓M1

$D \Rightarrow (2a+b)(2a-b)$

$\frac{N}{D} = \frac{(3a+2b)\cancel{(2a+b)}}{\cancel{(2a+b)}(2a-b)}$ ✓M1

$= \frac{3a+2b}{2a-b}$ ✓A1

3. Koech and Kigen began a 10000 m race together at the starting line. Koech and Kigen took 36 seconds and 48 seconds respectively to run a 400 m lap. The two athletes were together again at the starting line after some time. Determine the number of laps that Kigen had to run to complete the race after they were together. (3 marks)

L.C.M of 36 and 48

2	36	48
2	18	24
2	9	12
2	9	6
2	9	3
3	3	1 ✓B1
3	1	1

$2^4 \times 3^2 = 144$

Laps completed by Kigen

$\frac{144}{48} = 3$ ✓B1

No. of laps in 10000 m race

$= \frac{10000}{400} = 25$

No. of laps Kigen had to run

$\Rightarrow 25 - 3 = 22$ ✓B1

4. A Kenyan bank bought and sold Japanese Yen when the rate is as shown below.

	Buying (Ksh)	Selling (Ksh)
100 Japanese Yen	84.00	85.50

A Kenyan businessman travelled to Japan and converted Ksh. 1 613 760 to Japanese Yen. He spends 75% of the amount and then converted the balance into Kenyan shillings at the bank when buying rate increased by 1.4% and selling rate increased by 1.3%. Calculate the amount of money in Kenyan shilling that he received. (3 marks)

In Yens $= \frac{100 \times 1613760}{85.50}$

$= 1887438.59649123$ ✓M1

Balance $= 25\%$ of 1887438.59649123

$= 471859.649122807$

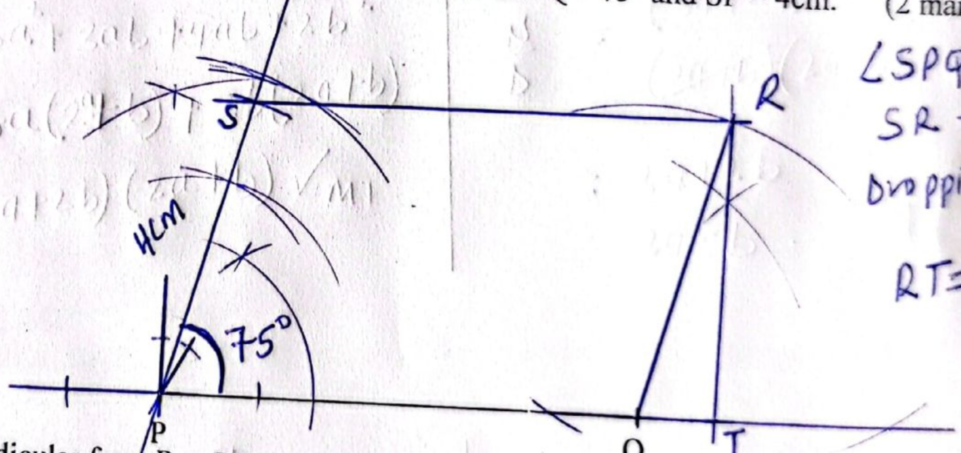
New Buying rates $= 84 \times 1.014$

$= 85.176$ ✓M1

Amount in Ksh $= \frac{471859.649122807 \times 85.1}{100}$

$=$ Sh. 401,911.17 ✓A1

5. (a) Line PQ given below is one of side of a parallelogram PQRS. Using a ruler and a pair of compass only, construct the parallelogram given that ∠SPQ = 75° and SP = 4cm. (2 marks)



∠SPQ - B1

SR - B1

Dropping B1 ✓B1

RT = 3.9 ± 0.1

(b) Drop a perpendicular from R to PQ produced at T. Measure RT. (2 marks)

6. The surface area of two similar bottles is $12cm^2$ and $108cm^2$ respectively. If larger one has a volume of $810cm^3$. Find the volume of the smaller one. (3 marks)

Area scale factor $= \frac{12}{108} = \frac{1}{9}$.

L.s.f $= \sqrt{\frac{1}{9}} = \frac{1}{3}$ ✓M1

V.s.f $= \left(\frac{1}{3}\right)^3 = \frac{1}{27}$

Volume of smaller one

$\frac{1}{27} \times 810$ ✓M1

$= 30cm^3$ ✓A1

7. Shapes are triangles or rectangles and are either red or blue. The ratio of triangles to rectangles is 3: 4. Of the triangles, the ratio of red to blue is 2:3 while of the rectangles, the ratio of red to blue is 4:1. Find the ratio of red shapes to blue shapes. (3 marks)

Let the number of triangles be $3x$ and rectangles $= 4x$

Red triangles $= \frac{2}{5} \times 3x = \frac{6x}{5}$

Red rectangles $= \frac{4}{5} \times 4x = \frac{16}{5}x$ ✓M1

Blue triangles $= \frac{3}{5} \times 3x = \frac{9x}{5}$

Blue rectangles $= \frac{1}{5} \times 4x = \frac{4}{5}x$ ✓M1

$\therefore$ Red shapes : Blue shapes

$= \left(\frac{6}{5}x + \frac{16}{5}x\right) : \left(\frac{9}{5}x + \frac{4}{5}x\right)$

$= \frac{22}{5}x : \frac{13}{5}x$

$= 22 : 13$ ✓A1

8. Solve for x in $27^{x+1} - 3^{3x+2} - 400 = 86$ (4 marks)

$3^{3(x+1)} - 3^{3x+2} = 486$

$3^{3x+3} - 3^{3x+2} = 486$

$3^{3x} \cdot 3^{3} - 3^{3x} \cdot 3^{2} = 486$

Let 3^{3x} be m

$27m - 9m = 486$

$18m$

$M = \frac{486}{18} = 27$

But $M = 3^{3x} = 3^{3}$.

$\therefore 3x = 3$

$x = 1$

9. Under an enlargement with scale factor -1.5, the point R (2, -8) is mapped onto R' (10, 5). By calculation, determine the coordinates of the center of enlargement.

(3 marks)

O(a, b) R (2, -8) R'(10, 5).

$\vec{OR} = \begin{pmatrix} 2 \\ -8 \end{pmatrix} - \begin{pmatrix} a \\ b \end{pmatrix}$: $OR' = \begin{pmatrix} 10 \\ 5 \end{pmatrix} - \begin{pmatrix} a \\ b \end{pmatrix}$

$-1.5\left\{\begin{pmatrix} 2 \\ -8 \end{pmatrix} - \begin{pmatrix} a \\ b \end{pmatrix}\right\} = \left\{\begin{pmatrix} 10 \\ 5 \end{pmatrix} - \begin{pmatrix} a \\ b \end{pmatrix}\right\}$ ✓M1

$-3 + 1.5a = 10 - a$

$2.5a = 13$

$a = 5.2$

$12 + 1.5b = 5 - b$

$2.5b = -7$ ✓M1

$b = -2.8$

Centre $(5.2, -2.8)$ ✓A1

10. Solve the following inequality and show your solution on a number line. (3 marks)

$$4x - 3 \leq \tfrac{1}{2}(x + 8) < x + 5$$

$8x - 6 \leq x + 8 < 2x + 10$

$8x - 6 \leq x + 8$

$7x \leq 14$ ✓B1

$x \leq 2$

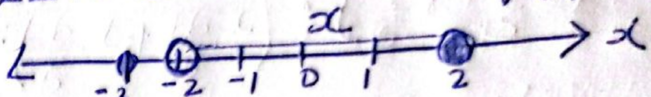
$x + 8 < 2x + 10$

$8 - 10 < x$

$-2 < x$

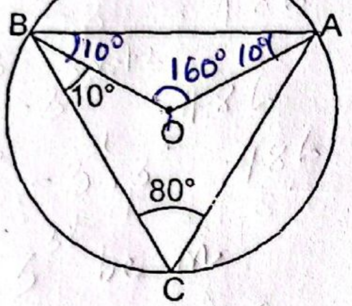
$x > -2$ ✓B1

$-2 < x \leq 2$. ✓B1



11. In the figure below, O is the centre of circle. Angle BCA = 80^0 and angle CBO = 10^0.

Determine the size of angle CAB. (2 marks)



$\angle CAB = 180^\circ - (80^\circ + 20^\circ)$ ✓B1

$= 80^\circ$ ✓B1

12. Two matrices A and B are such that A = $\begin{pmatrix} k & 4 \\ 3 & 2 \end{pmatrix}$ and B = $\begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$, given that the determinant of AB = 4, find the value of K. (3 marks)

$\vec{AB} = \begin{pmatrix} k & 4 \\ 3 & 2 \end{pmatrix}\begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix} = \begin{pmatrix} k+12 & 2k+16 \\ 9 & 14 \end{pmatrix}$ ✓M1

determinant $= 14k + 168 + 18k - 144 = 4$ ✓M1

$\Rightarrow -4k = 4 - 24$

$-4k = -20$

$k = 5$ ✓A1

13. Some information about six numbers is provided below

- Lowest number 37
- The range 24
- The mode 43
- The median 46
- One number is a multiple of 11

Find the mean of the six numbers. (3 marks)

The numbers are 37, 43, 43, 49, 55, 61 ✓ B1

$$\bar{x} = \frac{37+43+43+49+55+61}{6}$$ ✓ M1

$\bar{x} = 48$ ✓ A1

14. A train passes through a station at a speed of 108km/h. the length of the station is 120m.The train takes 7 seconds to completely pass through the station. Calculate the length of the train. (3 marks)

$108 \text{ km/hr} \Rightarrow (108 \times \frac{5}{18}) \text{ m/s} = 30 \text{ m/s}$ ✓ B1

Let the length of the train be x

$\Rightarrow \frac{x+120}{30} = 7$ ✓ M1

$\Rightarrow x+120 = 210$

$x = 210-120$

$x = 90 \text{ m}$ ✓ A1

15. The dimensions of a rectangle are $(2x + 1)$ cm by $(x - 1)$ cm. The area of the rectangle is $29cm^2$ greater than the area of a square of side x cm. Find the perimeter of the rectangle.

(4 marks)

$(2x+1)(x-1) = x^2+29$

$\Rightarrow 2x^2-2x+x-1 = x^2+29$

$x^2-x-30=0$ ✓ M1

$p=-30,\ s=-1$ $JF \Rightarrow -6, 5$

$x^2-6x+5x-30=0$

$x(x-6)+5(x-6)=0$

$(x+5)(x-6)=0$ ✓ M1

$x=6$ or -5 (ignore) ✓ A1

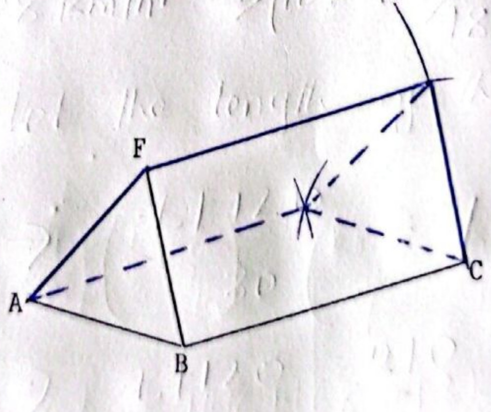
$P = 2\{[2(6)+1]+(6-1)\}$

$= 2\{13+5\}$

$= 36$ cm ✓ B1.

16. In the figure below ABF is a uniform cross section of a solid. AB, BC and BF are some of the visible edges of the solid. Complete the sketch showing the hidden edges with broken lines.

(3 marks)



construction. B1

Broken lines - B1

complete fig - B1

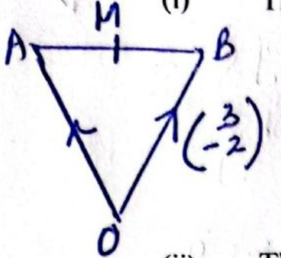
SEC TION II (50 MARKS)

Answer any FIVE questions in this section

17. OAB is triangle in which **OB** = $3\underline{i} - 2\underline{i}$ and **AB** = $4\underline{i} - 10\underline{j}$. M is the mid-point of **AB**.

(a) Find:

(i) The coordinates of A. (2 marks)



$\vec{OA} = \vec{OB} + \vec{BA}$

$= \begin{pmatrix} 3 \\ -2 \end{pmatrix} - \begin{pmatrix} 4 \\ -10 \end{pmatrix} = \begin{pmatrix} -1 \\ 8 \end{pmatrix}$ ✓M1

$A(-1, 8)$ ✓A1

(ii) The distance of M from the origin. (3 marks)

$M = \left(\frac{3-1}{2}, \frac{-2+8}{2} \right) = (1, 3)$ ✓B1

$|\vec{OM}| = \sqrt{(1)^2 + 3^2}$ ✓M1

$= \sqrt{10}$

≈ 3.162 units ✓A1

(b) A' (3, -2) is the image of A under a translation T. Find the image of B under T. (3 marks)

$T + \begin{pmatrix} -1 \\ 8 \end{pmatrix} = \begin{pmatrix} 3 \\ -2 \end{pmatrix}$ ✓M1

$T = \begin{pmatrix} 3 \\ -2 \end{pmatrix} - \begin{pmatrix} -1 \\ 8 \end{pmatrix} = \begin{pmatrix} 4 \\ -10 \end{pmatrix}$ ✓M1

$OB' = \begin{pmatrix} 4 \\ -10 \end{pmatrix} + \begin{pmatrix} 3 \\ -2 \end{pmatrix} = \begin{pmatrix} 7 \\ -12 \end{pmatrix}$

$\therefore B'(7, -12)$ ✓A1

(c) Given that the coordinates of C is (– 3, k), and that of A, B and C are collinear, find k. (2 marks)

$AB = \begin{pmatrix} 4 \\ -10 \end{pmatrix}$

$AC = \begin{pmatrix} -3 \\ k \end{pmatrix} - \begin{pmatrix} -1 \\ 8 \end{pmatrix} = \begin{pmatrix} -2 \\ k-8 \end{pmatrix}$ ✓M1

$-2AC = AB$

$\therefore -2(k-8) = -10$

$-2k + 16 = -10$

$-2k = -26$

$k = 13$ ✓A1

18. (a) Given that $A^{-1} = \begin{pmatrix} 2 & \frac{-5}{2} \\ -3 & 4 \end{pmatrix}$, find matrix A (3 marks)

From $\begin{pmatrix} a & b \\ c & d \end{pmatrix}\begin{pmatrix} 2 & -5/2 \\ -3 & 4 \end{pmatrix} = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$

or any other method

$4(2a - 3b = 1$
$3(-5/2 a + 4b = 0$
$\Rightarrow 8a - 12b = 4$
$+ \; -7.5a + 12b = 0$
$0.5a = 4$ ✓B1
$a = 8$

$2(8) - 3b = 1$
$16 - 3b = 1$
$3b = 15$
$b = 5$ ✓B1

$2c + 3d = 0)4$
$-5/2 c + 4d = 1)3$

$8c - 12d = 0$
$+ \; -7.5c + 12d = 3$
$0.5c = 3$
$c = 6$
$2(6) - 3d = 0$
$d = 4$

$\begin{pmatrix} a & b \\ c & d \end{pmatrix} = \begin{pmatrix} 8 & 5 \\ 6 & 4 \end{pmatrix}$ ✓B1

(b) A student bought 16 exercise books and 10 pens at a total cost of Kshs. 1018. If she had bought 12 exercise books and 8 pens, she would have spent Kshs. 242 less.

(i) Form a matrix equation to represent the information above (1 marks)

Let exercise book be b and Pens be P.

$16b + 10p = 1018$
$12b + 8p = 776$

$\Rightarrow \begin{pmatrix} 16 & 10 \\ 12 & 8 \end{pmatrix}\begin{pmatrix} b \\ p \end{pmatrix} = \begin{pmatrix} 1018 \\ 776 \end{pmatrix}$ ✓B1

(ii) Using the inverse of A in (a) above, determine the price of each item (4 marks)

$\begin{pmatrix} 2 & -2.5 \\ -3 & 4 \end{pmatrix}\begin{pmatrix} 16 & 10 \\ 12 & 8 \end{pmatrix}\begin{pmatrix} b \\ p \end{pmatrix} = \begin{pmatrix} 2 & -2.5 \\ -3 & 4 \end{pmatrix}\begin{pmatrix} 1018 \\ 776 \end{pmatrix}$ ✓M1

$\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}\begin{pmatrix} b \\ p \end{pmatrix} = \begin{pmatrix} 96 \\ 50 \end{pmatrix}$ ✓M1

$\begin{pmatrix} b \\ p \end{pmatrix} = \begin{pmatrix} 96 \\ 50 \end{pmatrix} \Rightarrow \begin{matrix} b = 96 \\ p = 50 \end{matrix}$ ✓A1

✓B1
∴ Book = sh. 96
Pen = sh. 50

(c) Find the total cost of 4 books and 5 pens by using matrices of orders 1×2 and 2×1 respectively. (2 marks)

$\begin{pmatrix} 4 & 5 \end{pmatrix}\begin{pmatrix} 96 \\ 50 \end{pmatrix}$ ✓M1

$= (4 \times 96) + (5 \times 50)$

$=$ sh. 634 ✓A1

19. A bucket is in the shape of a frustum of a cone. The base radius of the bucket is 30 cm and it is filled with water to a height of 60 cm. The radius of the water level in the bucket is 40 cm. Taking π to be 3.142;

a) Calculate:

(i) The quantity of water in the bucket in litres (3 marks)

$\frac{h}{h+60} = \frac{30}{40}$

$40h = 30h + 1800$

$10h = 1800$ ✓M1

$h = 180$

Volume of smaller Cone $= \frac{1}{3} \times 3.142 \times 30^2 \times 180$

$= 169{,}668$

Vol. of Larger Cone $= \frac{1}{3} \times 3.142 \times 40^2 \times 240$

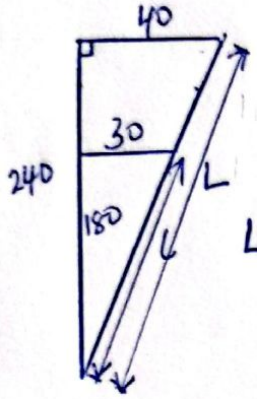
$= 402176$

Vol. of water $= 402176 - 169668$ ✓M1

$= \frac{232508}{1000}$

$= 232.508$ Litres ✓A1

(ii) The surface area of the bucket in contact with water. (4 marks)



$l = \sqrt{30^2 + 180^2}$

$= 182.48$

$L = \sqrt{40^2 + 240^2}$ ✓M1

$= 243.31$

C.S.A of Larger Cone $= \pi R L$

$= 3.142 \times 40 \times 243.31$

$= 30579.2008$ ✓M1

C.S.A of Smaller Cone

$= 3.142 \times 30 \times 182.48 = 17200.5648$

C.S.A $= (30579.2008 - 17200.5648)$

$= 13378.636$

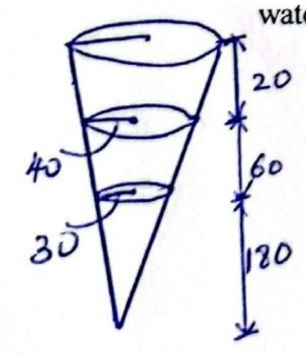
Bottom part $= \pi r^2 = 3.142 \times 30^2$

$= 2827.43$

T.S.A $= 13378.636 + 2827.43$ ✓M1

$= 16206.436 \text{ cm}^2$ ✓A1

b) Find the volume of water that if added into the bucket, would give a 20 cm rise in the water level. (3 marks)



$\frac{40}{240} = \frac{R}{260}$

$R = 43\frac{1}{3}$ ✓M1

New water volume

$\frac{1}{3} \times 3.142 \times 43\frac{1}{3}^2 \times 260$ ✓M1

$= 511331.407$

Volume added

$511331.407 - 402176$

$= 109155.407 \text{ cm}^3$ ✓A1

20. A straight line L_1 passes through the points $P(3,2)$ and $Q(-1,8)$.

(a) Find the equation of the line L_1 in the form $ax + by + c = 0$ where a, b and c are integers.

(3 marks)

$k = \frac{\Delta y}{\Delta x} = \frac{8-2}{-1-3} = \frac{6}{-4}$

$= -\frac{3}{2}$ ✓m1

$-\frac{3}{2} = \frac{y-2}{x-3}$ ✓m1

$\Rightarrow -3(x-3) = 2(y-2)$

$-3x + 9 = 2y - 4$

$3x + 2y - 13 = 0$ ✓A1

(b) The line L_1 meets the x – axis at R.

(i) Find the coordinates of R. (1 mark)

at X-axis, $Y = 0$

$3x + 2(0) - 13 = 0$

$3x = 13$

$x = 4\frac{1}{3}$

$R(4\frac{1}{3}, 0)$ ✓B1

(ii) Another line L_2 is perpendicular to L_1 at R. Find the equation of L_2 in the form $y = mx + c$ where m and c are constants. (3 marks)

$G_1 = -\frac{3}{2}$, $G_2 = \frac{2}{3}$ for perp. lines

$\frac{2}{3} = \frac{y-0}{x-\frac{13}{3}}$ ✓M1

$2\left(x - \frac{13}{3}\right) = 3y$

$2x - \frac{26}{3} = 3y$ ✓m1

$3y = 2x - \frac{26}{3}$ $\therefore y = \frac{2}{3}x - 2\frac{8}{9}$ ✓A1

(c) A third line L_3 is parallel to L_2 and passes through the point $(-12,5)$. Find the point where L_3 and L_1 intersect. (3 marks)

$L_3 \Rightarrow G_3 = \frac{2}{3}$. for Parallel lines

$\frac{2}{3} = \frac{y-5}{x+12}$

$3(y-5) = 2(x+12)$

$3y - 15 = 2x + 24$

$3y = 2x + 39$

$y = \frac{2}{3}x + 13$ ✓m1

$L_1 \Rightarrow 3x + 2y - 13 = 0$

$L_3 \Rightarrow y = \frac{2}{3}x + 13$

sub. y. in eqn L_1

$3x + 2(\frac{2}{3}x + 13) - 13 = 0$ ✓m1

$3x + \frac{4}{3}x + 26 - 13 = 0$

$4\frac{1}{3}x + 13 = 0$

$\frac{3}{13} \times \frac{13}{3}x = -13 \times \frac{3}{13}$

$x = -3$

$y = \frac{2}{3}(-3) + 13 = 11$

$(-3, 11)$ ✓A1

5 10 15 5 10 15

21. The table below shows marks scored by students in a class.

Marks	10 – 14	15 – 24	25 – 39	40 – 44	45 – 54	55 – 69
Frequency	11	8	9	4	6	t

x 12 19.5 32 42 49.5 62

(a) Given that the mean mark is 35.7, find

(i) The value of t. (3 marks)

fx 132 156 288 168 297 62t B1

$$35.7 = \frac{132+156+288+168+297+62t}{38+t} \checkmark M1$$

$$35.7 = \frac{1041+62t}{38+t}$$

$1356.6 + 35.7t = 1041 + 62t$

$315.6 = 26.3t$

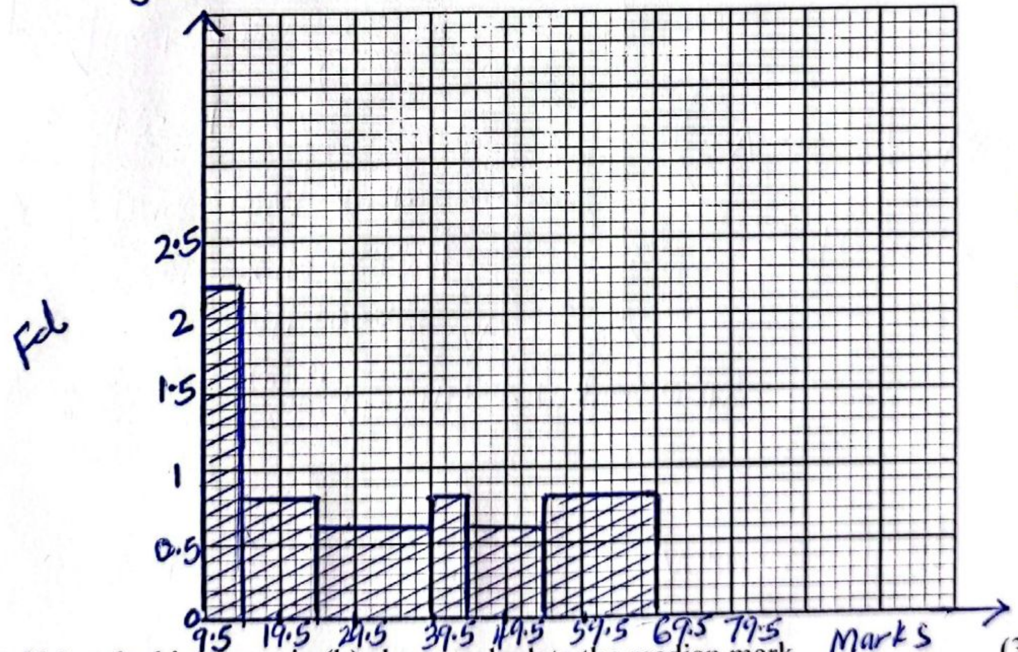
$t = 12 \checkmark A1$

(ii) The class interval for the modal class (1 mark)

$69.5 - 54.5 = 15 \checkmark B1$

(b) Represent the information in the table in (a) above in a histogram. (3 marks)

fd 2.2 0.8 0.6 0.8 0.6 0.8



B1

B2

(c) Using the histogram in (b) above, calculate the median mark. (3 marks)

$$\frac{\text{Total area}}{2} = 25 \checkmark M1$$

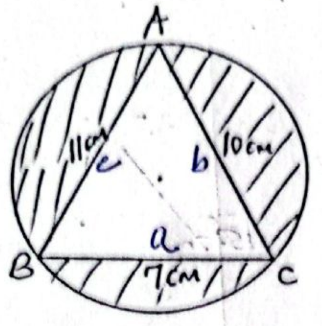
$W \times 0.6 = 25 - 19$

$W = 10 \checkmark M1$

$24.5 + 10$

$= 34.5 \checkmark A1$

22. The figure shows triangle ABC inscribed in a circle where AC = 10cm, BC = 7cm and AB =11cm



Calculate correct 1 d p ($use\ \pi = \frac{22}{7}$)

a) The size of the angle CAB (4 marks)

$a^2 = b^2 + c^2 - 2bc\cos A$

$\cos A = \dfrac{b^2+c^2-a^2}{2bc}$

$= \dfrac{10^2+11^2-7^2}{2\times 10\times 11}$ ✓ m1

$\cos A = 0.7818$ ✓ m1

$A = \cos^{-1}(0.7818)$ ✓ m1

$= 38.6°$ ✓ A1

b) The radius of the circle (2 marks)

$\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = 2R$

$\dfrac{7}{\sin 38.6} = 2R$ ✓ m1

$\dfrac{11.22}{2} = \dfrac{2R}{2}$

$R = 5.6$ cm ✓ A1

c) Hence, find the area of the shaded region (4 marks)

Area of Circle $= \pi r^2$

$= \frac{22}{7} \times 5.6^2$

$= 98.56 cm^2$ ✓ m1

Area of triangle

$= \frac{1}{2} ab \sin \theta$

$= \frac{1}{2} \times 11 \times 10 \times \sin 38.6°$

$= 34.29$ ✓ m1

Follow thro' an alternative

Shaded

$\Rightarrow 98.56 - 34.29$ ✓ m1

$= 64.3\ cm^2$ ✓ A1

23. A bus left Migori at 7:00am for Kisumu at an average speed of 80km/hr. A car also left Migori one and a quarter hours later for Kisumu along the same road at an average speed of 100km/hr.

(a) Determine:

(i) The time when the car caught up with the bus. (4 marks)

Migori Kisumu

Bus – 80km/hr
car – 100km/hr

$D = ST$ ✓M1
$= 80 \times 5/4 = 100km$

$RS = 100 - 80 = 20km/h$ ✓M1

$T = \frac{D}{S} = \frac{100}{20} = 5hrs$ ✓M1

Time met $= 7 + 1.15 + 5$
$= 1.15\ pm$ ✓A1

(ii) The distance from Migori when the car caught up with the bus. (2 marks)

$D = ST$
$= 5 \times 100$ ✓M1
$= 500km$ ✓A1

(b) A Matatu left Kisumu for Migori at 10:10a.m and moved at an average speed of 100km/hr. if the Matatu met the bus at the same time as the car, find the time when the Matatu arrived in Migori. (4 marks)

Time taken to meet
$13.15 - 10.10 = 3.15$
ie 3hr 15min ✓M1

Distance covered
$3\frac{1}{4} \times 100 = 325km$ ✓M1

Total distance $= 500 + 325 = 825km$

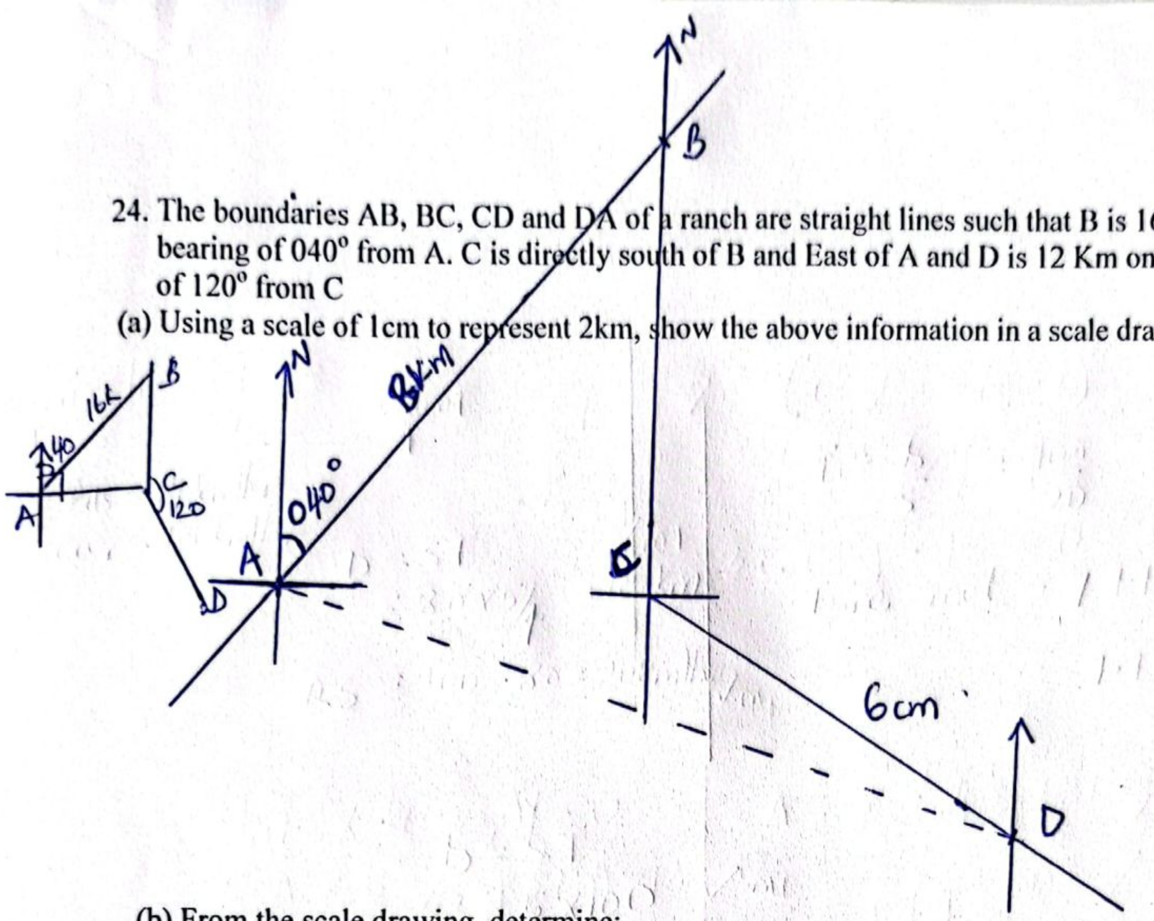
Follow thro' an alternative

$T = \frac{825}{100} = 8$ hrs 15 minutes ✓M1

Time arrived $= 10.10 + 8.15$
$= 18.25$
6.25pm ✓A1

24. The boundaries AB, BC, CD and DA of a ranch are straight lines such that B is 16km on a bearing of 040° from A. C is directly south of B and East of A and D is 12 Km on a bearing of 120° from C

(a) Using a scale of 1cm to represent 2km, show the above information in a scale drawing. (3 marks)



B_1 - B
B_1 - D
B_1 - Complete

(b) From the scale drawing, determine:

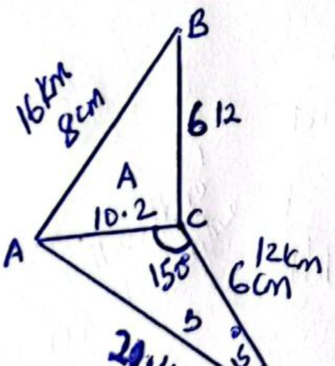
(i) The distance in Km of A from D (2 marks)

$10.7 \pm 0.1 \times 2$ B_1 $= 21.4 \pm 0.2$ Km B_1

(ii) The bearing of A from D (1 marks)

$180^\circ + 105^\circ = 285^\circ$ B_1

(c) Calculate the area of the ranch ABCD in square kilometers. (4 marks)



$A_A = \frac{1}{2} \times 10.2 \times 12 = 61.2$ Km^2 M1

$A_B = \frac{1}{2} \times 21.4 \times 12 \times \sin 15^\circ = 33.23$ km^2 M1 M1

Total area $= 94.43$ Km^2 A1

Follow thro' for atta