



SUCCESS PATH JOINT EXAM

2026 MARCH/APRIL EXAMINATION

Kenya Certificate of Secondary Education



MARKING SCHEME

121 / 1 - Mathematics Paper 1 (Alt. A)	NAME.....
Term I March / April, 2026	ADM No.....
8.00 a.m. - 10.30 a.m.	Signature.....

Instructions to candidates

- Write your *Index Number* and *sign* in the spaces provided above.
- This paper consists of two sections; *Section I* and *Section II*.
- Answer all the questions in *Section I* and only five questions from *Section II*.
- Show all the steps in your calculations, giving your answers at each stage 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.
- This paper consists of 15 printed pages.
- Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.

For Examiner's 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

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SECTION I (50 marks)

Answer all the questions in this section

- 1 Evaluate $\frac{44 - -28}{12 \times -2} - \frac{8^2 \times -12 - 24}{96 \div -12 \times 9}$ without using mathematical tables or calculator. (3 marks)

$$\begin{array}{l} \text{No: } 44 + 28 = \\ \quad = 72 \\ \text{Den: } (64 \times -12) - 24 \\ \quad = -768 - 24 \\ \quad = -792 \end{array} \quad \begin{array}{l} \text{De:} \\ = 12 \times -2, \\ = -24 \\ \text{Den: } (8^2 \div -12) \times 9 \\ = -8 \times 9 \\ = -72. \end{array} \quad \left| \begin{array}{l} \frac{72}{-24} - \frac{-792}{-72} \text{ M}_1 \\ -3 - 11 \\ = -14 \checkmark \text{ A}_1 \end{array} \right.$$

- 2 Factorise completely $3(x-2)^2 - 27$ (3 marks)

$$\begin{array}{l} 3 \cancel{[(x-2)^2]} \\ 3 [(x-2)^2 - 9] \text{ M} \\ a^2 - b^2 = (a-b)(a+b) \text{ M} \\ 3 [(x-2)-3] [(x-2)+3] \text{ A}_1 \\ = 3(x-5)(x+1) \text{ A}_1 \end{array}$$

- 3 A basket ball team play 10 matches in a tournament. The following are scores in each match.
9, 15, 17, 16, 7, 20, 21, 15, 10, 12

Determine:

- (a) the mode. (1 mark)

$$15 \text{ B}_1$$

- (b) the median. (2 marks)

$$\begin{aligned} &= \frac{15 + 15}{2} \text{ B}_1 \\ &= 15 \text{ A}_1 \end{aligned}$$

- 4 A wholesaler sold a cell phone to a retailer making a profit of 20%. The retailer later sold the cell phone for Ksh.3120 making a profit of 30% calculate the amount of money the wholesaler had paid for the cell phone. (3 marks)

$$\begin{aligned} \frac{130}{100} \times y &= 3120 \\ \frac{1.3y}{1.3} &= \frac{3120}{1.3} \\ y &= 2400 \text{ M}_1 \end{aligned}$$

$$\begin{aligned} \frac{120}{100} \times W &= 2400 \text{ M}_1 \\ \frac{1.2W}{1.2} &= \frac{2400}{1.2} \\ W &= 2000 \\ &= \text{Ksh. } 2000 \checkmark \text{ A}_1 \end{aligned}$$

- 5 A line P passes through the point $(-2, 5)$ and has a gradient of $\frac{-3}{4}$. Another line Q is perpendicular to

P and meets it at a point where $y = \frac{1}{2}$ find equation of Q. (4 marks)

$$\begin{aligned} M &\Rightarrow M_1 \cdot M_2 = -1 \\ -\frac{3}{4} M_2 &= -1 \\ M &= \frac{4}{3} \text{ M}_1 \end{aligned}$$

$$\begin{aligned} y - 5 &= -\frac{3}{4}(x + 2) \\ \frac{1}{2} - 5 &= -\frac{3}{4}(x + 2) \\ 4.5 &= -0.75(x + 2) \end{aligned}$$

$$\begin{aligned} 6 &= x + 2 \\ x &= 4 \checkmark \text{ M}_1 \\ \text{Intersection point } &(4, 0.5) \\ y - 0.5 &= \frac{4}{3}(x - 4) \checkmark \text{ M}_1 \\ 3y - 1.5 &= 4x - 16 \\ 3y &= 4x - 14.5 \\ y &= \frac{4}{3}x - \frac{29}{6} \checkmark \end{aligned}$$

- 6 The mass of two similar solid are 324g and 768g. Find

- (a) height of the smaller solid if the height of the bigger solid is 20cm. (2 marks)

$$\begin{aligned} \text{V.S.F} &= \sqrt[3]{\frac{27}{64}} \\ \text{L.S.F} &= \sqrt[3]{\frac{27}{64}} \\ &= \frac{3}{4} \text{ M}_1 \end{aligned} \quad \left| \begin{aligned} &= \frac{3}{4} \times 20 \\ &= \underline{15 \text{ cm}} \text{ A}_1 \end{aligned} \right.$$

- (b) the surface area of the smaller solid if the surface area of the bigger solid is 40cm². (2 marks)

$$\begin{aligned} \text{A.S.F} &= \left(\frac{3}{4}\right)^2 \\ &= \frac{9}{16} \text{ M}_1 \\ &= \frac{9}{16} \times 40 \\ &= \underline{22.5 \text{ cm}^2} \text{ A}_1 \end{aligned}$$

- 7 A cylindrical pipe 5 metres long has an internal diameter 28 millimetres and an external diameter of 42 millimetres. The density of the material that makes the pipe is 1.45 g/cm^3 . Calculate the mass of the pipe in kilograms. (Take $\pi = \frac{22}{7}$).

$$V = \pi (R^2 - r^2) h \cdot \rho$$

$$= \frac{22}{7} \times (2.1^2 - 1.4^2) \times 500 \text{ M}_1$$

$$= 3850 \text{ cm}^3 \cdot \rho$$

$$\text{Mass} = \text{Density} \times \text{Volume}$$

$$= 1.45 \times 3850$$

$$= 5582.5$$

$$\underline{\underline{5.5825 \text{ kg} \cdot \text{A}_1}}$$

(4 marks)

- 8 Simplify: $\frac{32^{\frac{5}{2}} \times 8100^{\frac{1}{4}}}{8^{\frac{1}{2}} \times 5^{\frac{1}{2}} \times 4^0 \times 4^{\frac{1}{4}}}$

$$\frac{2^{5(-\frac{1}{2})} \times (3^4 \times 10^2)^{\frac{1}{4}}}{2^{3(-\frac{1}{2})} \times 5^{\frac{1}{2}} \times 4^0 \times 2^{2(\frac{1}{4})}}$$

$$\frac{2^{-\frac{5}{2}} \times 3^3 \times 10^{\frac{1}{2}} \text{ M}_1}{2^{-\frac{3}{2}} \times 5^{\frac{1}{2}} \times 1 \times 2^{\frac{1}{2}}}$$

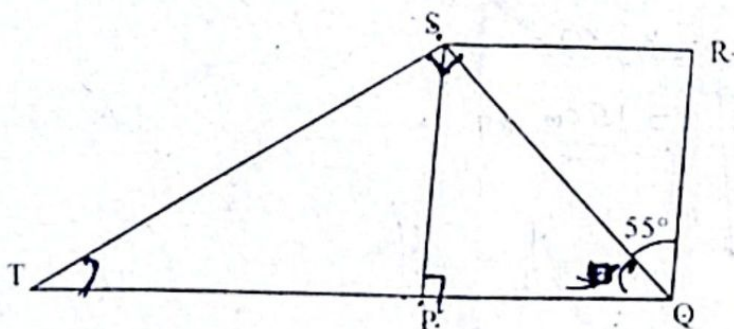
$$= \frac{\frac{1}{2} \times 27 \times 10\sqrt{10}}{2\sqrt{2}}$$

$$= \frac{135\sqrt{10}}{0.5\sqrt{5}} \text{ M}_1$$

$$= \underline{\underline{270\sqrt{2} \cdot \text{A}_1}}$$

(3 marks)

- 9 In the figure below PQRS is a rhombus, $\angle \text{SQR} = 55^\circ$, $\angle \text{QST}$ is a right angle and TPQ is a straight line.



Find the size of the angle STQ.

$$\angle \text{SQR} = \angle \text{PQS} = 55^\circ$$

$$\angle \text{PQR} = 55^\circ + 55^\circ$$

$$= 110^\circ \text{ M}_1$$

$$\angle \text{QST} = 90^\circ$$

$$\therefore \angle \text{SQT} = \angle \text{SQR} = 55^\circ \text{ M}_1$$

$$\angle \text{STQ} + 90 + 55 = 180$$

$$\angle \text{STQ} = 180 - 145^\circ$$

$$= \underline{\underline{35^\circ \text{ A}_1}}$$

(3 marks)

- 10 A square toilet is covered by a number of whole rectangular tiles of sides 48 cm by 36 cm. Calculate the least possible area of the room in square metres. (3 marks)

$$\begin{aligned}
 & \text{LCM} \\
 & 48 = 2^4 \times 3 \\
 & 36 = 2^2 \times 3^2 \\
 & = 2^4 \times 3^2 \\
 & = 16 \times 9 \\
 & = 144 \text{ cm } M_1 \\
 & \text{Area} = 144 \times 144 \\
 & = 20,736 \text{ cm}^2 M_1
 \end{aligned}$$

$$\begin{aligned}
 & \frac{20,736}{10,000} \\
 & = \underline{\underline{2.0736 \text{ m}^2}} \quad A_1
 \end{aligned}$$

- 11 The exterior angle of a regular polygon is $(x-50)^\circ$ and the interior angle is $(2x+20)^\circ$. Find the number of sides of the polygon. (3 marks)

$$\angle I + \angle E = 180$$

$$\cancel{x} (x-50) + (2x+20) = 180$$

$$3x - 30 = 180$$

$$\frac{3x}{3} = \frac{210}{3}$$

$$x = 70^\circ M_1$$

$$\angle E = 70 - 50 = 20^\circ M_1$$

$$n = \frac{360}{20}$$

$$= \cancel{18} = 18 \text{ sides } \cdot A_1$$

- 12 Given that $(88.38)^{-1} = 0.01131$ and $(0.02735)^{-1} = 36.56$. Work out without using tables or calculators

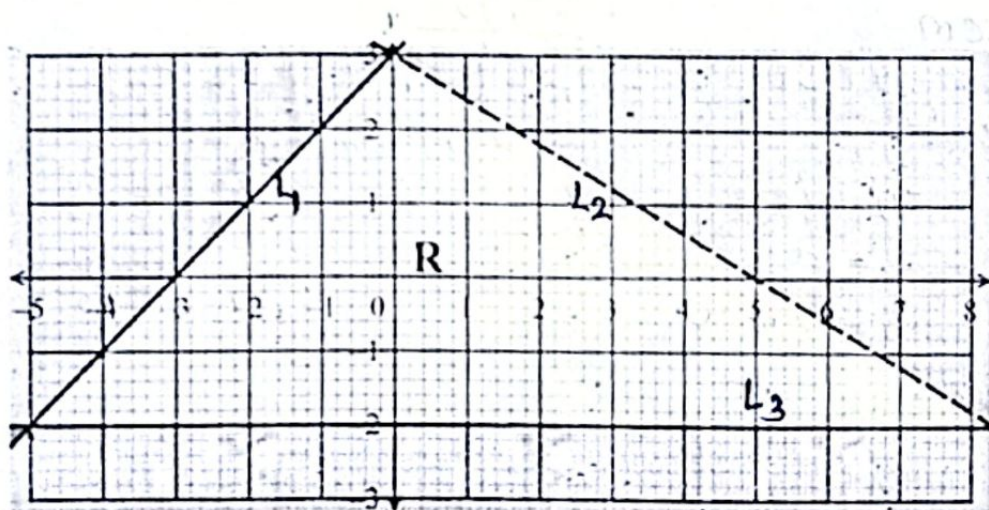
the value of $\frac{6}{0.8838} + \frac{0.5}{2.735}$

$$\begin{aligned}
 6(0.8838)^{-1} + (0.5)(2.735)^{-1} &= (88.38 \times 10^{-2})^{-1} \\
 &= 0.01131 \times 10^2 \\
 &= 6 \times 1.131 \\
 &= \underline{\underline{6.786}} \quad M_1
 \end{aligned}$$

$$\begin{aligned}
 0.5(2.735)^{-1} &= 0.5(2.735)^{-1} \\
 0.02735 \times 100 &= 2.735 \\
 (2.735)^{-1} &= (0.02735 \times 100)^{-1} \\
 &= 36.56 \times 10^{-2} \\
 &= 0.5 \times 0.3656 \\
 &= \underline{\underline{0.1828}} \quad M_1
 \end{aligned}$$

$$\begin{aligned}
 6.786 + 0.1828 &= \underline{\underline{6.9688}} \quad A_1
 \end{aligned}$$

- 13 The figure below shows a region R bounded by lines L_1 , L_2 and L_3 . Form the inequalities represented by region R. (3 marks)



$$L_1$$

$$m = \frac{3 - (-2)}{6 - (-5)}$$

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

$$= 1$$

$$\frac{y-3}{x-0} = 1$$

$$y-3 = x$$

$$y = x+3$$

$$y \leq x+3 \quad m \checkmark$$

$$L_2$$

$$m = \frac{-2-3}{8-0}$$

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

$$\frac{y-3}{x-0} = -\frac{5}{8}$$

$$8y-24 = -5x$$

$$\frac{8y}{8} = \frac{-5x+24}{8}$$

$$y = -\frac{5}{8}x + 3$$

$$y \leq -\frac{5}{8}x + 3 \quad m \checkmark$$

$$L_3$$

$$y = -2$$

$$y \geq -2 \quad m \checkmark$$

- 14 The length of a minute hand of a clock is 3.5 cm. Find the angle it turns through if it sweeps an area of

4.8125 cm². Take π to be $\frac{22}{7}$. (3 marks)

$$A = \frac{\theta}{360} \cdot \pi r^2$$

$$4.8125 = \frac{\theta}{360} \times \frac{22}{7} \times 3.5^2 \quad m_1$$

$$\pi r^2 = \frac{22}{7} \times 12.25$$

$$= 12.25 \times 38.5$$

$$4.8125 = \frac{\theta}{360} \times 38.5 \quad m_2$$

$$\theta = \frac{4.8125 \times 360}{38.5} \quad m_1$$

$$= 45^\circ \quad A_1$$

15 Given that $\sin x = \cos(3x+10)$. Find the value of x .

(2 marks)

$$\cos(90-x) = \cos(3x+10) \quad B_1$$

$$90-x = 3x+10$$

$$80 = 4x$$

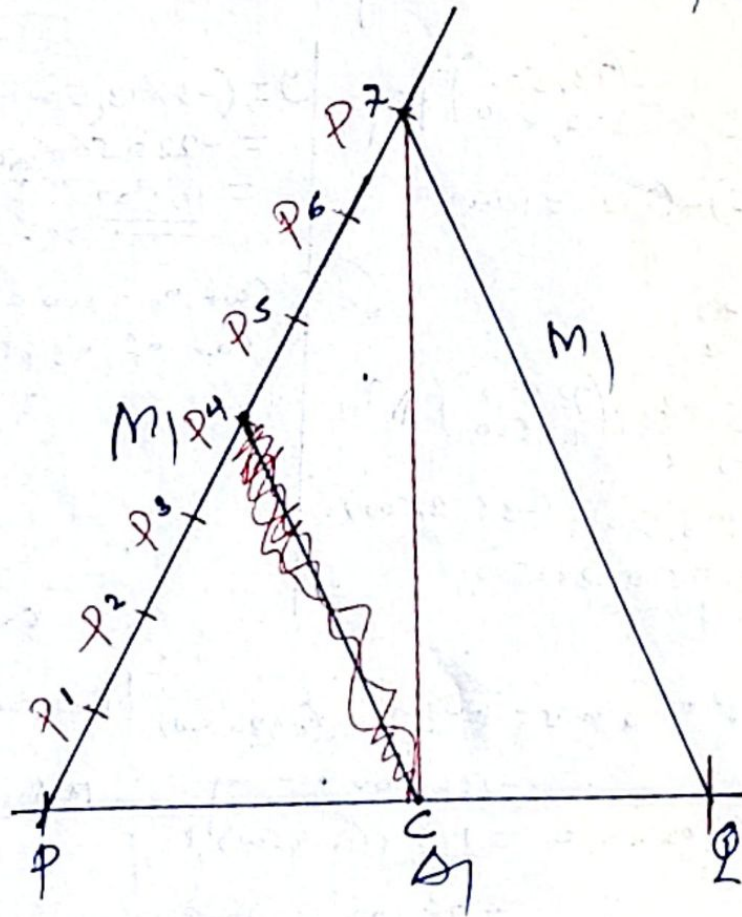
$$\frac{4x}{4} = \frac{80}{4}$$

$$= 20^\circ \quad \Delta_1$$

16 A point C is on a line PQ where $PQ = 9\text{cm}$. C divides PQ such that $PC = \frac{4}{7}PQ$. By construction

locate C.

(3 marks)



SECTION II (50 marks)

Answer only five questions in this section in the spaces provided

- 17 A trader bought 8 cows and 12 goats for a total of Ksh.294,000. If he had bought 1 more cows and 3 more goats he would have spend Ksh.337,500.

- (a) Form two equations to represent the above information.

(2 marks)

Cost of one cow = x sh.
Cost of one goat = y sh.

$$\frac{8x}{4} + \frac{12y}{4} = \frac{294,000}{4}$$

$$2x + 3y = 73,500 \quad \dots (i) \quad B1$$

$$\frac{9x}{3} + \frac{15y}{3} = \frac{337,500}{3}$$

$$3x + 5y = 112,500 \quad \dots (ii) \quad B1$$

- (b) Use matrix method to determine the cost of a cow and that of a goat.

(4 marks)

$$\begin{pmatrix} 2 & 3 \\ 3 & 5 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 73,500 \\ 112,500 \end{pmatrix} \quad M1$$

$$\text{Det} = (2 \times 5) - (3 \times 3) = 10 - 9 = 1$$

$$A^{-1} = \begin{pmatrix} 5 & -3 \\ -3 & 2 \end{pmatrix}$$

$$\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 5 & -3 \\ -3 & 2 \end{pmatrix} \begin{pmatrix} 73,500 \\ 112,500 \end{pmatrix} \quad M1$$

$$x = (5 \times 73,500) + (-3 \times 112,500)$$

$$= 367,500 - 337,500$$

$$= 30,000$$

$$y = (-3 \times 73,500) + (2 \times 112,500)$$

$$= -220,500 + 225,000$$

$$= 4,500$$

Cost of a cow = Ksh. 30,000 ✓

Cost of a goat = 4,500 ✓

- (c) The trader sold the animals he had bought making a profit of 40% per cow and 45% per goat.

- (i) Calculate the total amount of money he received.

(2 marks)

$$\text{S.P of cows} = \frac{140}{100} \times (8 \times 30,000)$$

$$= 336,000$$

$$\text{S.P of goats} = \frac{145}{100} \times (12 \times 4,500)$$

$$= 78,300$$

$$\text{Total cost} = 336,000 + 78,300$$

$$= 414,300 \quad \checkmark \quad A1$$

- (ii) Determine his profit in Kenya shillings.

(2 marks)

$$= 414,300 - 294,000 \quad B1$$

$$= 120,300 \quad A1$$

- 18 A truck left town X at 11:45am and travelled towards town Y at an average speed of 60km/hr. A car left town X at 2:15pm on the same day and travelled along the same road at an average speed of 100km/hr. The distance between the two towns is 500km.

(a) Calculate the time of the day when the car overtook the truck.

(4 marks)

$$\begin{aligned} &= 2:15\text{pm} - 11:45\text{am} \\ &= 2\text{hr } 30\text{min} \\ D &= 60\text{km/h} \times 2.5 \\ &= 150\text{km M}_1 \\ R.S &= 100\text{km/h} - 60\text{km/h} \\ &= 40\text{km/h. M} \\ \text{Time} &= \frac{150\text{km}}{40\text{km/h}} \\ &= 3.75\text{ hours} \\ &= 3\text{hr } 45\text{min. M}_1 \end{aligned}$$

$$\begin{aligned} &= 2:15\text{pm} + 3\text{hr } 45\text{min} \\ &= \underline{\underline{6:00\text{pm}}} \text{ A}_1 \end{aligned}$$

(b) The distance from Y when the car overtook the truck.

(3 marks)

$$\begin{aligned} D &= 100\text{km/h} \times 3.75\text{h} \\ &= 375\text{km M}_1 \\ D.\text{from Y} &= 500\text{km} - 375\text{M} \\ &= \underline{\underline{125\text{km}}} \text{ A}_1 \end{aligned}$$

(c) After overtaking the bus, both vehicles continued towards Y at their original speeds. Find how long the car had to wait at town Y before the truck arrived.

(3 marks)

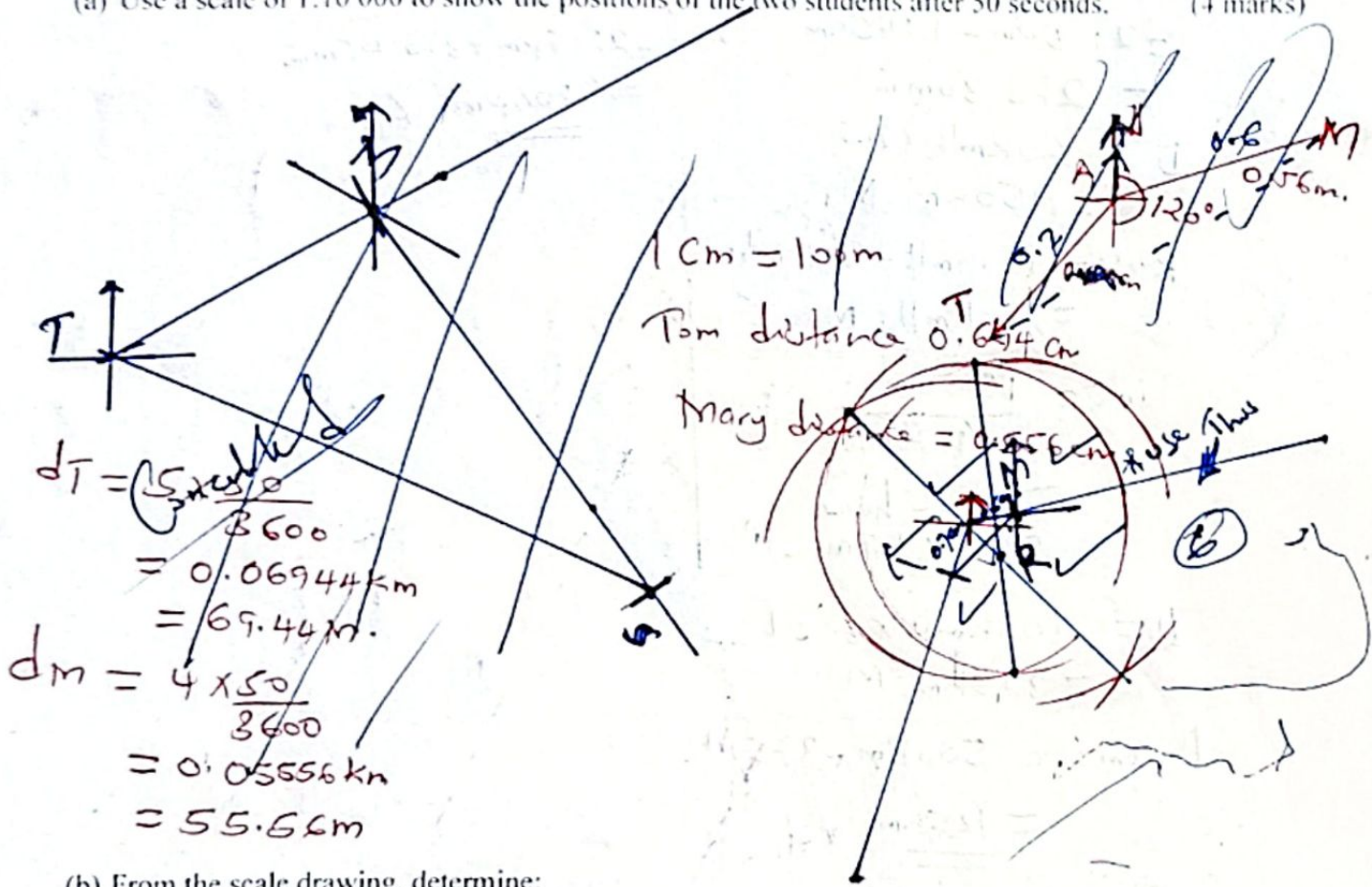
$$\begin{aligned} T &= \frac{125}{100} \\ &= 1.25\text{hours} \\ &= 1\text{hr } 15\text{min} \\ \text{Car arrive at Y at: } &6:00\text{pm} + 1:15 \\ &= 7:15\text{pm M}_1 \end{aligned}$$

$$\begin{aligned} \text{Truck arrive at Y at: } &6:00\text{pm} + 2.083\text{hr} \\ &= 8:05\text{pm M}_1 \\ \text{Waiting time} &= 8:05\text{pm} - 7:15\text{pm} \\ &= \underline{\underline{50\text{min}}} \text{ A}_1 \end{aligned}$$

$$\begin{aligned} \text{T.T by Truck: } &\frac{125\text{km}}{60\text{km/h}} \\ &= 2.083\text{hr} \\ &= 2\text{hr } 5\text{min} \end{aligned}$$

19 Two students Tom and Mary leave a point A on a level ground at the same time. Tom walks on a bearing of S15°W at an average speed of 5 km/h while Mary walks on a bearing of N75°E at an average speed of 4 km/h.

(a) Use a scale of 1:10 000 to show the positions of the two students after 50 seconds. (4 marks)



$$d_T = \frac{5 \times 50}{3600}$$

$$= 0.06944 \text{ km}$$

$$= 69.44 \text{ m}$$

$$d_M = \frac{4 \times 50}{3600}$$

$$= 0.05556 \text{ km}$$

$$= 55.56 \text{ m}$$

(b) From the scale drawing, determine:

(i) The bearing of Tom from Mary after 50 seconds. (2 marks)

280 ± 2° ✓

(ii) The distance between Tom and Mary after 50 seconds. (2 marks)

1.2 cm × 10,000 = 12 000 cm ✓

$$\frac{12,000}{100} = 120 \text{ m} ✓$$

(c) A point R is equidistant from Tom and Mary after the 50 seconds walk, and from point P. Using a ruler and a pair of compasses only, locate point R hence determine the distance of R from point P. (3 marks)

$$= 0.6 \text{ cm}$$

$$= 0.6 \times 10,000$$

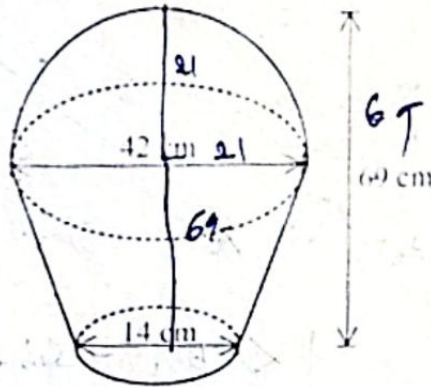
$$= 6,000 \text{ cm}$$

$$= \frac{6,000}{100}$$

$$= 60 \text{ metres}$$

$$\frac{140}{70} = 280$$

- 20 The figure below represents a bucket that comprises a frustum of a cone and a hemisphere. The internal base diameter of the frustum is 14 cm and the internal top diameter of the frustum is 42 cm and is equal to the internal diameter of the hemispherical top. The internal height of the bucket is 69 cm.



Taking π to be $\frac{22}{7}$, calculate:

- (a) The internal surface area of the bucket.

(5 marks)

$$\frac{r_1 - r_2}{h} = \frac{21 - 7}{48}$$

$$\frac{r_1 - 7}{36} = \frac{21 - 7}{48}$$

$$r_1 - 7 = \frac{36 \times 14}{48}$$

$$r_1 - 7 = 10.5$$

$$r_1 = 17.5 \text{ cm M}_1$$

$$H = 69 - 21$$

$$= 48 \text{ cm B}_1$$

$$L = \sqrt{48^2 + (21 - 7)^2}$$

$$= \sqrt{2500}$$

$$= 50 \text{ cm M}_1$$

Frustum Curved area = $\pi(r_1 + r_2)L$

$$= \frac{22}{7}(21 + 7) \times 50$$

$$= 4400 \text{ cm}^2 \text{ M}_1$$

Hemisphere Area

$$= 2\pi r^2$$

$$= 2 \times \frac{22}{7} \times 21^2$$

$$= 2772 \text{ cm}^2 \text{ M}_1$$

Base area = πr^2

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

$$= 154 \text{ cm}^2 \text{ B}_1$$

$$\text{T.S.A} = 4400 + 2772 + 154$$

$$= 7326 \text{ cm}^2$$

(5 marks)

- (b) The volume of water in the bucket if it is filled to a height of 36 cm.

$$\frac{r_1 - r_2}{36} = \frac{21 - 7}{48} \text{ M}_1$$

$$r_1 - 7 = \frac{36 \times 14}{48}$$

$$r_1 - 7 = 10.5$$

$$r_1 = 17.5 \text{ cm M}_1$$

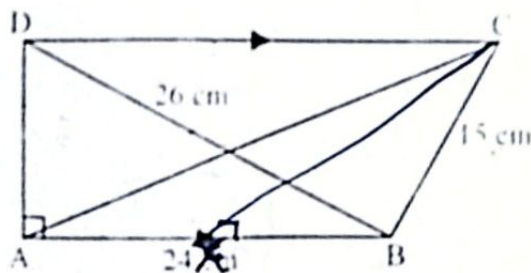
$$V = \frac{1}{3}\pi h(r_1^2 + r_1 r_2 + r_2^2) \text{ M}_1$$

$$= \frac{1}{3} \times \frac{22}{7} \times 36 \times (17.5^2 + 17.5 \times 7 + 7^2)$$

$$= \frac{264}{7} \times (122.5 + 306.25 + 49) \text{ M}_1$$

$$= 18018 \text{ cm}^3 \text{ or } 18.018 \text{ Litres. M}_1$$

- 21 ABCD is a trapezium in which AB is parallel to DC. AB = 24 cm, BC = 15 cm and BD = 26 cm. Angle BAD is a right angle.



Calculate correct to 1 decimal place:

- (a) The size of angle ABC.

$$\begin{aligned} AD &= \sqrt{26^2 - 24^2} \\ &= \sqrt{676 - 576} \\ &= 10 \text{ cm } M_1 \\ CX &= AD = 10 \text{ cm } B_1 \end{aligned}$$

$$\begin{aligned} \angle CBX &= \sin^{-1} \frac{10}{15} \\ &= 41.81^\circ M_1 \\ \angle ABC &= 180^\circ - 41.81^\circ \\ &= 138.19^\circ A_1 \end{aligned}$$

(4 marks)

- (b) The length of AC.

$$\begin{aligned} XB &= \sqrt{15^2 - 10^2} \\ &= \sqrt{125} \\ &= 11.18 \text{ cm } M_1 \\ AX &= 24 - 11.18 \\ &= 12.82 \text{ cm } M_1 \end{aligned}$$

$$\begin{aligned} AC &= \sqrt{12.82^2 + 10^2} \\ &= \sqrt{164.25 + 100} \\ &= 16.25 \text{ cm } A_1 \end{aligned}$$

(3 marks)

- (c) The area of the trapezium ABCD.

$$\begin{aligned} DC &= AX = 12.82 \text{ cm } B_1 \\ A &= \frac{1}{2}(a+b)h \\ &= \frac{1}{2}(12.82 + 24) \times 10 M_1 \\ &= 36.82 \times 5 \\ &= 184.1 \text{ cm}^2 A_1 \end{aligned}$$

(3 marks)

22 A minor sector of a circle of diameter 42 cm includes angle $\frac{5}{6}\pi$ at the centre.

(a) Calculate the:

(i) Area of the sector

(3 marks)

$$\begin{aligned} A &= \frac{1}{2} r^2 \theta \quad \text{M1} \\ &= \frac{1}{2} \times 21^2 \times \frac{5}{6} \times \frac{22}{7} \quad \text{M1} \\ &= \frac{1}{2} \times 441 \times \frac{110}{42} \\ &= 577.5 \text{ cm}^2 \quad \text{A1} \end{aligned}$$

(ii) The length of the major sector

(3 marks)

$$\begin{aligned} S &= r \theta \quad \text{M1} \\ &= 21 \times \frac{5}{6} \times \frac{22}{7} \quad \text{M1} \\ &= 21 \times \frac{110}{42} \\ &= 55 \text{ cm} \quad \text{A1} \end{aligned}$$

(b) The sector is folded to form right circular based cone. Calculate

(i) Radius of the cone

(2 marks)

$$\begin{aligned} 2\pi R &= 55 \quad \text{M1} \\ 2 \times \frac{22}{7} \times R &= 55 \\ R &= \frac{55 \times 7}{44} \\ &= 8.75 \text{ cm} \quad \text{A1} \end{aligned}$$

(ii) Perpendicular height of the cone.

(2 marks)

$$\begin{aligned} h &= 21 \\ H &= \sqrt{l^2 - R^2} \\ &= \sqrt{21^2 - 8.75^2} \quad \text{M1} \\ &= \sqrt{364.4375} \\ &= 19.1 \text{ cm} \quad \text{A1} \end{aligned}$$

- 23 A number of students agreed to contribute equally to buy sodas worth Kshs.12,000 for class party. Five students pulled out and so the other agreed to contribute extra Kshs.100 each. Their contributions enabled them to buy sodas worth Kshs.2,000 more than they originally expected.

(a) Write an expression showing the expected original individual contribution. (1 mark)

$$\text{Expected} = \frac{12,000}{x} \quad B_1$$

$$\text{Actual} = \frac{14,000}{x-5}$$

(b) Write down two expressions how much each contributed after the five students pulled out. (2 marks)

$$\frac{14,000}{x-5} - \frac{12,000}{x} = 100 \quad M_1 \quad \left| \quad x^2 - 25x - 600 = 0 \quad A_1 \right.$$

$$140x - 120(x-5) = x(x-5)$$

$$140x - 120x + 600 = x^2 - 5x$$

(c) Calculate the number of students who made the contribution's (5 marks)

$$x^2 - 25x - 600 = 0 \quad M_1$$

$$P = -600 \quad Q = -25$$

$$S = -25$$

$$(x-40)(x+15) = 0 \quad M_1$$

$$x(x-40) + 15(x-40) = 0$$

$$(x+15)(x-40) = 0 \quad M_1$$

$$x+15=0$$

$$x=-15$$

$$x-40=0$$

$$x=40 \quad A_1$$

$$= 40 - 5$$

$$= 35 \text{ students } B_1$$

(d) How much did each contribute (2 marks)

$$= \frac{14,000}{35} \quad M_1$$

$$= \text{Ksh. } 400 \quad A_1$$

- 24 A businessman introduced a new product and carried out some market research. The table below is a summary of the ages of people who say they will buy the product.

$\frac{fx}{h}$	Age (x) years	Frequency	Cumulative Frequency	$\frac{N}{h}$	$\frac{cf}{N}$	x
180	$20 < x \leq 25$	8	8	5	1.6	22.5
420	$25 < x \leq 35$	A	22	10	1.4	30.0
510	$35 < x \leq 50$	12	34	15	0.8	42.5
577.5	$50 < x \leq 55$	11	B	5	2.2	52.5
937.5	$55 < x \leq 70$	15	60	15	1	62.5
$\Sigma fx = 2625$		$\Sigma f = 60$				$\Sigma \frac{fx}{h}$

- (a) Find the values of A and B.

$$8 + A + 12 + 11 + 15 = 60$$

$$46 + A = 60$$

$$A = 60 - 46$$

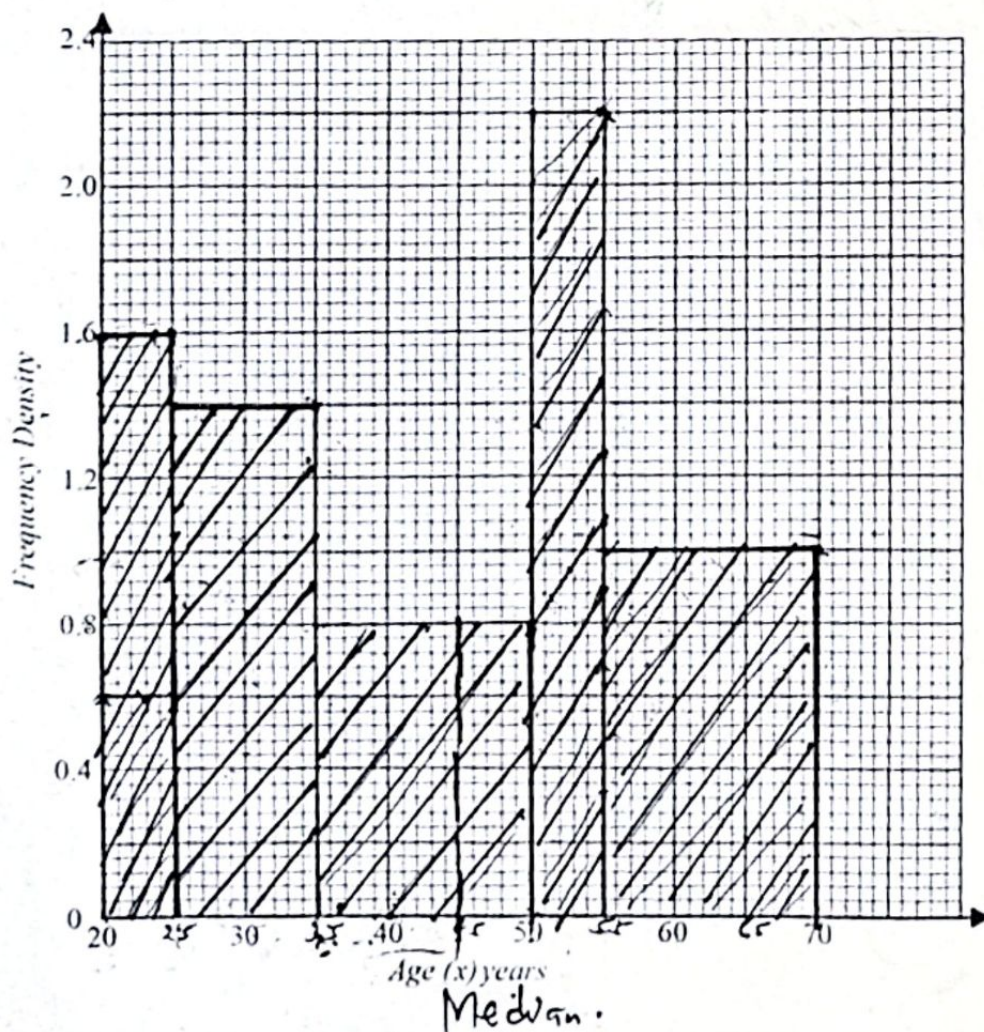
$$= 14$$

$$11 + 34 = 45$$

(1 mark)

- (b) (i) On the grid provided below, draw a histogram to represent the information provided in the table.

(3 marks)



$$\left(\frac{N}{2}\right)$$

$$Fh = \frac{F}{N}$$

- (ii) Use the histogram to estimate the median age. (3 marks)

$$Bar_1 = 5 \times 1.6 \quad \left(\frac{60}{2}\right) = 30$$

$$= 8$$

$$Bar_2 = 10 \times 1.4 \quad \left. \begin{array}{l} \\ \\ \end{array} \right\} M_1$$

$$= 14$$

$$Bar_3 = 15 \times 2 \quad \left. \begin{array}{l} \\ \\ \end{array} \right\} M_1$$

$$= 30$$

$$W_{Bar_3} = \frac{8}{0.8}$$

$$= 10$$

$$= 35 + 10$$

$$= 45$$

- (c) Calculate the mean age. (3 marks)

$$\bar{X} = \frac{\sum fx}{\sum f}$$

$$= \frac{625}{14.5}$$

$$= 43.25 \text{ year}$$

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