

SECTION I (50 marks)

Answer all the questions in this section in the spaces provided.

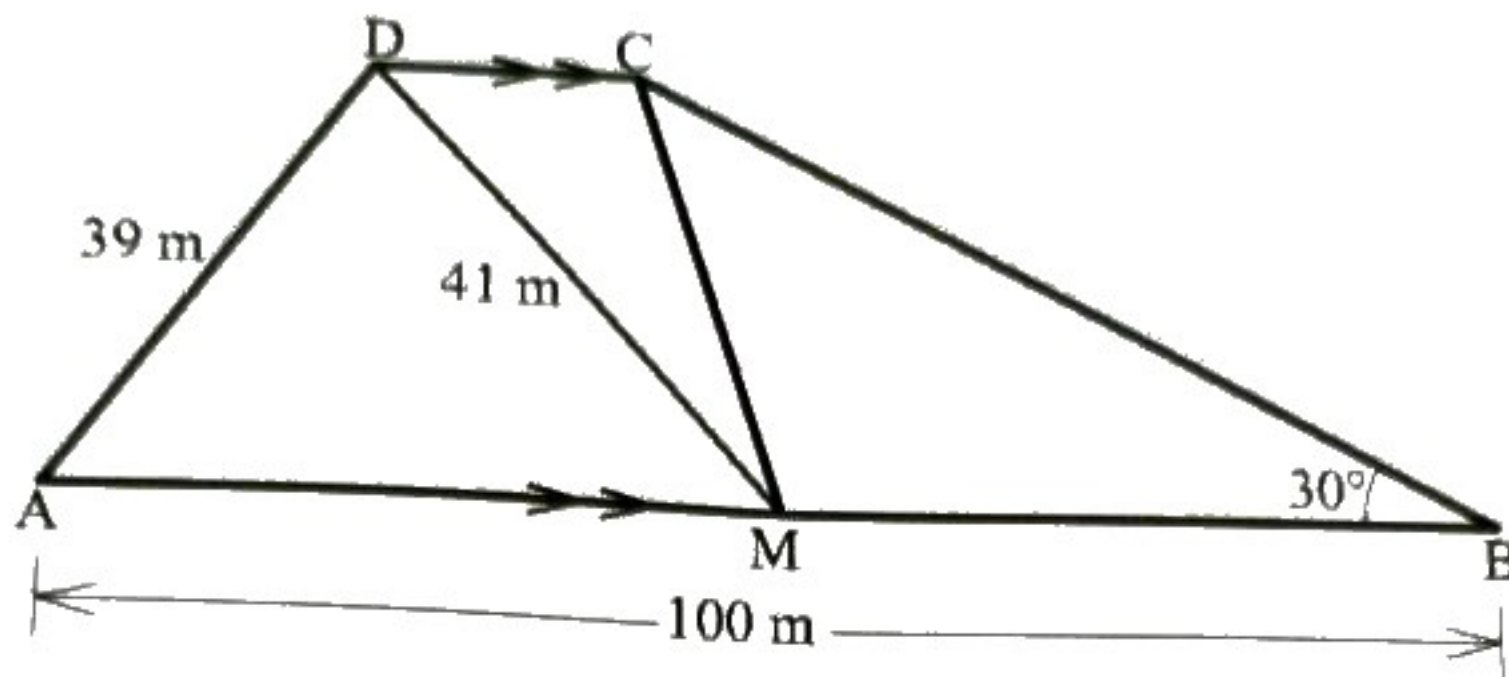
1 Without using mathematical tables or a calculator, evaluate $\frac{0.13 \times 0.3 - 0.003}{0.09}$ giving the answer in decimal form. (3 marks)

Simplify the expression $\frac{4x^2 - 9}{2x^2 + x - 6}$.

(3 marks)

- 3 A straight line L_1 whose equation is $y = 2 - \frac{1}{3}x$ meets the y -axis at Q. Another straight line L_2 is perpendicular to L_1 at Q. Find the equation of L_2 in the form $y = mx + c$ where m and c are constants. (3 marks)
- 4 A circle of radius 3 cm passes through all the vertices of a regular hexagon. Determine the area of the circle that lies outside the hexagon. (3 marks)
- 5 Solve for x in the equation $25^x = 125^{\frac{2}{3}} \div 5^{-1}$.

- 20 The following figure represents a piece of land in the shape of a trapezium ABCD. Lines AB and DC are parallel. Point M is the midpoint of AB. The land is divided into three triangular plots. Line AB = 100 m, AD = 39 m, MD = 41 m and angle ABC = 30° .



- (a) Calculate the area of the triangular plot AMD and hence the perpendicular distance between the two parallel sides. (4 marks)
- (b) Calculate the length of:
- BC; (2 marks)
 - MC. (2 marks)
- (c) Calculate the size of the obtuse angle BMC. (2 marks)

- 19 Airport S is 1700 km on a bearing of 300° from airport R. Airport Q is 800 km on a bearing of 215° from R.
In the following figure, airport R is represented by point R.



- (a) Using a scale of 1 cm to represent 200 km, show on the figure the relative positions of airports S and Q. (3 marks)
- (b) Use the scale drawing to determine:
- the distance from airport S to airport Q in kilometres; (1 mark)
 - the bearing of S from Q. (2 marks)
- (c) An aircraft flying at a speed of 400 km/h left S for Q at 8.00 am. Determine the time when the aircraft was exactly 1000 km from airport R on its way to Q. (4 marks)

- 18 The price of pens in a bookshop changed in the months of February, March and April. The price of a pen was sh 2 less in the month of February than the price of a pen in the month of March. In the month of April the price of a pen was sh 2 more than the price of a pen in the month of March. The bookshop sold pens worth Ksh 4 200 in February. In April, pens worth Ksh 4 500 were sold.

Take Ksh x to be the price of a pen in March.

- (a) Write an expression in x for the number of pens sold by the bookshop in:

(i) February;

(1 mark)

(ii) April.

(1 mark)

- (b) The bookshop sold 50 more pens in February than in April. Determine the number of pens sold in February. (6 marks)

- (c) Determine the percentage change in the number of pens sold by the bookshop in April compared to the number sold in February. (2 marks)

- (a) Triangle $A'B'C'$ is the image of triangle ABC under an enlargement centre $(-3, -2)$ and scale factor $(S.F) = -2$. On the same grid, draw $\triangle A'B'C'$. (3 marks)
- (b) Triangle $A''B''C''$ is the image of triangle $A'B'C'$ under rotation centre $O(0, 0)$.
- (i) State the angle of rotation. (1 mark)
- (ii) Complete triangle $A'B'C'$. (2 marks)
- (c) Triangle $A''B''C''$ is the image of triangle $A'B'C'$ under a reflection. (1 mark)
- (i) Draw the mirror line. (2 marks)
- (ii) Determine the equation of the mirror line in the form $y = mx + c$. (2 marks)
- (d) Describe fully a single transformation that maps triangle $A'B'C'$ onto triangle $A''B''C''$. (1 mark)

- 21 Two matrices $\mathbf{P}$ and $\mathbf{Q}$ are such that $\mathbf{P} = \begin{pmatrix} 3 & 7 \\ h & 4 \end{pmatrix}$ and $\mathbf{Q} = \begin{pmatrix} 5 & -4 \\ 3 & -2 \end{pmatrix}$. The determinant of $\mathbf{PQ} = 3$.
- (a) (i) Determine the value of h . (3 marks)
- (ii) Find $\mathbf{P}^{-1}$, the inverse of matrix $\mathbf{P}$. (2 marks)
- (b) Patel and Lagat purchased watches at sh m per watch and phones at sh n per phone. Patel purchased 12 watches and 28 phones for Ksh 24 600. Lagat purchased 15 watches and 40 phones for Ksh 34 500.
- (i) Form two equations in m and n . (2 marks)
- (ii) Use the matrix method to determine the price of a watch and that of a phone. (3 marks)

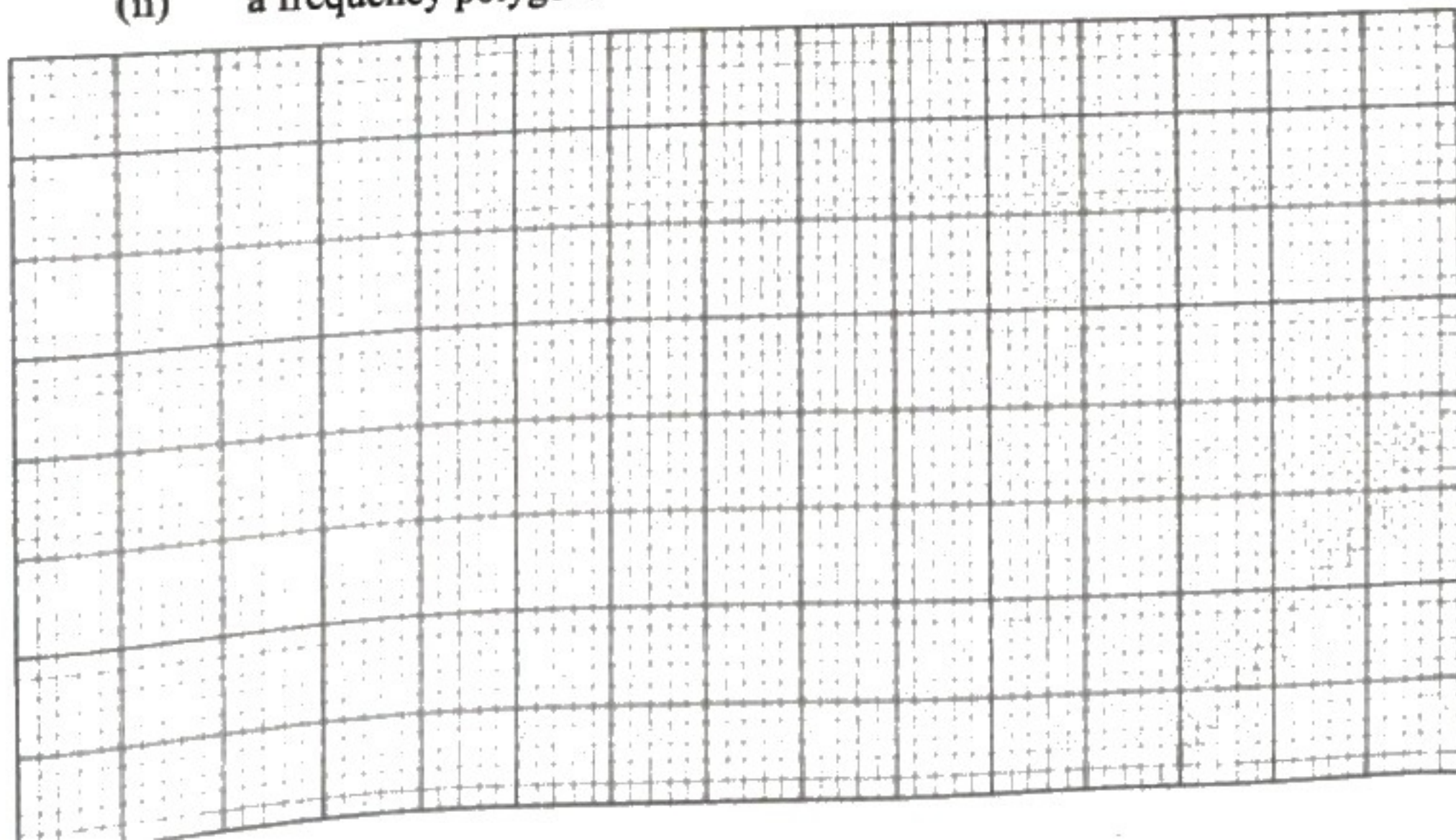
Members of the Environmental Club planted trees. The number of trees planted by each member is recorded as follows.

24	7	11	6	12	27	8	9	33	23
12	32	19	33	16	21	14	16	17	10
21	18	16	9	17	8	28	13	8	19
9	17	24	18	29	15	12	31	22	14

- (a) (i) Using a class width of 5 and starting with the class 6 - 10, make a frequency distribution table for the data. (2 marks)
- (ii) State the modal class. (1 mark)
- (iii) Estimate the mean number of trees planted. (3 marks)

- (b) On the grid provided and on the same axes represent the data using:

- (i) a histogram; (3 marks)
- (ii) a frequency polygon. (1 mark)



SECTION II (50 marks)

Answer only five questions in this section in the spaces provided.

- 17** On a market day, Abdul had 32 goats while Chebet had 56 goats. Chebet sold twice as many goats as Abdul. After the sale, the number of the goats that Abdul and Chebet remained with was in the ratio 3 : 5 respectively.
- (a) Determine the total number of goats sold by Abdul and Chebet at the market. (4 marks)
- (b) Abdul and Chebet raised a total of Ksh 97 600 from the sale of goats at the market. Abdul's selling price per goat was 5% higher than that of Chebet. Determine the ratio of the earnings of Abdul to Chebet from the sale of goats. (4 marks)
- (c) Abdul decreased the selling price per goat in the ratio 19:21 for the goats that remained. Determine the new selling price per goat. (2 marks)

- 19 Airport S is 1700 km on a bearing of 300° from airport R. Airport Q is 800 km on a bearing of 215° from R.
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- (a) Using a scale of 1 cm to represent 200 km, show on the figure the relative positions of airports S and Q. (3 marks)
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- the distance from airport S to airport Q in kilometres; (1 mark)
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(1 mark)

(ii) April.

(1 mark)

- (b) The bookshop sold 50 more pens in February than in April. Determine the number of pens sold in February. (6 marks)

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