MASENO SCHOOL

2025 MOCK EXAMINATION

Kenya Certificate of Secondary Education

121 / 1 - Mathematics Paper 1 (Alt. A)	
Tuesday 15th July, 2025	**Unique Identifier No...........................**
8.00 a.m. - 10.30 a.m.	**Signature...**

Instructions to candidates

a) *Write your **unique identifier number** and **sign** in the spaces provided above.*

b) *This paper consists of **two** sections; **Section I** and **Section II**.*

c) *Answer all the questions in **Section I** and only **five** questions from **Section II**.*

d) ***Show all the steps in your calculations, giving your answers at each stage in the spaces provided below each question.***

e) *Marks may be given for correct working even if the answer is wrong.*

f) ***Non – programmable** silent electronic calculators **and** KNEC Mathematical tables may be used, except where stated otherwise.*

g) ***This paper consists of 15 printed pages.***

h) ***Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.***

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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

**THE MASENO SCHOOL MOCK COMMITTEE – 2025**

SECTION I (50 marks)

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

1 A tank is $\frac{3}{4}$ full of water. After 15 litres of water is drawn from it, it becomes $\frac{5}{8}$ full. Calculate the

capacity of the tank. (3 marks)

2 A wholesaler sells a phone to a retailer making 20% profit on the cost price. The retailer then sells it to a customer for Ksh 24 000 thereby making 25% profit. Calculate the original cost price of the phone to the wholesaler. (3 marks)

3 Five students sat for a mathematics test and had a mean score of 68%. When the score of the sixth student is included, the mean rises to 70%. Find the score of the sixth student. (3 marks)

4 Two alarm clocks ring at intervals of 42 minutes and 56 minutes respectively. Both clocks ring together at 7:00 a.m. Calculate the number of times the clocks will ring together again by 5:24 a.m. the following day. (3 marks)

5 From a point on the ground, the angle of elevation to the top of a flag post is 35º. From a point 30 metres closer to the base of the pole, the angle of elevation is 50º. Calculate the height of the post correct to 1 decimal place. (4 marks)

6 A straight line P passes through the point $(4, -2)$ and is perpendicular to the line whose equation is $3x - 4y = 12$. Find the equation of the line P. Give your answer in the form $y = \mathrm{m}x + \mathrm{c}$ where m and c are constants. (3 marks)

7 Two numbers A and B are such that their sum is 10 and the sum of their reciprocals is $\dfrac{5}{12}$. Calculate the

numbers. (3 marks)

8 Solve the inequality $x - 5 < 3x + 2 \leq 2(x + 3)$ hence represent your solution on a number line. (3 marks)

9 In triangle ABC, points D and E are on AB and AC respectively such that DE is parallel to BC. Given that AD:DB = 2:3 and that the area of triangle ADE is 20 cm^2, calculate the area of the quadrilateral EDBC. (3 marks)

10 In the figure below, ABCD is a rhombus of side 10 cm. The arc BD with its centre at A intersect the major diagonal AC at X. The size of angle ABC = 120º.
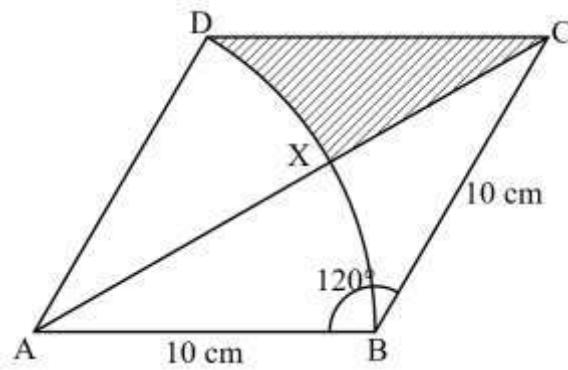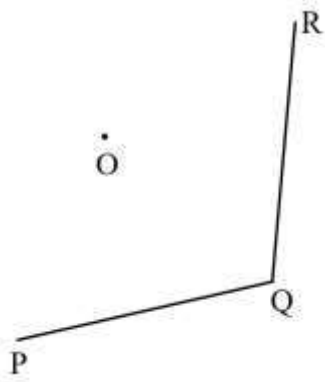

Taking $\pi = 3.142$, calculate the area of the shaded region.   (3 marks)

**11** Solve for y in the equation $3 \times 8^{y+1} + 2^{3y-1} = 98$ (3 marks)

12 The lines PQ and QR are two sides of a figure whose rotational symmetry is of order 5 about O. Using a ruler and a pair of compasses only, complete the figure hence draw its lines of symmetry.   (3 marks)

13 The ratio of the ages of a father to his son is 7:1. In 8 years' time, the ratio will be 3:1. Find their current ages.   (3 marks)

14 Given that $\mathbf{A} = \begin{pmatrix} -1 & 4 \\ 2 & -5 \end{pmatrix}$, $\mathbf{B} = \begin{pmatrix} 2 & 3 \\ 1 & -1 \end{pmatrix}$ and that $\mathbf{A}^{-1} = \mathbf{B}^2\mathbf{C}$, find $\mathbf{C}$.   (4 marks)

15 Use the grid below to solve the pair of simultaneous equations $3x - 5y = 15$ and $y = 6 - 3x$. (3 marks)
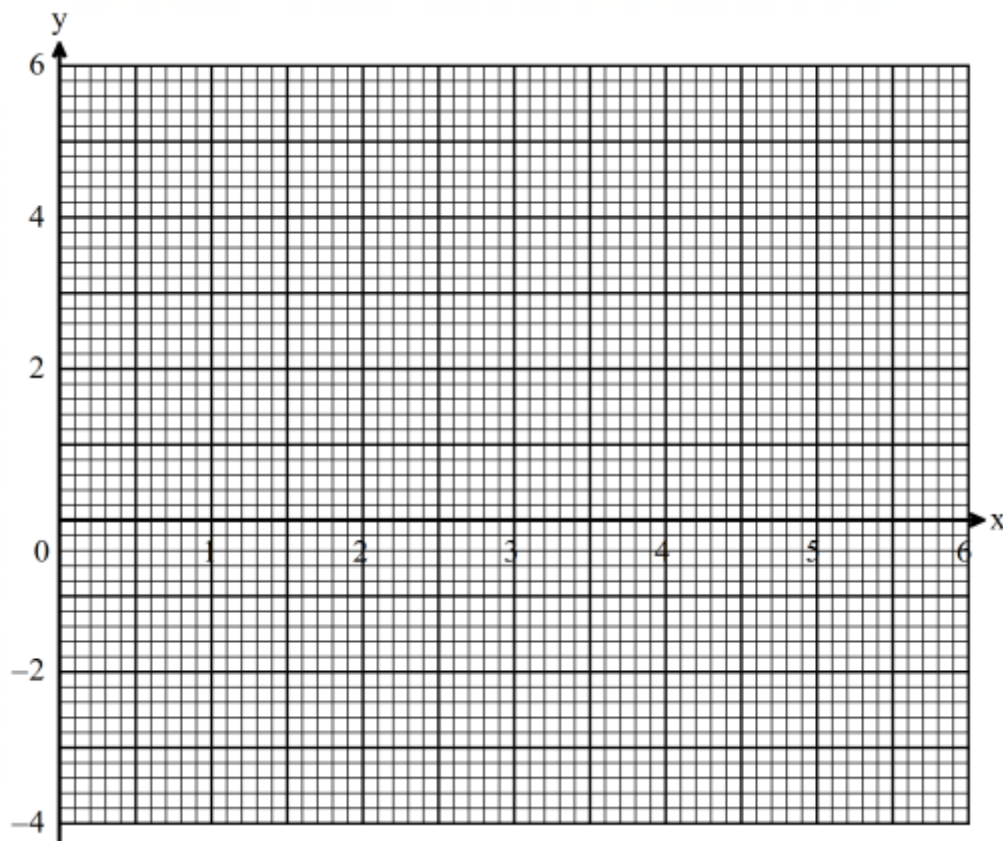
16 Two of the interior angles of an irregular polygon measure 150° each and the rest measure 105° each. From one vertex of the polygon, straight lines are drawn to divide the polygon into x number of triangles. Find x. (3 marks)

SECTION II (50 marks)

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

17 The position vector of a point A is $\mathbf{OA} = \begin{pmatrix} 2 \\ 4 \end{pmatrix}$ and vector $\mathbf{AB} = \begin{pmatrix} -6 \\ -6 \end{pmatrix}$.

(a) Find the:

(i)   Coordinates of point M, the mid – point of **AB**.   (3 marks)

(ii)   Distance of M from point $R(5,3)$ correct to 2 decimal places.   (2 marks)

(b) A translation $\mathbf{T} = \begin{pmatrix} -1 \\ -5 \end{pmatrix}$ maps points M onto point P.

(i)   Find the coordinates of P.   (2 marks)

(ii)   Show that **AB** is parallel to **PR**.   (3 marks)

18 The table below shows time in minutes that a group of 45 students took to complete a mathematics test.

10	25	24	22	35	17	32	20	13	30	21	16	34	24	13
35	23	38	26	11	14	32	37	29	37	37	22	17	35	20
37	38	18	14	32	34	28	11	19	31	15	22	15	38	19

(a) From the given data, complete the frequency distribution table below. (2 marks)

Time in minutes	10 – 12	13 – 15	16 – 21	22 – 24	25 – 33	34 – 39
Tally						
No. of students						

(b) Using the frequency distribution table in (a) above, draw a histogram to represent the data. (3 marks)
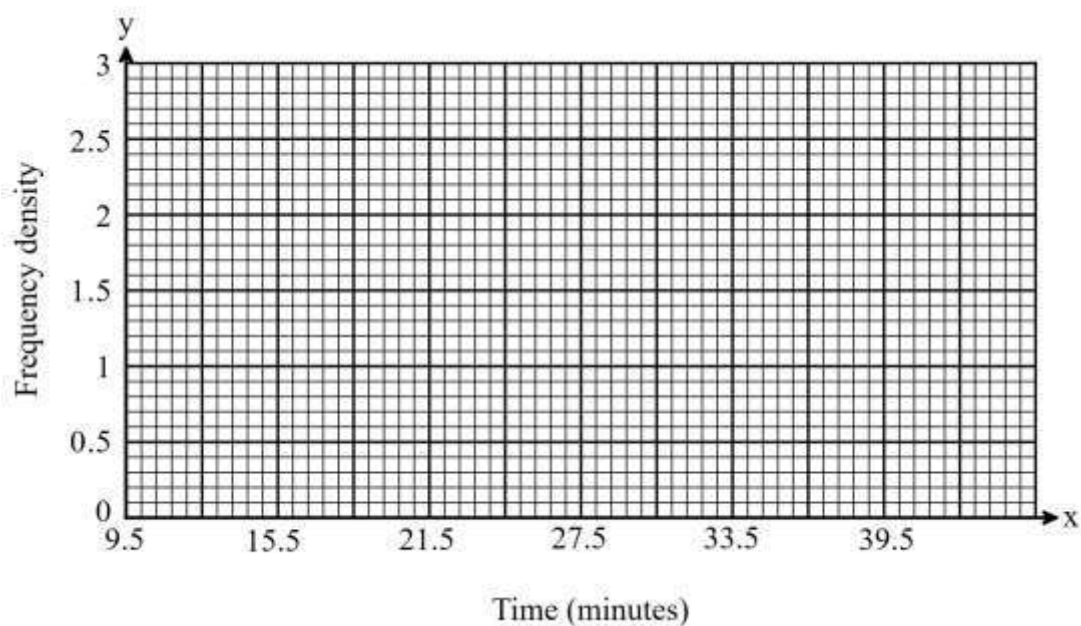
Time (minutes)

(c) From the histogram, estimate the:

   (i)   Median time in minutes. (3 marks)

   (ii)   Number of students that spent from 21.5 minutes to 36.5 minutes. (2 marks)

19 The distance between two towns A and B is 180 km. A bus covers the distance at an average speed of x km/h. When the bus moves at 18 km/h faster, he covers the distance in 30 minutes less.

(a) Calculate the speed x km/h of the bus. (4 marks)

(b) The bus left town A for town B at 7.00 a.m. Twenty minutes later, a tractor left town B for town A using the same route at an average speed of 32 km/h. Calculate:

(i) The time when the two vehicles met. (3 marks)

(ii) The distance of the tractor from town A when the bus arrived at B. (3 marks)

20 The figure below shows a curved boundary of a farm next to a river. The boundary is 60 metres long. Measurements perpendicular to the river were taken at 5 metre intervals.
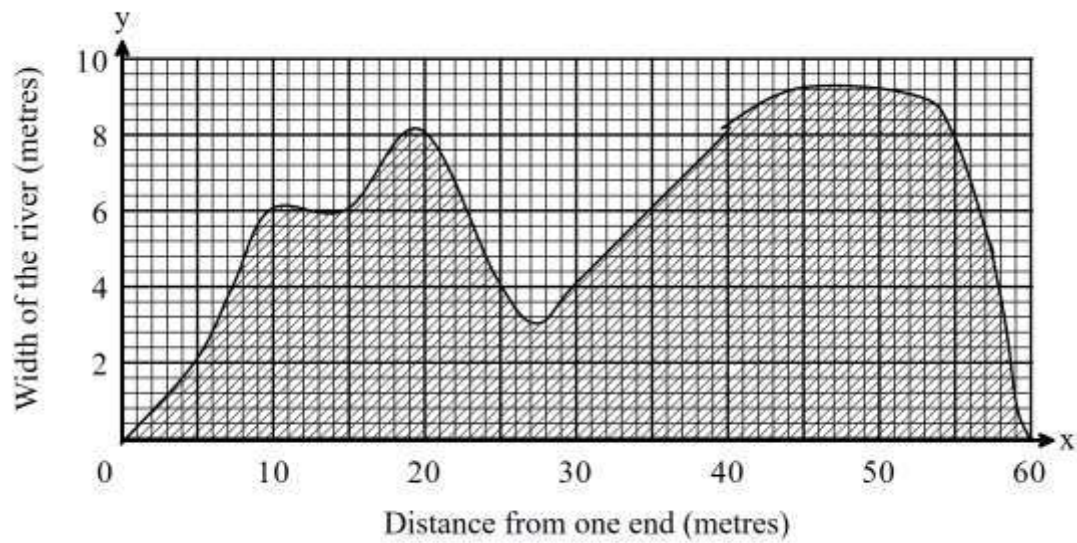
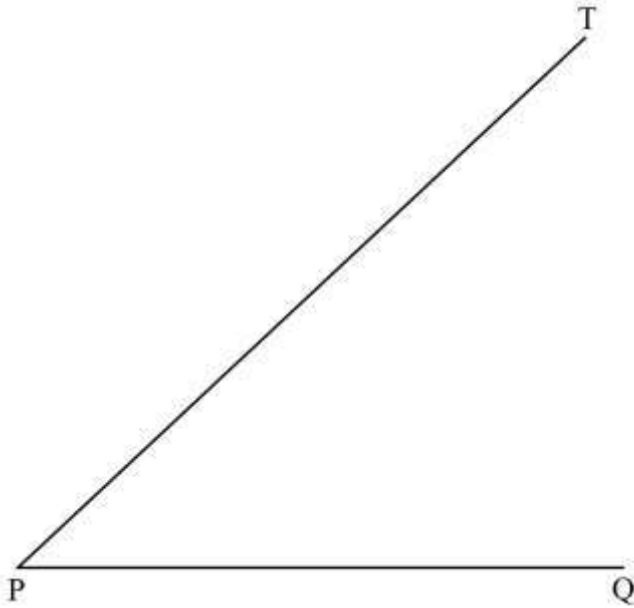(a) From the grid, fill the approximate width of the river. (2 marks)

Distance from one end	0	5	10	15	20	25	30	35	40	45	50	55	60
Width from river													

(b) Estimate the area in hectares bounded by the river and the boundary using:

    (i)   Trapezium rule with 6 strips. (4 marks)

    (ii)   Mid – ordinate rule with 6 strips. (4 marks)

21 *In this question, use a ruler and a pair of compasses only for all construction.*

(a) A triangle PQR is such that R lies on the line PT and angle $PQR = 67.5°$. PQSR is a quadrilateral in which RS is parallel to PQ and RS = QS. Complete:

    (i)   The triangle PQR.   (2 marks)

    (ii)   The quadrilateral PQSR.   (3 marks)

(b) Draw a circle inside triangle RQS that touches the sides RQ, QS and RS. Measure the radius of the circle.   (2 marks)

(c) Calculate the area in the triangle RQS that lies outside the circle.   (3 marks)

22 A manufacturer wants to design a rectangular open box with a square and a fixed volume of 256 cm^3.

Letting the side of the square base be x cm and the height be h cm;

(a) Express h in terms of x. (1 mark)
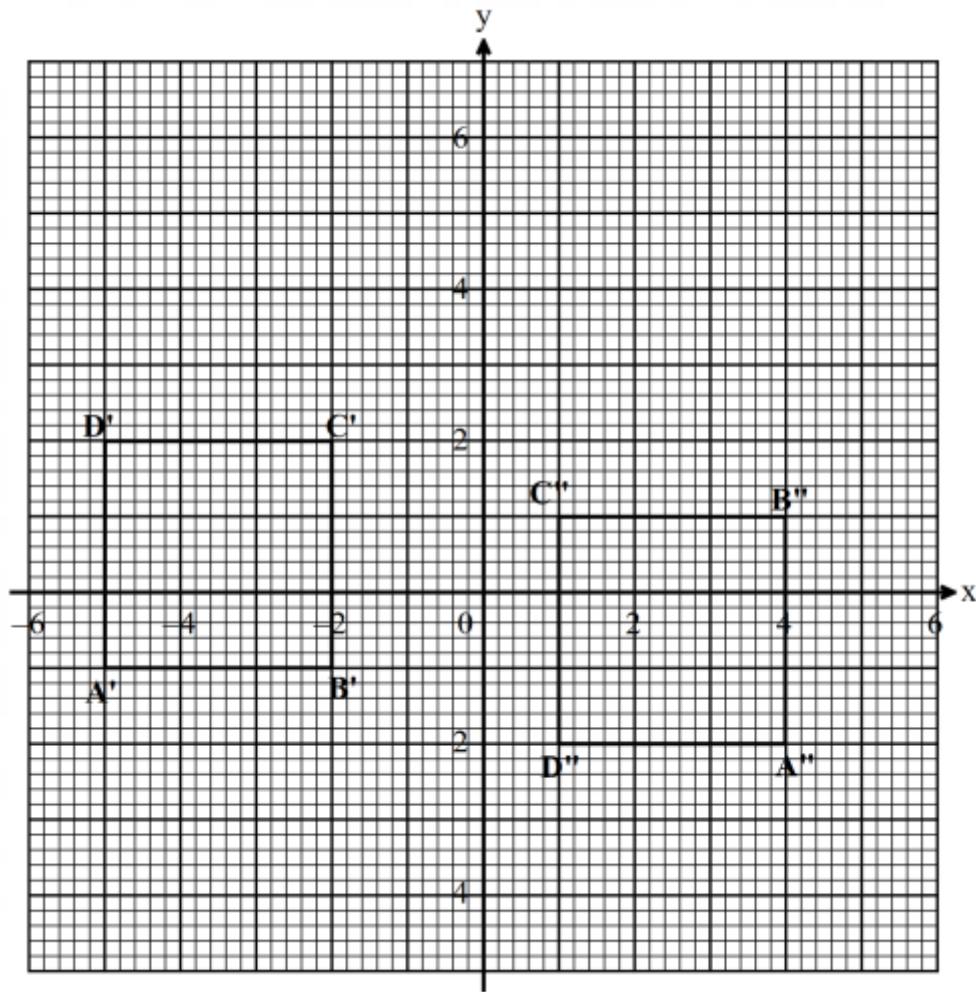
(b) Find an expression in x for the surface area A of the box. (3 marks)

(c) Determine the:

   (i)   Dimensions of the box that give the minimum surface area. (4 marks)

    (ii)   Hence calculate the minimum surface area of the box. (2 marks)

23 The squares A′B′C′D′ and A″B″C″D″ are drawn on the grid below. A′B′C′D′ is the image of ABCD under an enlargement, centre $(-5, -4)$ and scale factor 3.

(a) Describe the transformation that maps square A′B′C′D′ onto square A″B″C″D″. (3 marks)

(b) On the same axes, draw the square ABCD. (3 marks)

(c) Square A″B″C″D″ is mapped onto square A‴B‴C‴D‴ by a reflection in the line $y = x + 2$.

    (i)   Draw the line $y = x + 2$ on the same axes. (1 mark)

    (ii)   Draw the square A‴B‴C‴D‴. (1 mark)

(d) State the type of congruency between the squares:

    (i)   A′B′C′D′ and A″B″C″D″ (1 mark)

    (ii)   A′B′C′D′ and A‴B‴C‴D‴ (1 mark)

24 In the figure below, AB is parallel to DC. AB = 28 cm, BD = 12 cm, AD = 20 cm and $\angle ABC = 135°$.
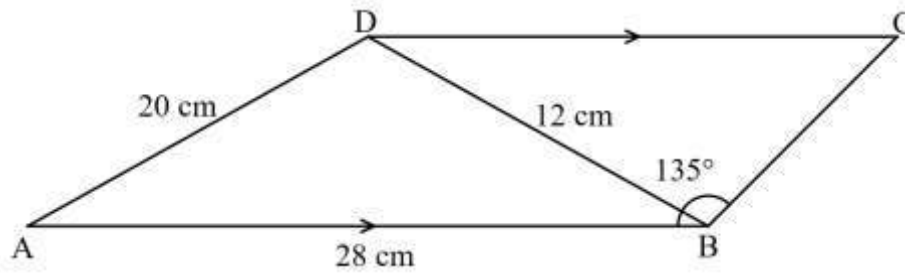
(a) Calculate the:

(i)   Size of angle ADB. (3 marks)

(ii)   Exact area of triangle ABD. (2 marks)

(b) Calculate, correct to 2 decimal places, the length of:

(i)   The side BC. (2 marks)

(ii)   The side DC. (3 marks)

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