







121/1

MATHEMATICS

Paper 1

(Alt. A)

PRE-MOCK

March 2025 – Time: 2¹/₂ hours

Name Adm No...... Class.....

School.....Sign.....

Instructions to candidates

- a) Write your name, admission number and class in the spaces provided above.
- b) Write the name of your school, the date and signature.
- c) This paper consists of two sections; Section I and Section II.
- d) Answer all the questions in Section I and only five from Section II.
- e) Show all the steps in your calculations, giving your answers at each stage in the spaces provided below each question.
- f) Marks may be given for correct working even if the answer is wrong.
- *g)* Non programmable silent electronic calculators and KNEC Mathematical tables may be used, except where stated otherwise.
- *h)* This paper consists of 15 printed pages.
- *i)* 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	

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SECTION I (50 marks)

Answer all the questions in this section

A saleslady earns a basic salary of Ksh 22 000 plus a commission of x% for all sales above Ksh 150 000.
 In a certain month, she earned a total of Ksh 58 000 after making sales amounting to Ksh 600 000. Find the commission she would have earned for sales amounting to Ksh 840 000. (3 marks)

2 Solve the equation $8^{x+1} + 3 \times 2^{3x} = 176$.

(3 marks)

3 The length of three wires are 4.0 metres, 4.8 metres and 7.2 metres. Pieces of wire of equal lengths are cut form the three wires. Calculate the least number of pieces obtained. (4 marks)









4 The ratio of the interior angle of a regular polygon A to the interior angle of another regular polygon B is 4:5. Each exterior angle of polygon A is 27° more than that of the exterior angle of polygon B. Calculate the number of sides of polygon B. (3 marks)









6 Solve the equation $\sin 2x = \cos x$ for which x is acute, hence find the exact value of $\tan x \cdot (3 \text{ marks})$

The perimeter of a rectangle is 53 cm while its area is 168 cm². Calculate the dimensions of the rectangle.
 (3 marks)

8 Solve the inequality $x-7 \le 3x+1 < 2x+3$ and express the solution on a number line. (3 marks)









In the figure below, AB is one side of the cross – section of a pentagonal prism. The cross section
 ABCDE is a regular pentagon. BF is one of the lengths of the prism.



Complete the sketch of the prism showing hidden edges using broken lines. (3 marks)

10 A translation vector T maps a point A(-2,3) onto A'(3,-1). Find the coordinates of a point B whose image is B'(1,-4) under T. (3 marks)

11 Given that
$$\mathbf{A} = \begin{pmatrix} h & -3 \\ 2 & -1 \end{pmatrix}$$
, $\mathbf{B} = \begin{pmatrix} 6 & 2 \\ 2 & 1 \end{pmatrix}$ and that the determinant of **AB** is 8, find h. (3 marks)









12 The recording of the speed of a bus started at 10 m/s. The bus accelerated uniformly for 30 seconds then maintained the speed attained for 18 seconds before decelerating to rest in another 12 seconds. The bus covered a distance of 1 125 metres in the 60 seconds. Calculate the:
(a) Maximum speed in m/s attained by the bus. (2 marks)

(b) Time taken by the bus to cover the first 261 metres.

(2 marks)

13 Given that $AB = \begin{pmatrix} -4 \\ 4 \end{pmatrix}$ and $OB = \begin{pmatrix} 6 \\ 6 \end{pmatrix}$, and that a point M is the midpoint of AB, Calculate the distance of M from the origin. (3 marks)

14 Determine the equation of the normal to the curve $y = 2x^3 - 7x^2 + 9x - 5$ at x = 2. (3 marks)









15 In the figure below, the broken line MM is the mirror line that reflects the object.





16 In the figure below, AB and CD are arcs of two concentric circles, centre O. \angle AOB is 2.5 radians, AD = BC = 6 cm and the length of the arc AB = 20 cm.



Calculate the perimeter of ABCD.

(3 marks)









SECTION II (50 marks)

Answer only five questions in this section in the spaces provided

- A carpenter constructed an open wooden box with internal measurements 1.5 m long, 1.2 m wide and 0.8 m high. The wood used in constructing the box was 2.0 cm thick and had a density of 0.6 g/cm³.
 - (a) Determine the:
 - (i) Volume in cm^3 of the wood used in constructing the box. (3 marks)

(ii) Surface area of the wooden box.

- (b) Identical cylindrical tins of radius 5 cm and height 20 cm with a mass of 160 g each were packed in the box. Calculate the:
 - (i) Maximum number of tins that were packed. (2 marks)

(ii) Total mass of the box with the tins. (2 marks)







(3 marks)

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- **18** Triangle ABC is such that AC = BC. The coordinates of A and B are (-2,1) and (6,7) respectively. The equation of the line AC is y = -18x 35.
 - (a) Find the equation of the perpendicular bisector of the line AB giving your answer in the form ax + by = c where a, b and c are integers. (4 marks)

(b) Find the coordinates of point C.

(3 marks)

(c) Determine the *x* intercept of line BC.

(3 marks)









19 The line AB below is one side of the trapezium ABCD in which AB is parallel to DC, AD = 5 cm, angle DAB = 67.5° and angle ABC = 75° .



- a) Using a ruler and a pair of compasses only, construct the trapezium. (4 marks)
- b) Drop a perpendicular from D to AB hence calculate the area of the trapezium ABCD. (4 marks)

c) A point X is equidistant from the points A, B and C. Locate the point X. (2 marks)









- 20 A triangle ABC with vertices A(2,2), B(4,2) and C(4,4) is mapped onto triangle A'B'C' by a reflection in the line y = x+1.
 - (a) Draw triangle ABC and A'B'C' on the same grid.

(3 marks)



- (b) Triangle A'B'C' is mapped onto triangle A''B''C'' with vertices at A''(0,2), B''(-2,2) and C''(-2,4).
 - (i) On the same axes, draw triangle A''B''C''. (1 mark)
 - (ii) Describe the transformation that maps triangle A'B'C' onto triangle A''B''C'' . (2 marks)
- (c) Triangle A'''B'''C''' is the image of triangle A''B''C'' under enlargement, centre (-1,1) and scale factor -2. Draw triangle A'''B'''C''' on the same axes.
 (2 marks)
- (d) State the type of congruency between the triangles:
 - (i) ABC and A''B''C''. (1 mark)
 - (ii) A'B'C' and A''B''C''. (1 mark)









21 In the figure below, $\angle BAD = \angle CBA = 120^{\circ}$, $\angle ADB = \angle BAC$, AD = 16 cm and BC = 9 cm.



(a) Find the length of AB hence calculate the area of triangle ABC.

(b) Calculate correct to 1 decimal place:

(i)	The length of BD
(1)	The length of DD.

(ii) The size of angle BCA.

(3 marks)









(3 marks)

(4 marks)

22 In the figure below, the region R is bounded by the line y = 2x + 4 and the curve $y = x^2 - 4x - 12$.



(a) Find the coordinates of points A and B.





(4 marks)

(ii) Mid – ordinate rule with 5 strips. (3 marks)











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23 Marks scored by 40 students in a test were recorded as shown in the table below.

11	17	21	25	19	24	13	24	27	19	16	38	46	18	49	29	49	12	25	43
36	33	17	14	22	22	21	50	34	35	44	32	30	24	48	23	36	20	41	18

(a) Use the data provided to fill the table below.

Marks	Tally	Frequency	Frequency density
11-15			
16-20			
21-25			
26-35			
36-50			

(b) Using the table in (a) above, estimate the mean mark.

(3 marks)

(3 marks)

(c) (i) On the grid below, represent the information in the table above in a histogram. (2 marks)



(ii) Use the histogram above to estimate the median mark.

(2 marks)









- 24 The displacement, x metres, of a moving particle after t seconds is given by $x = t^3 6t^2 + 9t + 5$. Determine the:
 - (a) Displacement of the particle during the 3^{rd} second.

(3 marks)

(3 marks)

(b) Times when the particle is momentarily at rest.

(c) Minimum velocity.

(2 marks)

(d) Acceleration when the particle is initially at rest.

(2 marks)

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