KAPSABET HIGH SCHOOL

TRIAL 1 EXAMINATION 2025

MATHEMATICS

121/1
PAPER 1
TIME: 2½ HOURS

NAME…………………………………………………………………………………………

SIGN………………………

INDEX NO………………………………………………   ADM NO……………………

INSTRUCTIONS TO CANDIDATES

a) Write your **name** and **index number** in the spaces provided above.
b) Sign and write the **date** of examination in the spaces provided above.
c) This paper consists of **two** sections, section **I** and section II.
d) Answer **all** the questions in **section I** and only **five** questions from **section II**.
e) **All** answers and working **must** be written on the question paper in the spaces provided below each question.
f) Show all the steps in your calculations, giving your answers at each stage in the spaces below each question.
g) Marks may be given for correct working even if the answer is wrong.
h) Non- programmable silent calculators and KNEC mathematical tables may be used except where stated otherwise.
i)

SECTION 1

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

SECTION 2

17	18	19	20	21	22	23	24		GRAND TOTAL

Answer ALL the Questions in the section

1. Evaluate: **3mks**

$$\frac{2\frac{1}{5} \;\Diamond\Diamond\; 1\frac{3}{4} - \frac{2}{5}\,5\frac{1}{4}\;\frac{4}{4}}{1\frac{2}{5} + 2(1\frac{1}{4} - 2\frac{3}{4})}$$

2. An electrician made a loss of 30% by selling a multi plug at Sh. 1400. What profit would he have made if he sold the multi plug at sh 2300.　　　　　　**3mks**

3. Simplify $\sqrt{\dfrac{12\Box^{4}\,\Box^{-1}}{\Box^{5}}}$　　　　　　**2mks**
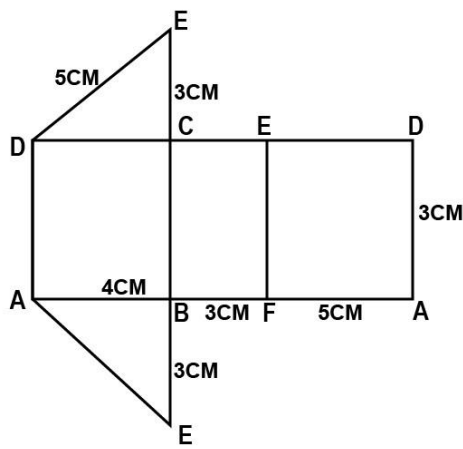
$$\frac{3\Box^{-2}\Box}{-3\Box^{3}}$$

4. Solve the following inequalities and represent the solutions on a number line

$X + 1 \leq 4x - 5 < 3x + 2$

5. The figure below shows a net of a solid.
   Sketch the solid of the net showing the hidden edges with broken lines.   **2mks**

a. Find the surface area of the solid.   **2mks**

6. Determine the quartile deviation for the following distribution.   **3mks**
3,4,9,5,4,7,6,2,1,6,7,8,9

7. Given that $2^{3/2x} = 4096$, find the value of x   **2mks**

8. It would take 15men 8days to dig a trench of 240m long. Find how many days it would take 18men to dig a trench 360meters long working at the same rate. **3mks**

9. Use logarithms to evaluate. **4mks**

$$\sqrt[3]{\frac{0.921 \times \diamond}{\frac{0.00739}{0.023}}}$$

10. A regular polygon is such that its exterior angle is one eighth the size of interior angle. Find the number of sides of the polygon. **3mks**

11. A translation vector $\begin{pmatrix} x - 1 \\ 2 - y \end{pmatrix}$ maps a point A(4,6) onto A^{I}(9,12). Find the value of x and y.

3mks

12. A Canadian tourist arrived in Nairobi with Canadian dollars 6200. She converted all his money into Kenya Shillings and then spent a total of Kshs. 100,000. She paid her Kenyan tour guide a commission equivalent to 20% of the remainder. Given that 1 canadian dollar = Ksh. 48.12. calculate

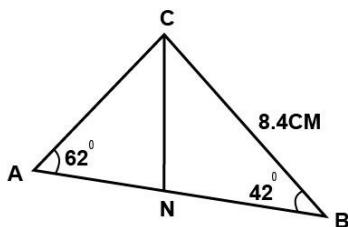A. How much she got in kenya shillings after converting all her money.　　**1mk**

B. The amount of kenya shillings she was left with at the end.　　**2mks**

13. In the figure below <A=62°, <B = 42°, BC = 8.4cm and CN is a bisector of angle ACB. Calculate to 1dp the length of CN.　　**3mks**

14. A father is now four times as old as his son. Five years ago, he was exactly one year and half times as old as his son will be in ten years from now. Determine the sum of their present ages.

4mks

15. An arc length of 11cm subtends an angle of 140° at the circle. Find the area of the enclosed sector.

4mks

16. Factorize and simplify the expression.   **3mks**

$$\frac{x^2 + 6x + 9}{x^2 - 9}$$

SECTION II (50 marks)

Answer any FIVE questions from this section

17. The triangle ABC with coordinates A(2,3), B(4,2) and C(1,1) is mapped onto triangle $A^1B^1C^1$ by a reflection in the line $y + x = 0$.

a. (i) Draw triangle ABC and its image $A^1B^1C^1$ on the same plane.   **3mks**

(ii) Triangle $A^1B^1C^1$ is mapped onto $A^{11}B^{11}C^{11}$ by a transformation represented by the matrix.

$$\begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix}$$

Draw triangle $A^{11}B^{11}C^{11}$ and describe fully a single transformation that maps triangle ABC onto triangle $A^{11}B^{11}C^{11}$ **4mks**

b. Triangle ABC is mapped onto xyz with A being mapped onto x, B onto Y and C onto Z. given that the coordinates of x is (-4,3), Y is (0,2) and Z is (-1,1), find the matrix representing the transformation.   **3mks**

18. A lorry left town A for B at 6.50pm at an average speed of 60km/h. at 8.35pm, a car left tow A for B at an average speed of 90km/h. if A is 317km from B. determine:

a. The distance of the lorry from town A when the car took off. **3mks**

b. The distance the car travelled to catch up with the lorry. **4mks**

c. What time of the day did the car catch up with the lorry? Give your answer in 24hrs system. **3mks**

19. Three ships X, Y and Z are approaching a habour H. X is 150km from the habour on a bearing of O90°. Y is 130km from the habour on a bearing of 130°E and Z is 180km to the west of Y.
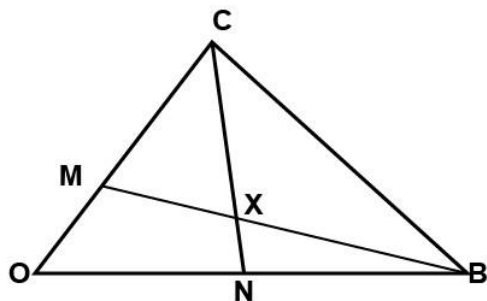
a) Taking a scale of 1cm to represent 20km, make a scale drawing of the routes of the three ships to the habour. **2mks**

b) What is the distance between ships X and Z? **2mks**

c) Find the bearing of H from Z. **2mks**

d) If ship Y is travelling at a speed of 50km/h how long will it take to reach the harbor. **2mks**

20. The figure below shows a triangle OAB with O as the origin. OA=$\underline{a}$ OB = $\underline{b}$, OM 2/5$\underline{a}$ and ON = 2/3$\underline{b}$.

a) Express in terms of $\underline{a}$ and $\underline{b}$ the vectors

(i) BM   **1mk**

(ii) AN   **1mk**

b) Vector OX can be expressed in two ways: OB + KBM or OA + hAN, where K and h are constants.
Express OX in terms of:

i. $\underline{a}$, $\underline{b}$ and k.   **2mks**

ii. $\underline{a}$, $\underline{b}$ and h.   **2mks**

c) find the valuesof k and h.   **4mks**

21. in a certain meeting, there were 95men in attendance. There were 50 more women than men and twice as many children as men.

a. Determine the number of people in attendance. **2mks**

b. Find the percentage of children in attendance, correct to 3 significant figures. **2mks**

c. A hall for the meeting was fitted with benches that could accommodate eighher 10 children or 7 adults per bench.

Find the number of benches

i. Used by the children **2mks**

ii. Completely filled by the adults. **2mks**

iii. Adults who would fill the unoccupied space. **2mks**

22. a) The point A(-2, 4) and B(3,-6) lies on a straight line AB, find
(i) the equation of the line perpendicular to AB and passing through **A**   **3mks**

(ii) The equation of the line parallel to AB and passing through the point. **(3,-1).**   **3mks**

b) The points A and B are translated by a vector
$M = \begin{pmatrix} 2 \\ -1 \end{pmatrix}$. Find
(i) the images of A and B.   **2mks**

(ii) the equation of the line passing through A¹ and B¹ the images of A and B respectively. **2mks**

23. The figure below represents a solid made up of a conical frustum and a hemispherical top. The slant height of the frustum is 8cm and its base radius is 4.2cm.

3.5CM

8CM

4CM

4.2cm
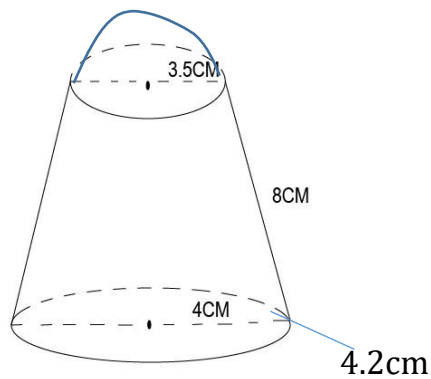
If the radius of the hemispherical top is 3.5cm

a. Find the area of:

i. The circular base   **2mks**

ii. The curved surface area of frustum.   **4mks**

iii. The hemispherical surface   **2mks**

b. A similar solid has a total surface area of 81.5cm2. determine the radius of the base.   **2mks**

24. Using a ruler and a pair of compasses, construct parallelogram ABCD such that AB = 8cm, diagonal AC = 12cm and angle BAC = 22.5° **4mks**

a) Measure   (i) The diagonal BD **1mk**

(ii) The angle ABC **1mk**

b) Draw the circumference of triangle ABC **2mks**

c) Calculate the area of the circle drawn **2mks**