KAPSABET HIGH SCHOOL

TRIAL 1 EXAMINATION 2025

MATHEMATICS

121/2

PAPER 2

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

SECTION I (50Mks)

Attempt ALL Questions from this section

1. Make x the subject of the formula **3mks**

$$P = \sqrt{\frac{x + 2w}{4x + 3R}}$$

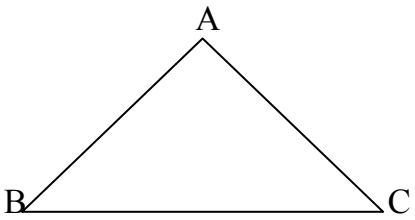
2. P varies partly as the square of v and partly as the cube of v. when V=2, P = -20 and when v = -3, P=135. Find the relationship between P and v. **3mks**

3. Expand $(1 + 2x)^7$ up to x^3, hence use the expansion to estimate the value of $(1.02)^7$ correct to four decimal places. **3mks**

4. Simplify the following by rationalizing the denominator. **3mks**

$$\frac{\sqrt{2}-1}{4\sqrt{2}-3}$$

5. The diagram below represents a field ABC.



(a) Draw the locus of points equidistant from sides AB and AC **2mks**

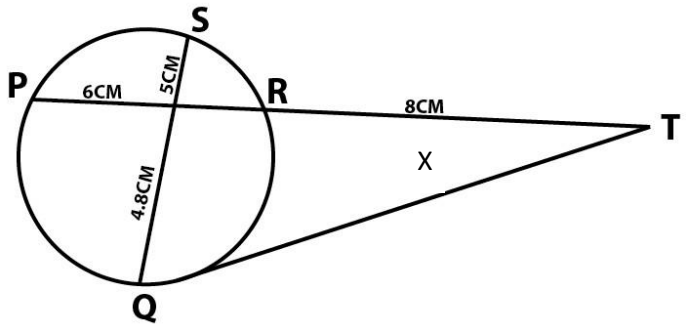
(b) Draw the locus of points equidistant from points A and C. **2mks**

C) A coin is lost within a region which is nearer to point A than to point C and closer to side AC than to side AB. Shade the region where the coin can be located. **2mks**

6. Given x = 13.4cm and y=4.3cm. calculate the percentage error in x/y correct to 4 d.p **3mks**

7. If matrix A = $\begin{pmatrix} 1 & 2 \\ 4 & 3 \end{pmatrix}$ Find B given that $A^2 = (A + B)$. **3mks**

8. In the figure below QT is a tangent to a circle at Q. PXRT and QXS are straight lines. PX = 6cm, RT = 8cm, QX= 4.8CM



Find the length of

a. XR **2mks**

b. QT **2mks**

9. A circle whose equation is $(x - 1)^2 + (y - k)^2 = 10$ passed through point (2,5). Find the coordinates of the two possible centresof the circle. **3mks**

10. A blender mixes two brands of juice A and B to obtain 70mls of the mixture worth Ksh. 165 per litre. If brand A is valued at Kshs. 168 per litre and brand B at Ksh. 153 per litre bottle, calculate the ration in which the brands A and B are mixed**.** **(2mks)**

11. Without using logarithm tables solve the equation log $(5x - 4) = \log(x + 2) + {}^{1}/_{3} \log 27$. **3mks**

12. a) Use reciprocal tables to find the value of $= {}^{1}/_{0.325}$ **1mk**

b) Hence, evaluate $\sqrt[3]{\dfrac{0.000125}{0.325}}$ **1mk**

13. The G.C.D of three numbers is 45 and the LCM is 18900. Two of the numbers are 675 and 540. Find the other possible numbers. **3mks**

14. solve for θ given that θ is acute and $\sin(3\theta - 50^{o}) - \cos(20 + 10^{o}) = 0$ **3mks**

15. A container of height 90cm has a capacity of 4.5L. What is the height of a similar container of volume $9cm^{3}$. **3mks**

16. A point R divides a line PQ internally in the ration 3:4. Another point S, divides the line PR externally in the ratio 5:2. Given that PQ = 8cm, calculate the length of RS, correct to 2 decimal places. **3mks**

SECTION II (50mrks)

Attempt any FIVE questions from this section

17. Complete the table below for the function

(a) $y=x^2 + {}^{12}/_{x} - 15$ for $0.5 \leq x \leq 4$

X	0.5	1	1.5	2	2.5	3	3.5	4
y	9.25			-5	-4			

(b) Draw the graph of $y=x^2 + {}^{12}/_{x} - 15$ for $0.5 \leq x \leq 4$. using a scale of 2cm rep 1 unit on the x – axis and 2cm for 5 units on the y – axis. **3mks**

(c) (i) from your graph, state the range of values of x for which $y=x^2 + {}^{12}/_{x} \leq 18$ **3mks**

(ii) By adding a suitable straight line to your graph, solve the equation $y = x^2 + {}^{12}/_{x} - 5x + 20$. **3mks**

18. The product of the first three terms of a geometric progression is 64. If the first term is a and the common ratio is r.

(a) Express r in terms of a **3mks**

(b) Given that the sum of the three terms is 14,

(i) Calculate the values of a and r and hence write down two possible sequences each up to the 4^{th} term. **5mks**

(ii) Find the product of the 50^{th} terms of the two sequences **2mks**

19. The table below shows income tax rates for certain year.

Monthly income in Kenya Shillings (Kshs	Tax rate in each shillings
0 – 10164	10%
10165 – 19740	15%
19740 – 29316	20%
29317 – 38892	25%
Over 38892	30%

A tax relief of Kshs. 1162 per month was allowed. In a certain month of the year, an employee's taxable income in the fifth band was Ksh. 2108.

(a) Calculate

i) Employees total income in that month **2mks**

ii) The tax payable by the employee in that month. **5mks**

(b) The employee's income includes a house allowance of Ksh. 15,000 per month. The employees contributed 5% basic salary to a cooperative. Calculate the employee net pay for that month.**3mks**

20. The following table shows the distribution of marks obtained by 50 students in a test.

Marks	45-49	50-54	55-59	60-64	65-69	70-74	75-79
No. of Students	3	9	13	15	5	4	1

By using an assumed mean of 62, calculate

a) The mean **5mks**

b) The variance **3mks**

c) The standard deviation **2mks**

21. A red and black dice are rolled and the events x, y and z are defined as follows.
X = the red die shows a 4
Y = the sum of the scores of the two dice is 6
Z = the black dice shows a 3

a. Find the probability of event x **2mks**

b. The probability of events x and y **3mks**

c. Which event is mutually exclusive to x **1mk**

d. Which event is independent of x **2mks**

e. The probability of event Y **2mks**

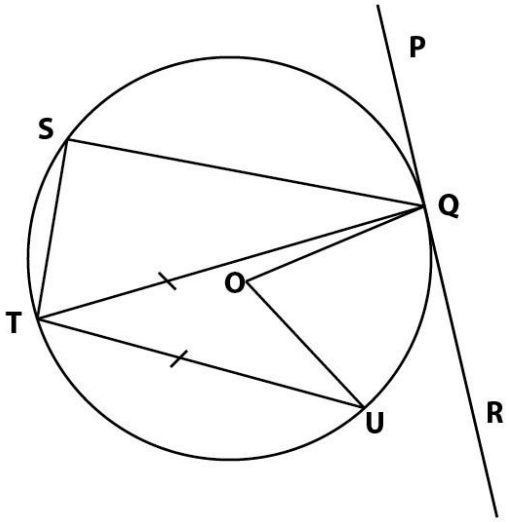
22. a) Complete the table below **2mks**

X	0	30º	60º	90º	120º	150º	180º	210º	240º	270º	300º	330º	360º
- Cos x	-1		-0.5		0.5	0.87		0.87			-0.5	0.87	
Sin(x-30		0.0	0.5			0.87	0.5		-0.5			-0.87	-0.5

b) Draw the graphs of y=sin(x-30) and y=-Cos x on the same axes, for $0º \leq x \leq 360º$ **(5mks**

c) Use your graph to solve the equation sin(x - 30º) + Cos x = 0 **(3mks)**

23. In the figure below, O is the centre of the circle, PQR is the tangent to the circle at Q, Angle PQS=28º, angle UTV = 54º and UT = TQ



Giving reasons, determine the size of

a) Angle STR **2mks**

b) Angle TQU **2mks**

c) Reflex angle TQS **2mks**

d) Reflex angle UOQ **2mks**

e) Angle TQR **2mks**

24. The cost c of producing n items varies directly as n and partly as the inverse of n to produce two items it costs Ksh. 135 and to produce three items it costs Ksh. 140. Calculate

a) The constant of proportionality and hence write the equation connecting c and n. **5mks**

b) The cost of producing 10 items **2mks**

c) The number of items produced at a cost of Ksh. 756. **3mks**