THE KENYA NATIONAL MATHS GURUS EXAMINATIONS COUNCIL
Featuring Kenya Certificate Of Secondary Education (K.C.S.E.) 2026.

121/1 — MATHEMATICS — Paper 1

ALT A
FORM TWO
OPENER EXAM
Jan. 2024 — $2\frac{1}{2}$ hours

Name…….…… Index Number:…….……....

Candidate's Signature…… Date……..……..

Instructions to candidates

(a) Write your name and admission number in the spaces provided above.
(b) Sign and write the date of examination in the spaces provided.
(c) This paper consists of two sections: **Section I** and **Section II**.
(d) Answer all questions in **section I** and **only five** questions from section **II**.
(e) **Show all the steps in your calculations, giving the 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 16 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.**
(j) **Candidates should answer the questions in English.**

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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 | |

SECTION I (50 marks)

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

1. Given that $\frac{\frac{3}{5}\ of\ 100+2\frac{2}{3}\times1\frac{1}{2}}{5\frac{5}{8}\times1\frac{7}{9}-\frac{5}{4}\ of\ 4\frac{4}{5}+2\frac{4}{5}\div\frac{7}{10}}=M^{x}$. Find the value of x (3marks)

2. Determine the smallest value of digit **P** if the number 32**P**91 is divisible by 11 (2marks)

3. For HIV/AIDS therapy, an adult takes three tablets daily, a child aged 9-15 years takes two tablets daily and a child aged 2-8 year takes one tablet daily. If there are 25 adults,36 children aged 9-15 years and 9 children aged 2-8 years, what is the least number of tablets required to sustain all of them for at least 30 days? (3marks)

4. Find without using tables or calculator, the value of

$$\sqrt{\left[3+\left(11-\sqrt{(10)+3\times 5}\right)\right]-[(5+4)\times 2-3^2-1]}$$ (3marks)

5. Express $0.43\dot{2}1\dot{3}$ in the form $\frac{a}{b}$ and state the value of a and b (3marks)

6. A mathematics test has 20 questions. Seven marks are awarded for each correct answer, two marks are deducted for each wrong answer. Zero marks are given for each omitted question. A boy got 87 marks in the test. How many questions did he omit if all questions were compulsory? (4 marks)

7. Simplify the expression $\frac{x-1}{x} - \frac{2x+1}{3x}$ (2marks)

hence solve the equation $\frac{x-1}{x} - \frac{2x+1}{3x} = \frac{2}{3}$ (1mark)

8. Four men start up a business. The ratio of A's and B's contributions is $3:2$ and the ratio of C's and D's contributions is $5:4$. C contributes sh.3000 more than A. If the total amount is sh.47,000, find how much each man contributed. (3 marks)

9. The area of a rhombus is $60cm^2$. Given that one of its diagonals is 15cm long, calculate the perimeter of the rhombus (3marks)

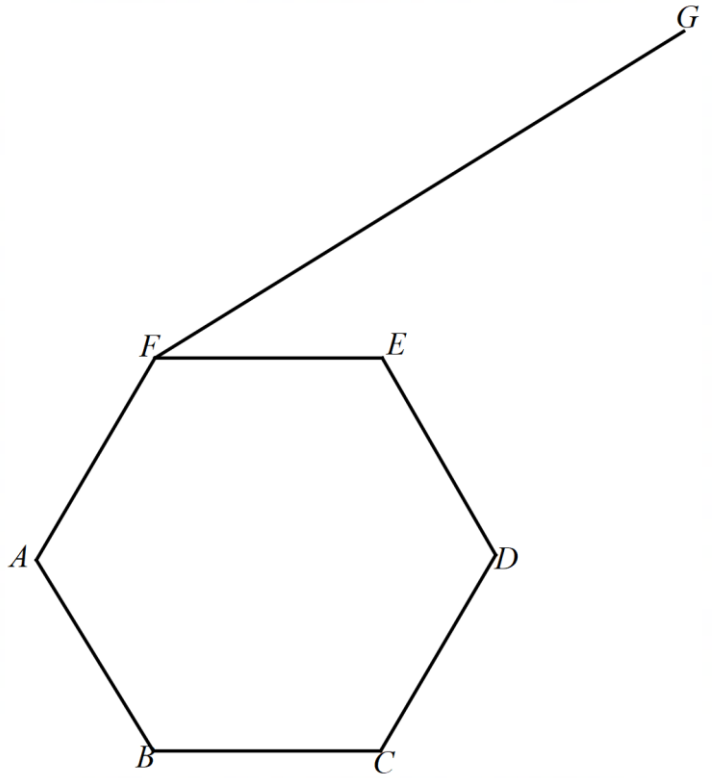
10. A jua kali has 63000g of metal which has a density of $7g/cm^3$.He intends to use it to make a rectangular pipe with external dimensions 120mm by 150m and internal dimensions of 100mm by 120mm. Calculate the length of the pipe in meters (3marks)

11. Rebecca has taken 20 days leave from her office. Her vacation will start on Monday 16th September. On which day and date will the vacation end (3marks)

12. Use squares and square root table to evaluate $(0.548)^{\frac{1}{2}}+4.357^2$ (4marks)

13. Four interior angles of a hexagon are $100°, 140°, 125°$ *and* $105°$. The fifth interior angle is four times the sixth angle. Find the fifth angle (3 marks)

14. In the figure below $ABCDEF$ is a uniform cross section of a solid. Given that FG is one of the visible edges of the solid. Complete the sketch showing the hidden edges with broken lines (4marks)



15. A salesman earns a basic salary of sh.9000 per month. In addition, he is also paid a commission of 5% for sales above sh.15,000. In a certain month he sold goods worth sh.120,000 at a discount of $2\frac{1}{2}\%$. Calculate his total earnings that month. (3marks)

16. A forex bureau in Nairobi buys and sells selected foreign currencies at the rates given in the table below

Currency	Buying (Ksh)	Selling (Ksh)
1 South African Rand	7.00	7.70
1 United Arab Emirates Dirham	36.14	37.50

A tourist arrived in Kenya from south Africa with 8546000 south African Rand. He converted the whole amount to Kenya shillings through an agent at a commission 0f 2%. While in Kenya he spent $\frac{1}{4}$ of this money and changed the balance to UAE Dirham. Calculate the amount of UAE Dirham that he received. (3marks)

SECTION II (50 marks)

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

17. Tracy and Gloria entered into a business partnership in which they contributed ksh.120000 and ksh.150000 every year respectively. After one year, Dayfed joined the business and contributed ksh90000.

a) Calculate the ratio of their investment after 3 years of business (3marks)

b) It was agreed that 30% of the profits after 3 years be used to cater for the cost of running the business, while the remaining would be shared proportionally. Calculate each person's share if the profit made after 3 years was ksh.187000. (4marks)

c) If each of them invested their shares back in the business, find their new individual investments at the beginning of the fourth year. (3marks)

18. A sales lady dealing in shoes earns a basic salary of sh.30000. In addition, she is paid commission on the sales of shoes as follows;

	Percentage commission
For sales upto Ksh 100,000	0%
For sales above Ksh 100,000	
i) For first Ksh 50,000	4%
ii) For next Ksh 50,000	5%
Any amount above Ksh 200,000	10%

On a certain month, she sold 200 pairs of shoes marked at sh.1200 a pair at a discount of 5%.

a) Calculate the total sales for the month (2marks)

b) Calculate her earning for that month (3marks)

c) If the next month her basic salary was increased by 10%. If she earned a total of sh39160, determine;

(i) Her sales for the month. (4marks)

(ii) The total number of pair of shoes she sold that month (1mark)

19. Using a ruler and a pair of compasses only;

a) Construct parallelogram ABCD in which $AB = 9cm, BC = 6cm$ *and* $\angle ABC$ 150°. (3marks)

b) Drop a perpendicular from D to meet AB at M. Measure DM and calculate the area of parallelogram. (3marks)

c) Divide line AD into 3 proportional parts and locate T on AD such that $AT:TD = 2:1$. Join T to B to form a triangle ATB (2marks)

d) Draw a circumcircle on triangle ATB and shade the area inside the parallelogram but outside the circle (2marks)

20. Four towns P, Q R and S are such that R is 80km directly to the north of P and T is on a bearing of 290° from P at a distance of 65km. S is on a bearing of 330° from T and a distance of 30km.

a) Using a scale of 1cm to represent 10km, make an accurate scale drawing to show the relative positions of the towns. (4marks)

b) Find;

(i) The distance and bearing of R from T. (3marks)

(ii) The distance and bearing of S from R (2marks)

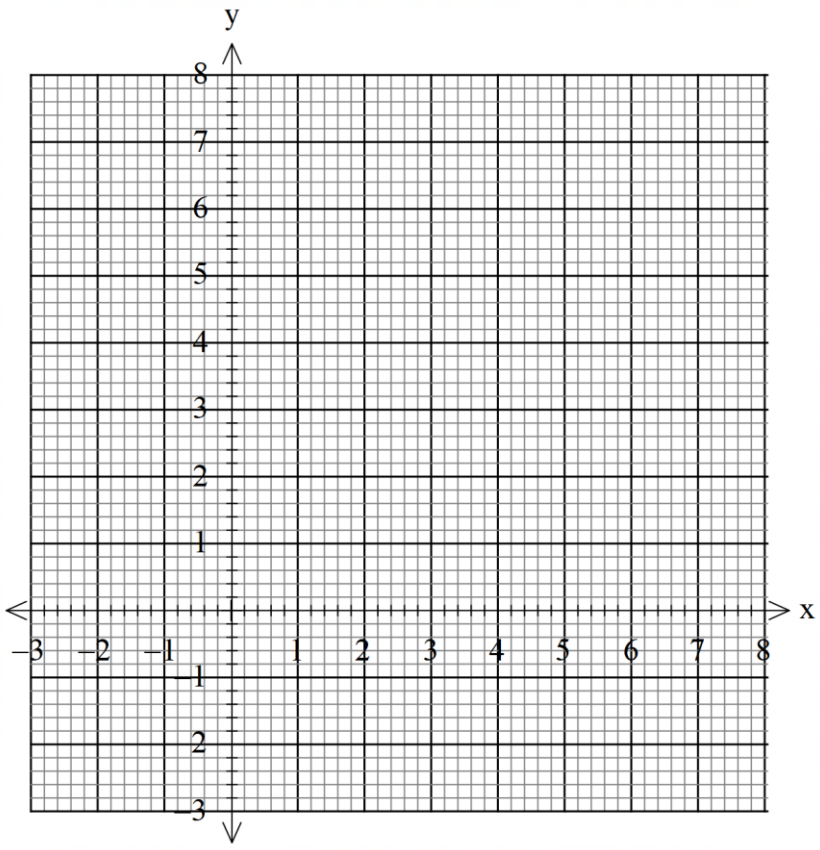
(iii) The bearing of P from S (1mark)

21.

a) Complete the table below for the equation $2x - 3y = -6$ (2marks)

x	0		6	
y		4		8

b) On the grid below, draw line $2x - 3y = -6$ using a scaleof 1cm to represent 1 unit on both axes (2marks)



c) Using the line drawn, solve the following simultaneous equations.

i. $2x - 3y = -6$ (1mark)
$x = 0$

ii. $2x - 3y = -6$ (3 marks)
$x + y = 7$

d) Using the graph, state the coordinates of

i. A point P on the line $2x - 3y = -6$ when $x = 5.4$ (1mark)

ii. A point Q on the line $x + y = 7$ when $y = 6.8$ (1mark)

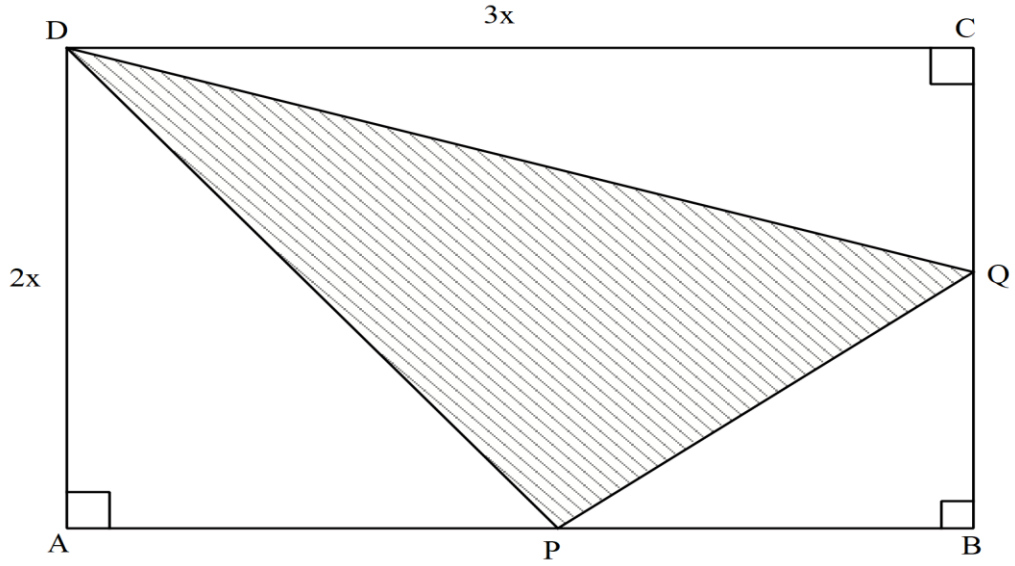
22. The attendance at a party consisted of 35 men, a number of women and some children. The number of women was one and a half that of children present.

a) If there are a total of 65 participants, how many women attended the party? (2marks)

b) During the party, each child took one bottle of soda, the men took two bottles each while some women took two and others three. Given that five crates each containing 24 bottles of soda were consumed, how many women took two bottles of soda each? (6marks)

c) Each crate of soda was bought for sh.432 plus a deposit of sh.10 per bottle in case it broke. How much money did the party organizers pay at the soda deport? (2marks)

23. In the figure below, ABCD is a rectangle in which $AB = 3x\ cm$ and $BC = 2x\ cm$.P and Q are points on AB and BC respectively such that $AP = \frac{3}{4}AB$ and $BQ = \frac{2}{3}BC$.



a) Calculate the area of the unshaded region (6marks)

b) Given that the area of the shaded region is $36cm^2$,determine the value of x and state the dimensions of the rectangle. (4marks)

24. Carren spent sh.10500 to buy a number of shirts and a number of trousers from a wholesale at sh.150 per shirt and sh.300 per trouser. Joyce bought the same number of shirts and trousers from another wholesaler where she paid 20% more for a shirt and 10% less for a trouser. Joyce spent sh.300 more than Caren.
    a) Determine the number of shirts and trousers each of the ladies bought. (4marks)

    b) Carren sold all her clothes at a profit of 50% per shirt and 30% per trouser. How much profit did she make? (3marks)

    c) Joyce sold her clothes at a profit of 45% per shirt and 60% per trouser. Calculate the percentage profit she made on the sales of all her clothes. (3marks)

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