Name ……..…… Admission Number …….

Class ……..…….. Date ……..……..…… Candidate's Signature…….…….

SUCCESS PATH JOINT EXAMINATION
FORM 2 – MATHEMATICS
Kenya Certificate of Secondary Education

121/1 – MATHEMATICS (Alt. A)
End Term Exam 2025 – 2 ½ hours

121 / 1 - Mathematics Paper 1
March – 2025
8.00 a.m. – 10.30 a.m.

Instructions to candidates

a) Write your name and admission number in the spaces provided above.
b) Write your class, the date of examination and sign 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 in **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 10 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 Without using a calculator, evaluate $\dfrac{3\frac{1}{3}-2\frac{1}{5}\,of\,3}{1\frac{4}{9}\div\left(-\frac{2}{3}\right)^2}$ (3 marks)

2 Find the value of n in the equation; $2^{(2n-4)} \div 4^{3n-5} = 4$ (3 marks)

3 A rectangular tank of length 4 m, width 2.5 m and height 6 m has an inlet pipe of radius 4.9 cm. water flows through the pipe at a rate of 12 cm per second. Find time it takes to fill the tank if it was initially empty.

(3 marks)

4 The cost of four test – tubes and five boiling tubes in a shop X is Kshs.860. John paid Kshs.750 for six test – tubes and three boiling tubes from the same shop. Calculate the cost of a test – tube and a boiling tube from the shop. (3 marks)

5 (a) Express 7 840 as a product of its prime factors. (1 mark)

(b) Find the smallest number m such that $7840m$ is a perfect cube. (2 marks)

6 Two bells ring at intervals of 42 and 56 minutes respectively. The bells ring together at 8.30 a.m. Determine the time when the bells will ring together again. (3 marks)

7 Simplify completely by factorization $\dfrac{4m^2 - ma + 4am - a^2}{-3m^2 + 2m - 3am + 2a}$ (3 marks)

8 George travelled by train from station X to station Y. The train left X on Sunday at 2350 hours and travelled for 7 hours 15 minutes to reach station Z. After a 45 minutes stop in Z, the train took 5 hours 40 minutes to reach Y. Find the time, in the 12 – hour clock system and the day George arrived in station Y. (3 marks)

9 A tourist arrived in Kenya on June 12th 2024 with 2 480 US dollars which he changed into Kenya shillings. He spent Ksh 177 402.50 during his week's stay in the country then converted the balance into US dollars on June 19th 2024.

	Buying (Ksh)	Selling (Ksh)
12th June 2024	156.75	157.50
19th June 2024	144.50	145.75

Using the table of rates above, calculate the amount he received in US dollars. (3 marks)

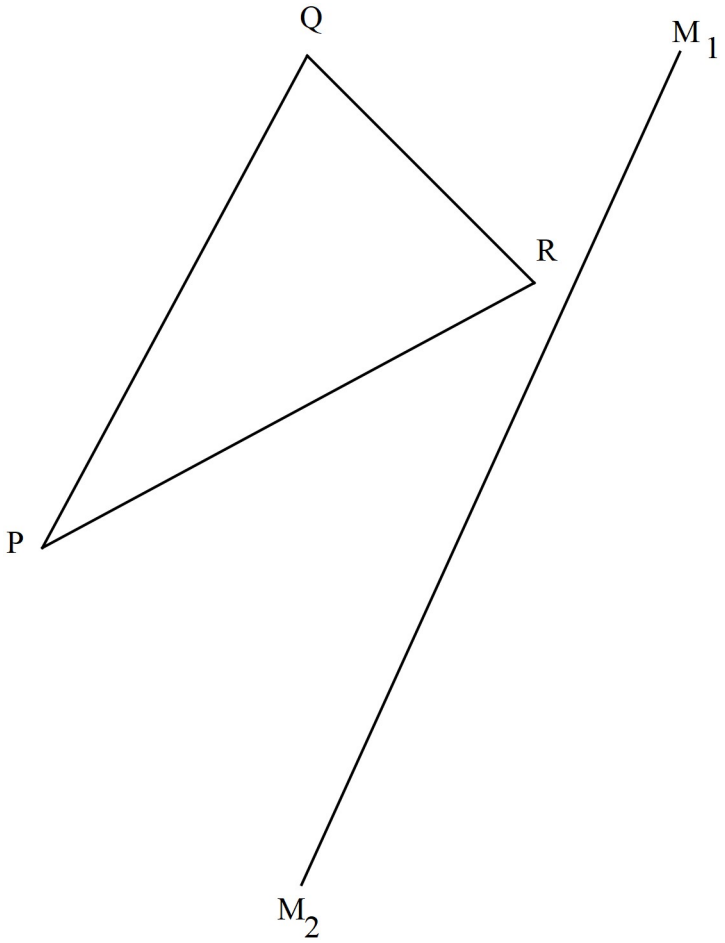
10 The size of an interior angle of a regular polygon is $3x^{o}$ while its exterior angle is $(x-12)^{o}$. Find the number of sides of the polygon. (3 marks)

11 Using a ruler and a pair of compasses only, construct a quadrilateral ABCD in which $AB = 6cm$, $BC = 5cm$, $\angle ABC = 105^{o}$, $\angle DAB$ is a right angle and AB is parallel to CD. Measure CD. (3 marks)

12 Evaluate using mathematical tables only expressing your answer to 4 significant figures

$$\frac{4}{0.2356} + (0.9873)^{3}$$ (3 marks)

13 The below shows a triangle PQR and a mirror line M_1M_2.



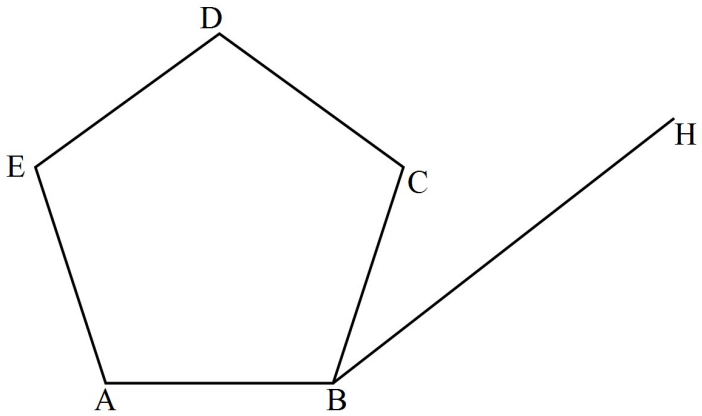
(a) Draw triangle $P'Q'R'$, the image of PQR, under a reflection in the mirror line M_1M_2. (2 marks)

(b) State the type of congruency between PQR and $P'Q'R'$. (1 mark)

14 Convert $5.\dot{5}$ into a mixed reaction. (3 marks)

15 A rectangular jar of length 6 cm, breadth 7 cm and height 11 cm is full of milk. The milk is poured into a cylindrical glass of diameter 7 cm and capacity of 0.5775 litres. Find the height of glass not in contact with milk. (3 marks)

16 In the figure below, ABCDE is a uniform cross – section of a solid. Given that BH is one of the visible edges of the solid, complete the sketch showing the hidden edges with broken lines. (3 marks)



SECTION II (50 Marks)

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

17 A saleslady dealing in printers earns a basic salary of Kshs.32,000. In addition, she is paid commission on the sales of printers as follows.

	Commission (%)
For sales up to Kshs.200,000	0%
For sales above 200,000	
(i) For the first 150,000	4%
(ii) For the next 150,000	5%
Any amount above 500,000	10%

On a certain month she sold 18 printers marked at Kshs.32 000 a pair at a discount of $6\frac{1}{4}\%$

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

(b) Calculate her total earnings for that month. (3 marks)

(c) In the next month her basic salary was increased in the ratio 5:4. If she earned a total of Kshs.66 500. Calculate :

(i) Her total sales for the month (3 marks)

(ii) The number of printers she sold that month. (2 marks)

18 A straight line L passes through the points $A(4,-1)$ and $B(-8,3)$.

(a) Find the equation of the line L in the form $ax + by = c$ where a, b and c are integers. (3 marks)

(b) Another striaght line P is perpendicular to line L through point A. Find the x and the y intercepts of line P. (3 marks)

(c) A third line Q is parallel to line P and passes through a point $(2,13)$. Find the point where line Q intersects line L. (4 marks)

19 (a) Given that $5^{5x-2y} = 3125$ and $5^{2x-y} = 1$ are satisfied for the real values of x and y:

(i) Form two simultaneous equations in x and y. (1 mark)

(ii) Find the values of x and y by substitution method (3 marks)

(b) Two schools Pramo mixed and Olendo mixed purchased maize and beans. Pramo purchased 8 bags of beans and 14 bags of maize and spend ksh 99 600. Olendo purchased 12 bags of beans and 16 bags of maize and spend ksh 20 400 more. Determine the cost of a bag of beans and a bag of maize. (3 marks)

(c) The price of beans later went up by 5% and that of maize remained constant. Pramo mixed bought the same quantity of beans and some bags of maize, and spent ksh 23 520 less than the amount of money spend before on the two items. State the new ratio of the bags of beans to maize. (3 marks)

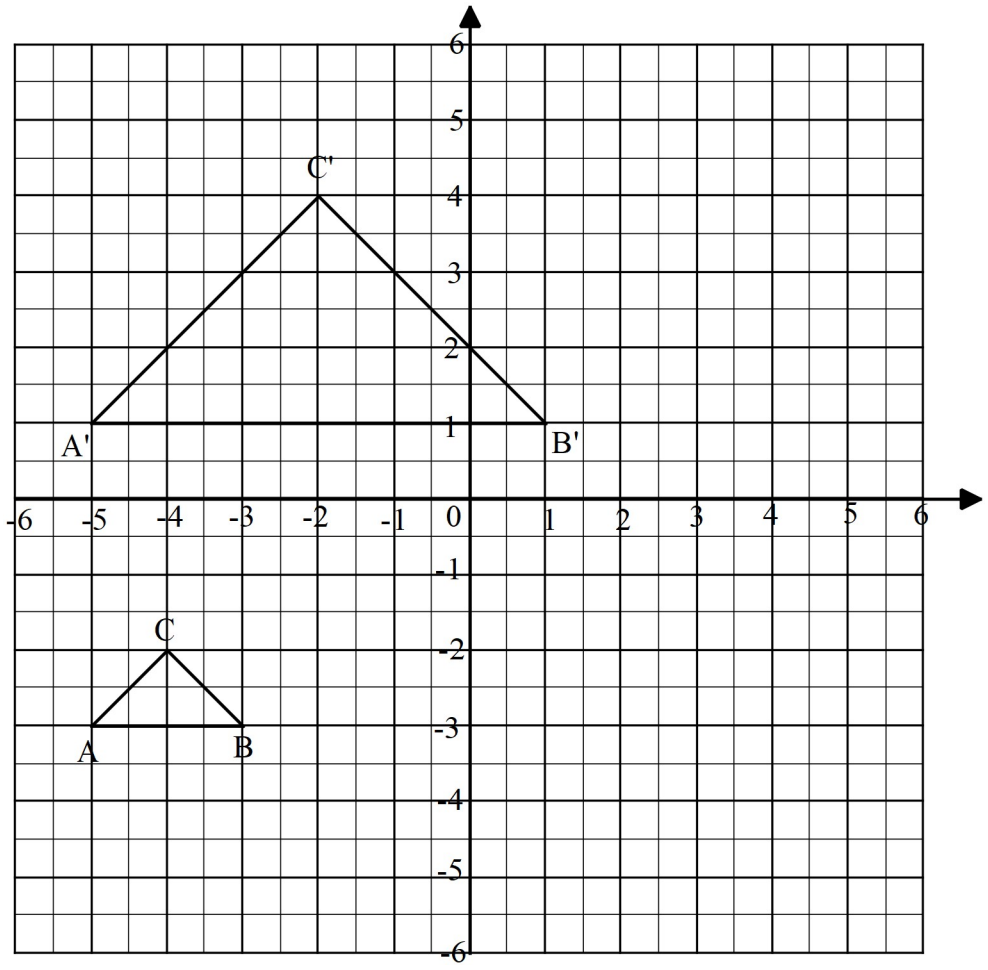
20 A swimming pool is 35 m long and it is divided across the width into 12 lanes of each 1.5 m wide. The pool is to be filled with water to a depth of 3 m at the shallow end and the depth of the water increase uniformly to a maximum depth of 7 m and this depth is to be maintained for the last 10 m of the pool's length.

(a) Calculate the volume of the water in the pool when filled to the required level in cubic metres (4 marks)

(b) How long will it take to fill the pool if the water flows into the pool at a rate of 120 litres per minute? Give your answer in hours (3 marks)

(c) To purify the water, chemicals are added to the water at a rate of 4ml per 100 litres of water. What is the volume of chemicals required? Give your answer in litres (3 marks)

21 The grid below shows a triangle ABC and its image $A'B'C'$ under a transformation **T**.



(a) Describe the transformation **T**. (2 marks)

(b) On the same grid, draw triangle $A''B''C''$, the image of triangle $A'B'C'$ under a reflection in the line $y = x$. State the coordinates of triangle $A''B''C''$. (2 marks)

(c) Given that the points $A'''(2,6)$ and $B'''(2,0)$ are the images of A' and B' under a rotation;

(i) Find the centre and the angle of rotation. (3 marks)

(ii) Complete the triangle $A'''B'''C'''$. (1 mark)

(d) Identify the type of congruency between the triangles:

(i) $A'B'C'$ and $A''B''C''$ (1 mark)

(ii) $A'B'C'$ and $A'''B'''C'''$ (1 mark)

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