

KCSE PREDICTION EXAMS SERIES, 2024

Kenya Certificate of Secondary Education

121/1

- MATHEMATICS - Paper 1

T- 2024 – Time 2 ½ hours

KCSE TRIAL EXAMS, 2024

Name Adm Number.....

Candidate’s Signature Date

INSTRUCTIONS TO CANDIDATES

- 1. Write your name, index number and class in the spaces provided above.
- 2. The paper contains two sections: **Section I** and **Section II**.
- 3. This paper contains **14 PRINTED** pages make sure all **PAGES ARE PRINTED** and **NON IS MISSING**
- 4. Answer **ALL** the questions in **Section I** and **ANY FIVE** questions from **Section II**.
- 5. All working and answers must be written on the question paper in the spaces provided below each question.
- 6. Marks may be awarded for correct working even if the answer is wrong.
- 7. Negligent and slovenly work will be penalized.
- 8. Non-programmable silent electronic calculators and mathematical tables are allowed for use.

For examiners use only
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



21123456789

SECTION I (50 MARKS)**Answer ALL questions in this section**

1. Evaluate.

(3 marks)

$$\frac{[28 - (-18)]}{-2} - \frac{[15 - (-2)(-6)]}{3}$$

2. Simplify $\frac{p^2 - 2pq + q^2}{2p^2 - 3pq + q^2}$

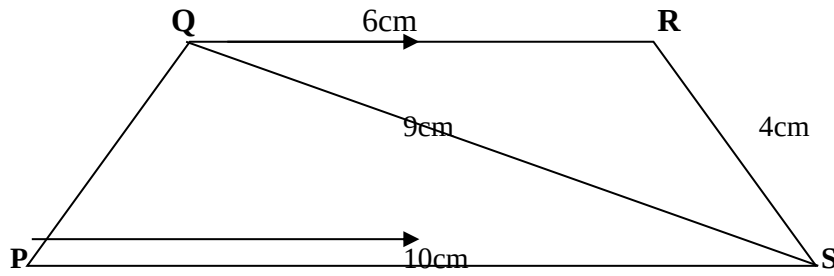
(3mrks)

3. Solve for X in the equation.

(3mrks)

$$\left(\frac{16}{9}\right)^{1.5x} = 0.75$$

4. In the figure below **PQRS** is a trapezium with **QR** parallel to **PS**. **QR**=6cm, **RS**=4cm, **QS**=9cm and **PS**=10cm



Calculate

- (a). The size of angle **SQR** (2marks)

- (b). The area of triangle **PQS** (2marks)

5. Find the value of x in the equation. (3marks)

$$\cos(3x - 180^\circ) = \frac{\sqrt{3}}{2} \text{ in the range } 0^\circ \leq x \leq 180^\circ$$

6. A farmer has a piece of land measuring 840m by 396m. He divides it into square plots of equal sizes. Find the maximum area of one plot. (3marks)
7. A liquid spray of 384g is packed in a cylindrical container of internal radius 3.2cm. Given that the density of the liquid is 0.6g/cm^3 , calculate to 2 decimal places the height of the liquid in the container. (3marks)
8. (a) Find the inverse of the matrix. (1mark)
- $$\begin{bmatrix} 4 & 3 \\ 3 & 5 \end{bmatrix}$$
- (b) Hence solve the simultaneous equation using the matrix method. (2marks)
- $$4x + 3y = 6$$
- $$3x + 5y = 5$$
9. Two pipes **A** and **B** can fill an empty tank in 3hrs and 5hrs respectively. Pipe **C** can empty the tank in 4hrs. If the three pipes **A**, **B** and **C** are opened at the same time find how long it will take for the tank to be full. (3marks)

10. A tourist arrived in Kenya with sterling pound (£) 4680 all of which he exchanged into Kenyan money. He spent Ksh.51790 while in Kenya and converted the rest of the money into US dollars. Calculate the amount he received in US dollars. The. Exchange rates were as follows. (4marks)

	<u>Buying</u>	<u>Selling</u>
US dollars \$	65.20	69.10
Sterling pounds £	123.40	131.80

11. The gradient of a straight line L_1 , passing through the point $P(3, 4)$ and $Q(a, b)$ is $-\frac{3}{2}$. A line L_2 is perpendicular to L_1 through Q and $R(2, -1)$. Determine the values of a and b . (3marks)

12. Find the number of sides of a regular polygon whose interior angle is 5 times the exterior angle. (3marks)

13. The points A , B and C lie on a straight line. The position vectors of A and C are $2\mathbf{i} + 3\mathbf{j} + 9\mathbf{k}$ and $5\mathbf{i} - 3\mathbf{j} + 4\mathbf{k}$ respectively; B divides AC internally in the ratio 2:1 Find the:

(a) Position vector of B (2marks)

(b)distance of B from the Origin

(1mark)

14. The sum of digits in a two digit number is 16. When the number is subtracted from the number formed by reversing the digits the difference is 18. Find the number. (3marks)
15. In Blessed Church Choir the ratio of males to females is 2:3. On one Sunday service ten male members were absent and six new female members joined the choir as guests for the day. If on this day the ratio of males to females was 1:3, how many regular members does the choir have? (3marks)
16. A businessman makes a profit of 20% when he sells a carpet for Ksh. 36000. In a trade fair he sold one such carpet for Ksh. 33600. Calculate the percentage profit made on the sale of the carpet during the trade fair. (3marks)

SECTION II (50 MARKS)

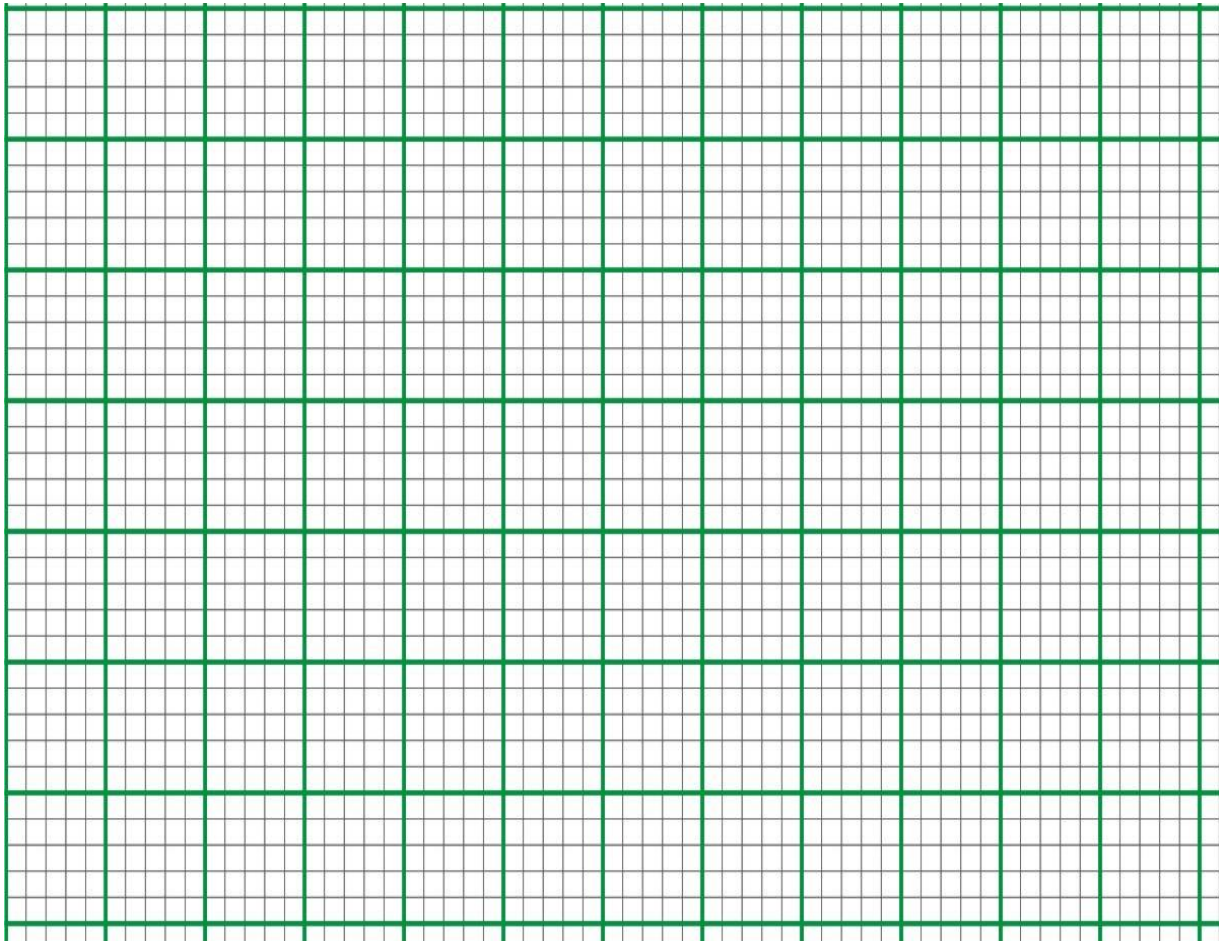
Answer ANY FIVE questions in the section.

17. Tickets for a football match cost 100 shillings and 50 shillings and tickets to the value of Ksh.100,000 were sold. If 30% more tickets of sh.50 and 40% fewer tickets of sh.100 had been sold, the income would have increased to Ksh.112, 500. How many tickets of each category were sold?
(10 marks)

18. Given that $A(-7, 2)$, $B(-3, 3)$, $C(-3, 6)$, $D(-7, 8)$ are the vertices of a trapezium.

a) Draw the trapezium on the grid provided.

(1 mark)



b) Rotate $ABCD$ through -90° about the origin to be mapped onto $A^1B^1C^1D^1$. (2 marks)

c) Reflect $A^1B^1C^1D^1$ along $y = -x$ to be mapped onto $A^{11}B^{11}C^{11}D^{11}$. (2 marks)

d) A certain transformation maps $A^{11}B^{11}C^{11}D^{11}$ to $A^{111}(-7, -9)$ $B^{111}(-3, -6)$ $C^{111}(-3, -9)$ $D^{111}(-7, -15)$.

i) Plot $A^{111}B^{111}C^{111}D^{111}$ on the same axis. (1 mark)

- ii) Find the matrix and describe fully the transformation that maps $A^{11}B^{11}C^{11}D^{11}$ onto $A^{111}B^{111}C^{111}D^{111}$.
(3 marks)

- iii) Find the area of $A^{111}B^{111}C^{111}D^{111}$ (1 mark)

19. The field book below gives measurement of a field. The distances are given in metres. $AF = 100\text{m}$.

	F	
	100	
E40	80	
	60	D50
C40	40	
	20	B30
	A	

- a) Using a scale of 1cm represents 10m draw a map of the field with straight boundary edges. (4 marks)

- b) i) Find the area of the field in square metres. (5 marks)

ii) Determine the area of the field in hectares.

(1 mark)

20. Use a ruler and compass only for all the constructions in this question.

a) Construct a triangle XYZ in which $XY = 6\text{cm}$, $YZ = 5\text{cm}$ and angle $XYZ = 120^\circ$.

(2 marks)

b) Measure XZ and angle YXZ.

(2 marks)

- c) Construct the perpendicular bisector of XZ and let it meet XZ at N . (1 mark)
- d) Locate a point W on the opposite of XZ as Y and that $XW = ZW$ and $YW = 9\text{cm}$ and hence complete triangle XZW . (2 marks)
- e) Measure WM and hence calculate the area of triangle XZW . (3 marks)

21. The table below shows the masses of newly born babies at a maternity home.

a) Complete the table and use it to answer the questions below. Take $A = 3.7$ (6 marks)

Mass (kg)	X	f	$d = X - A$	fd	d^2	fd^2
2.0 – 2.4	2.2	5	-1.5	-7.5		
2.5 – 2.9	2.7	15				
3.0 – 3.4	3.2	24				
3.5 – 3.9	3.7	40	0	0		
4.0 – 4.4	4.2	10				
4.5 – 4.9	4.7	4				
5.0 – 5.4	5.2	2	1.5	3.0		
		$\Sigma f = 100$		$\Sigma fd =$		$\Sigma fd^2 =$

b) Use the method of assumed mean to calculate to two decimal places.

i) The mean mass of the babies. (2 marks)

ii) The standard deviation of the distribution. (2 marks)

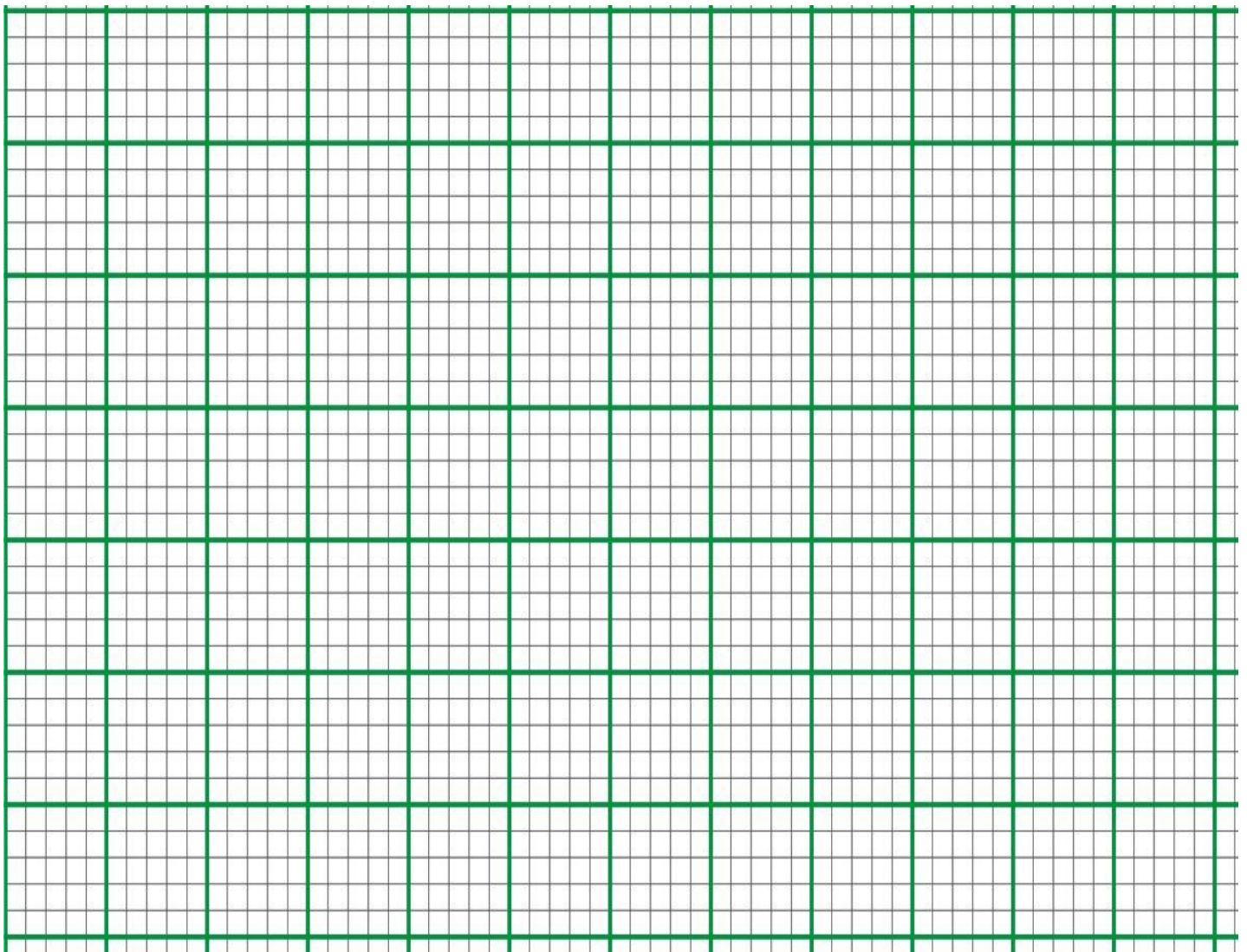
22. a) Complete the table below, for the function $y = 2x^2 + 4x - 3$.

(2 marks)

x	-4	-3	-2	-1	0	1	2
$2x^2$	32		8	2	0	2	
$4x-3$			-11		-3		5
y			-3			3	13

b) On the grid provided, draw the graph of $y = 2x^2 + 4x - 3$ for $-4 \leq x \leq 2$ and use the graph to estimate the roots of the equation to 1 decimal place.

(4 marks)



- c) In order to solve graphically $2x^2 + x - 5 = 0$, a straight line must be drawn to intersect the curve $y = 2x^2 + 4x - 3$.

Determine the equation of the straight line and draw it, hence obtain the roots of the equation

$2x^2 + x - 5 = 0$ to 1 decimal place. (4 marks)

23. a) A carpet measuring $(x+4)$ m by $(x-1)$ m laid down in a rectangular room measuring $2x$ m by x m leaving out uncovered floor near the walls round the room. If the carpet is 36m^2 , calculate the area of the uncarpeted floor. (6 marks)

- b) If 20cm square tiles were to be used to carpet the uncarpeted section of the floor in (a) above, calculate the cost of carpeting the whole floor if the carpet costs sh.300 per square metre and each tile costs sh.100 per square metre. (4 marks)

24. Mwikali is standing at a point P, 160m South of a hill H on a level ground. From point P she observes the angle of elevation of the top of the hill to be 67° .

- a) Calculate the height of the hill. (3 marks)

- b) After walking 420m due East to the point Q, Mwikali proceeds to point R due East of Q where the angle of elevation of the top of the hill is 35° . Calculate the angle of elevation of the top of the hill from Q. (3 marks)

c) Calculate the distance from P to R.

(4 marks)

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