

NAME:.....

SCHOOL:..... A.D.M NO:.....

DATE:.....CANDIDATE'S SIGNATURE:.....

121/1
MATHEMATICS
PAPER 1
TERM TWO
Time 2¹/₂ Hours
FORM THREE

INSTRUCTIONS TO CANDIDATES:

1. Write your name school, admission number and stream in the spaces provided above.
2. Sign and write the date in the spaces provided above
3. This paper contains two sections; Section I and section II.
4. Answer all the questions in section I and any five questions from section II.
5. All workings and answers must be written on the question paper in the spaces provided below each question.
6. Show all steps in your calculations giving your answers at each stage in the spaces below each question.
7. Non-programmable electronic calculator and KNEC mathematical tables may be used, except where stated otherwise

For Examiner's Use Only;

Section I

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

Section II

Questions	17	18	19	20	21	22	23	24	TOTAL
Marks									

**GRAND
TOTAL**

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SECTION I (50 MARKS)

1. Use logarithmic tables to evaluate

(3mrks)

$$\sqrt[3]{\frac{326.7 \times 0.0589}{30.6 \times 0.2471}}$$

2. Solve the simultaneous linear equations

(3mrks)

$$3x - 5y = 21$$

$$7x - 3y = 23$$

3. Solve the equation

(3mks)

$$2x^2 + 4x - 8 = 0$$

By completing the square method

4. A Kenyan bank buys and sells foreign currency as shown below:

(3mks)

	Buying in (KES)	Selling (in KES)
1 Hong Kong Dollar	9.70	9.78
1 S.A Rand	12.03	12.15

A tourist arrives in Kenya with 280,000 Hong Kong dollars and changed the whole amount to KES. He spent KES 835,210 and exchanged the balance to S.A Rand before leaving. Calculate the amount in S.A Rand that she was left with. (3mrks)

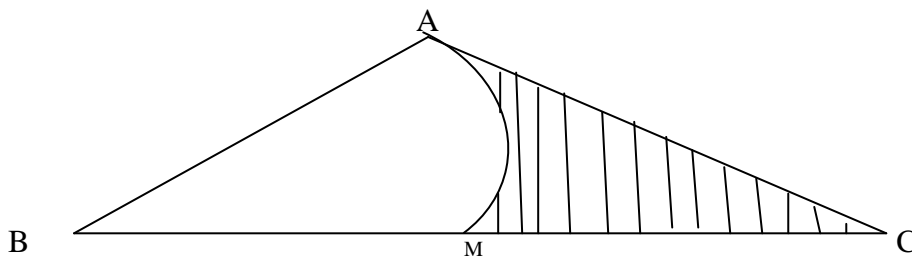
5. P (2,-1) and Q (6, 3) are points on a line. If R is the midpoint of PQ, find the:

a. Coordinates of R (1mk)

b. Equation of the line through R perpendicular to PQ (2mrks)

6. In the triangle ABC below, AB = 6cm, BC = 10cm and angle ABC = 42° .

AM is an arc of a circle, circle B. Take $\pi = 3.142$



Calculate the area of:

a) Triangle ABC (1mrk)

b) The shaded portion of the ABC

(3mrk)

7. Given that $S = 14.6\text{cm}$ and $t = 5.68\text{cm}$ determine the percentage error in the product of

$S t$

(3mrk)

8. Solve for x in the logarithmic equation $\log_{10} (3x + 4) = \log_{10} (3 - x) + 1$

(3mrks)

9. A man left Ksh 1,865, 280 in his will to be shared between his spouse, daughter and son in the ratio 1:2:3.

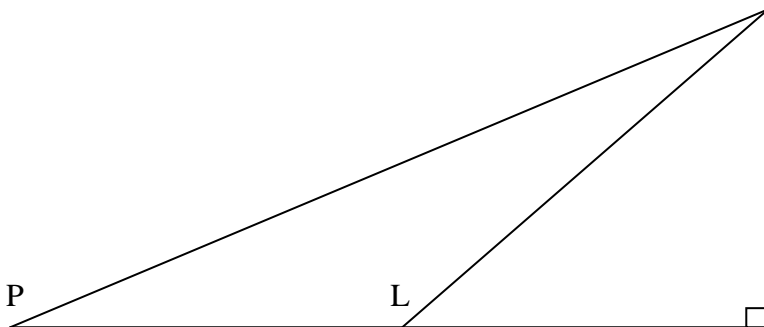
His spouse decided to divide her share equally between her daughter and son. Determine how much finally the son got.

(3mks)

10. A boy can dig a piece of land in three and a half hours while a girl can dig the same piece of land in five hours. How long would they take to dig the land if they worked together (3mks)

11. In a triangle UVW, (not drawn to scale) $VW = 14\text{cm}$, $UW = 10\text{cm}$ and $UV = 20\text{cm}$. Find the largest angle and hence determine its size. (3mks)

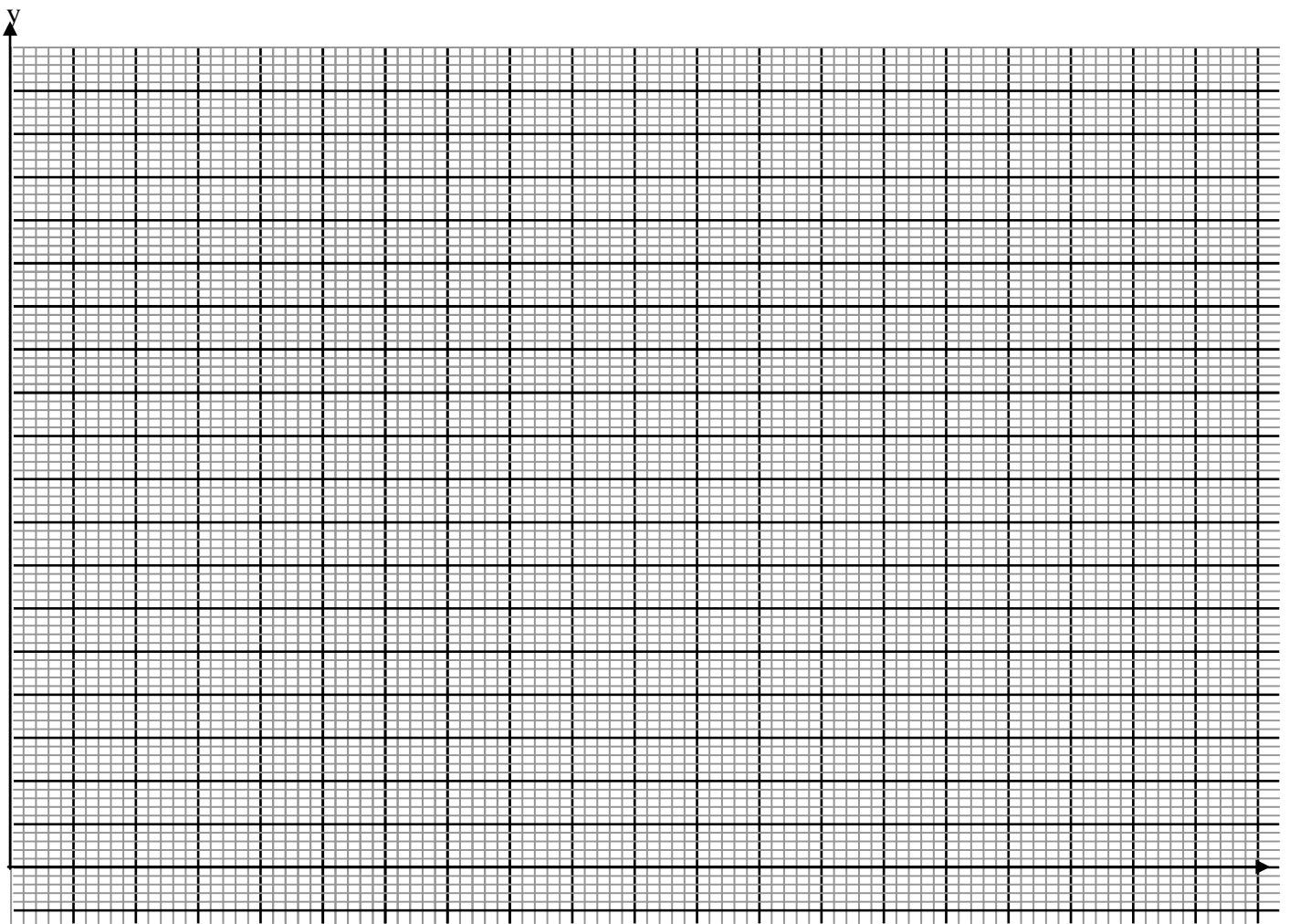
12. The angle elevation of the top of a tower is 35° from a point P and is 54° from another point L, 3metres nearer the foot of the tower which lies on the line PL and at the same level with P and L. Calculate the height of the tower. (4mks)



13. On the grid below, identify the region that satisfies the linear equalities and calculate its area.

$$X + 2y = 10$$

$$4x + 3y = 24$$



14. Express $\frac{7 + 2}{5 - \sqrt{2}}$ in the form of $a + b\sqrt{2}$.where a and b are integers (3mks)

15. Given that the position vectors of points A and B are $\underline{a} = \begin{pmatrix} 4 \\ 5 \end{pmatrix}$ and $\underline{b} = \begin{pmatrix} 5 \\ -4 \end{pmatrix}$ respectively find:

a) \underline{BA} (1mks)

b) $\left| \underline{BA} \right|$ (2mrks)

16. Without using a calculator, evaluate: (3mks)

$$\frac{\frac{3}{4} + 1\frac{5}{7} \div \frac{4}{7} \text{ of } 2\frac{1}{3}}{(1\frac{3}{7} - \frac{5}{8}) \times \frac{2}{3}}$$

SECTION II (50 MARKS)

ANSWER ONLY FIVE QUESTIONS.

17. (a) Without using a protractor, construct triangle ABC, such that $BC = 10\text{cm}$, angle $ABC = 60^\circ$ and angle $BCA = 45^\circ$ (let BC be the base) (4mks)

(b) Construct the perpendicular bisector of line BC on the above diagram. Draw the circumference of triangle ABC. (3mks)

- c) Find the radius of the circumference hence determine the area of the circle drawn. (3mks)

18. The speeds of a number of vehicles passing a 50kph limit sign were found to be as follows:

Speed in kph	40 - 44	45 - 49	50 - 54	55 - 54	55 - 59	60 - 64	65 -69
No. of vehicle	28	40	65	47	38	38	32

(a) Calculate the mean speed in kph of the above distribution (4mks)

(b) Calculate the medium speed of the distribution (2mks)

(c) Draw a histogram to illustrate the information.

1cm to represent 5 units on the x- axis

1cm to represent 10 units on the y - axis (4mks)

19. Measurements of a maize field using a base line XY were recorded as shown below in a field book as follows: (take XY = 400cm)

			Y			
			360	80	to	Q
To	R	80	280			
To	S	160	200			
			80	200	to	P
			x			

(a) Use a scale of 1cm to 40m to draw the map of the maize field. (5mks)

(b) Find the area of the maize field in hectares.

(4mks)

20. The table below shows some values of functions $y = 2\sin x$ and $y = 1 + \cos x$ for the domain $0^\circ \leq x \leq 240^\circ$

X	0	30	60	90	120	150	180	210	240
$2\sin x$	0		0.87	1		-0.84	0		
	2		1.5	1		0.13	0		

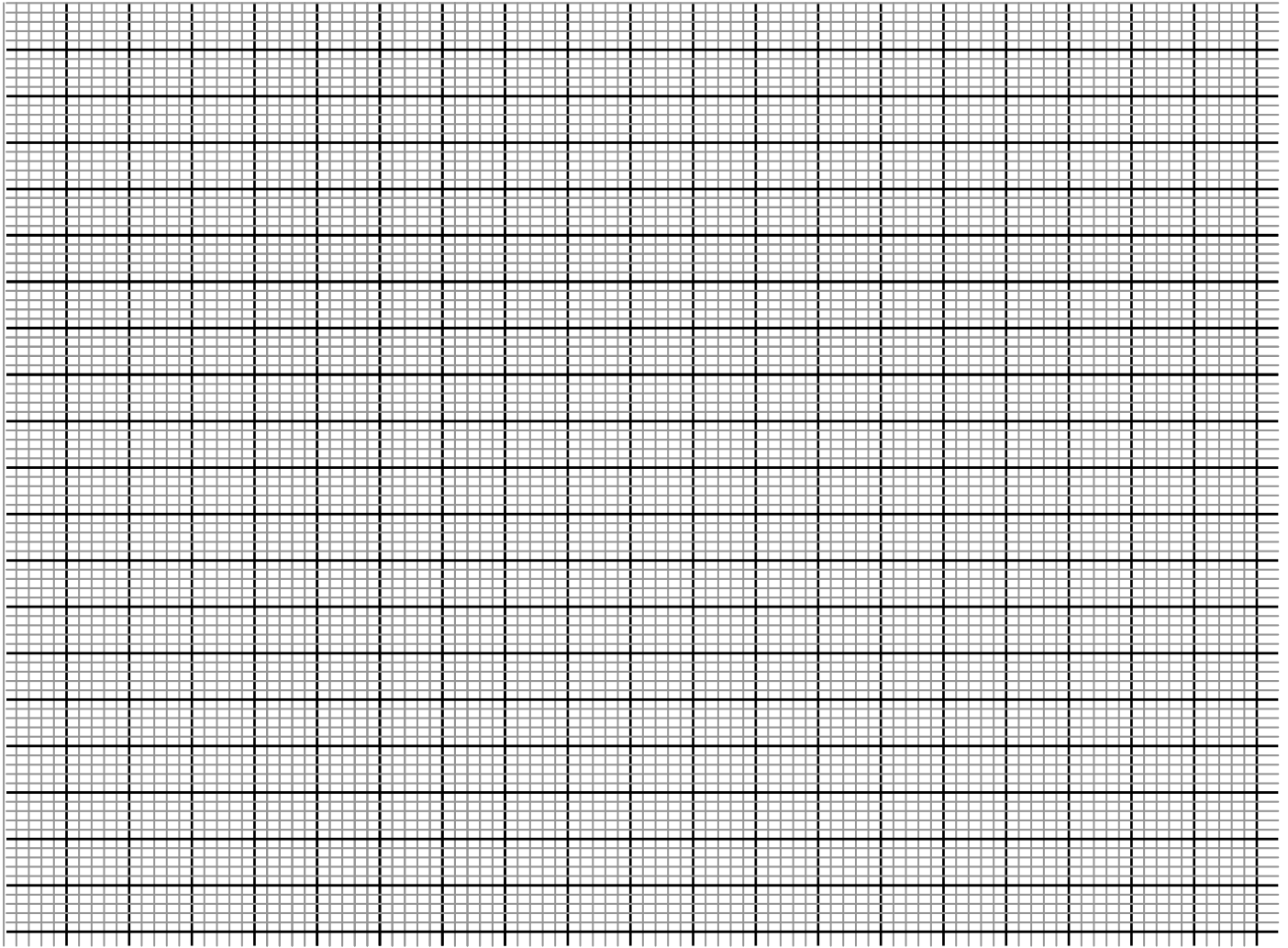
(a) Complete the table above

(2mks)

(b) Draw the Graph of the functions $y = 2 \sin x$ and $y = 1 + \cos x$ for the values of $0^\circ = x = 240$ using the scale

1cm to represent 30 units on the x- axis

2cm to represent 1 unit on the y – axis



(c)

Find the values of x for which

(i) $\sin x = 0.5$

(2mrks)

(ii) $\sin x - \frac{1}{2} \cos x = 0.5$

(2 mrks)

21. Four towns X, Y, Z and W are such that W is on a bearing of 545° W from X. Y is in the direction of 170° from W and X is 150km from Y in the direction 035° , Z is 40km from Y in the direction 125°

a) Use scale drawing (1cm = 20km) to represent the four towns (3mks)

(b) Determine the distance of:

(i) (i) W from X (2mks)

(ii) X and Z and the bearing of X from Z (3mks)

(iii) Z from W

(2mrks)

22. The table below shows some values of the function $y = 2x^2 - 7x - 1$ for $-1 \leq x \leq 5$

X	-1	0	1	2	3	4	5
Y		-1		-7		3	

(Take $\pi = 3.142$)

a) Complete the table above by filling in the missing values of y (2mrks)

b) Draw the graph of the function $y = 2x^2 - 7x - 1$ for $-1 \leq x \leq 5$ by using the scale 2cm to represent 1 unit on the X-axis.

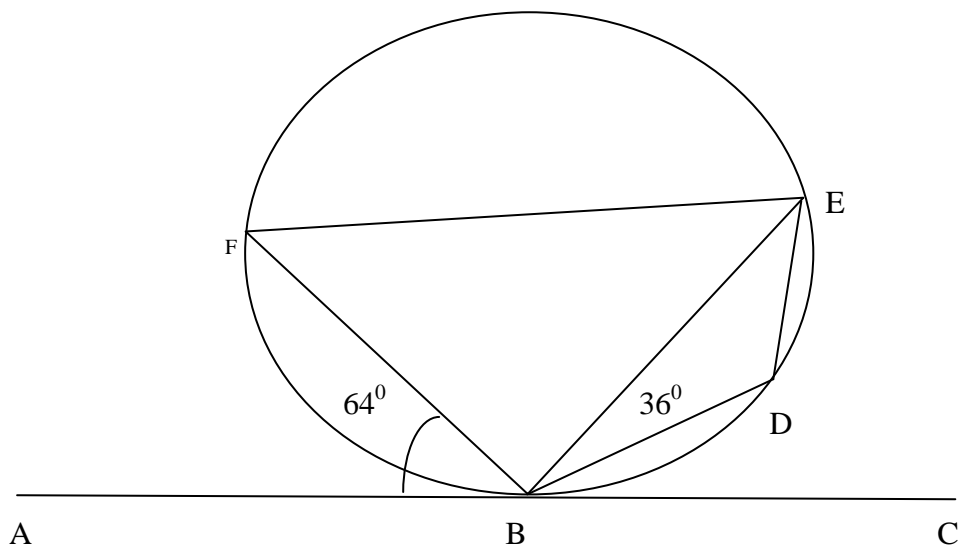
2cm to represent 5 units on the Y – axis (4mks)

c) By drawing suitable straight lines on the same axes, find the approximate roots of the following equations?

(i) $2x^2 - 7x - 1 = 0$ (2mrks)

(ii) $2x^2 - 4x + 3 = 0$ (2mrks)

23. in the figure below ABC is a tangent to the circle at B. angle ABF = 64° and angle DBE = 36° .
Triangle BEF is an isosceles triangle with sides BE = EF



Calculate the size of the following angles giving a reason in each case:

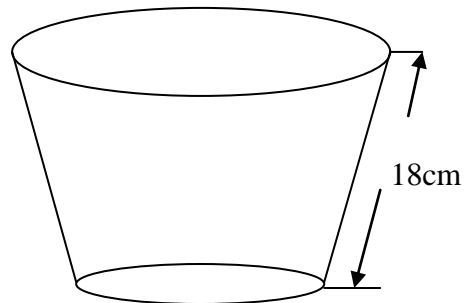
- (a) Angle BEF (2mks)
- (b) Angle FBE (2mks)
- (c) Angle DBC (2mks)
- (d) Angle BDE (2mks)

(e) Angle BED

(2mks)

24. The diagram below shows a frustum made by cutting off a small cone on a plane parallel to the base of the original one. The frustum represent a bucket with the open end diameter of 36cm and diameter of the bottom 24cm. the bucket is 18cm deep as shown

(Take $\Pi = \frac{22}{7}$)



Calculate the:

- (a) Volume of the small cone cut off.

(3mks)

- (b) Volume of the original cone

(2mks)

- (c) The capacity of the bucket in liters

(2mk)