



MANGU HIGH SCHOOL

121/1
MATHEMATICS
PAPER 1
MOCK
JULY 2017
TIME: 2½ HOURS

NAME: _____

ADM NO: _____ CLASS: _____

**Kenya Certificate of Secondary Education
Mock Examinations
Mathematics
Paper 1
2½ Hours.**

INSTRUCTIONS TO CANDIDATES

- This paper contains two sections: section **I** and section **II**.
- In section **A** answer **ALL** questions and in section **B** answer only **FIVE** questions.
- Show all the steps in your calculations, giving your answers at each stage in the spaces below each question.
- Marks may be given for correct working even if the answer is wrong.
- Non programmable silent electronic calculators and KNEC mathematical tables may be used, except where stated otherwise.

For Examiner's 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

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This paper consists of **14 printed pages**. Candidates should check the question paper to ensure that all the pages are printed as indicated and no questions are missing.

Turn Over

SECTION I: 50 MARKS

Answer ALL questions in this section

1. Evaluate

(3mks)

$$\frac{\left(2\frac{1}{4} - 3\frac{2}{3} + 5\frac{1}{6}\right) \div \left(2\frac{1}{4} - 3\frac{5}{6} + 2\frac{1}{3}\right)}{2\frac{3}{4} + \frac{1}{4} \left(1\frac{2}{3} - \frac{1}{6}\right) \div \left(4\frac{1}{8} - 7\frac{5}{12} + 4\frac{1}{6}\right)}$$

2. The LCM of two numbers is 5040 and their H.C.F. is 6. If one of the numbers is 126 use the factor method to find the other number (3mks)

3. Use reciprocal, square and square root table to evaluate to 4 significant figures the expression below (3mks)

$$\sqrt{\frac{1}{24.56} + 4.346^2}$$

1. Simplify the expression

(3mks)

$$\frac{2by - 2bx + 4ay - 4ax}{x - y}$$

What is the greatest number which when divided into 1003, 1864 and 1190 will leave the remainders of 2, 5 and 7 respectively.

(3mks)

Currency	Buying (Ksh)	Selling (Ksh)
1 US \$	72	80
100 Uganda shillings	4	4.20

Evaluate

(3mks)

$$\frac{[(-6 - 4x - 7 + 2)x^3 - 3]x^{40}}{24 \div 6x^2 + [12 - (-2) - 9]x^4}$$

The cost of producing a commodity consists of transport, labour and raw material in the ratio 8:4:12 respectively. If the transport cost increases by 12%, labour cost 18% and raw materials by 40% find the percentage increase of producing the commodity

(3mks)

8. Solve the equation

(3mks)

$$\frac{x-3}{4} - \frac{x-5}{6} = \frac{4x+6}{8} - 1$$

9. 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 US \$	75	80
100 Uganda shillings	4	4.50

A tourist arrived in Kenya with \$2000. She changed the dollars into Kenyan shillings at the bureau. During her stay in Kenya, she spent a total of ksh.60,000. She converted all her remaining Kenyan shillings into Ugandan shillings at the same bureau. How much in Ugandan shillings was she given

(3mks)

10. Find the value of x in the following equation

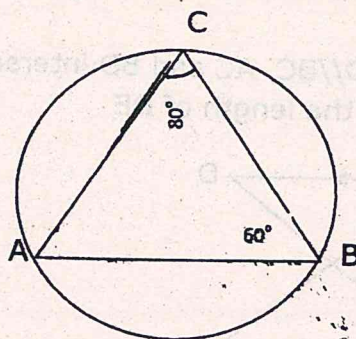
(4mks)

$$64^{x+1} + 8^{2x} = 1040$$

11. Determine the equation of a line passing through point $(3, -\frac{1}{3})$ and perpendicular to a line whose equation is $6y - 9x + 8 = 0$. Express the equation in the form of $y = mx + c$ (3mks)

12. If $x = \frac{2}{3}$ is a root of $6x^2 + kx - 2 = 0$. Find the value of k and the other root (3mks)

13. The figure below is a circle of radius 8cm. Point A, B and C are vertices of the triangle ABC in which angle $ABC = 60^\circ$ and angle $ACB = 80^\circ$. Calculate the area of triangle ABC. (4mks)

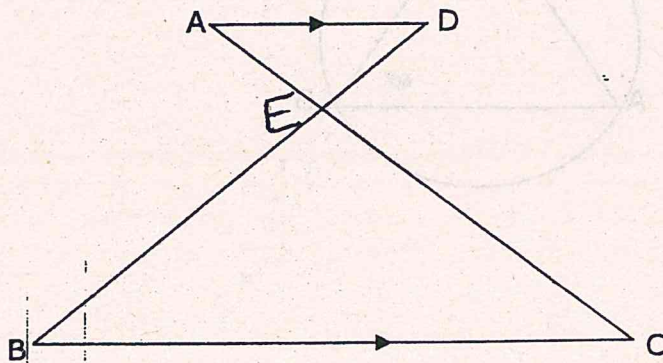


14. A pyramid is on a rectangular base of sides 6cm by 4cm. If the slant edges of pyramid are 8.4cm long, find the total surface area of the pyramid (3mks)

15. Use reciprocal, cubes and cube root tables to evaluate (4mks)

$$\frac{(2.9479)^3}{-63.34} - \sqrt[3]{0.0169}$$

16. In the figure below AD//BC, AC and BD intersect at E. Given that AE:EC=1:5 ; BD=12cm. Calculate the length of DE (2mks)



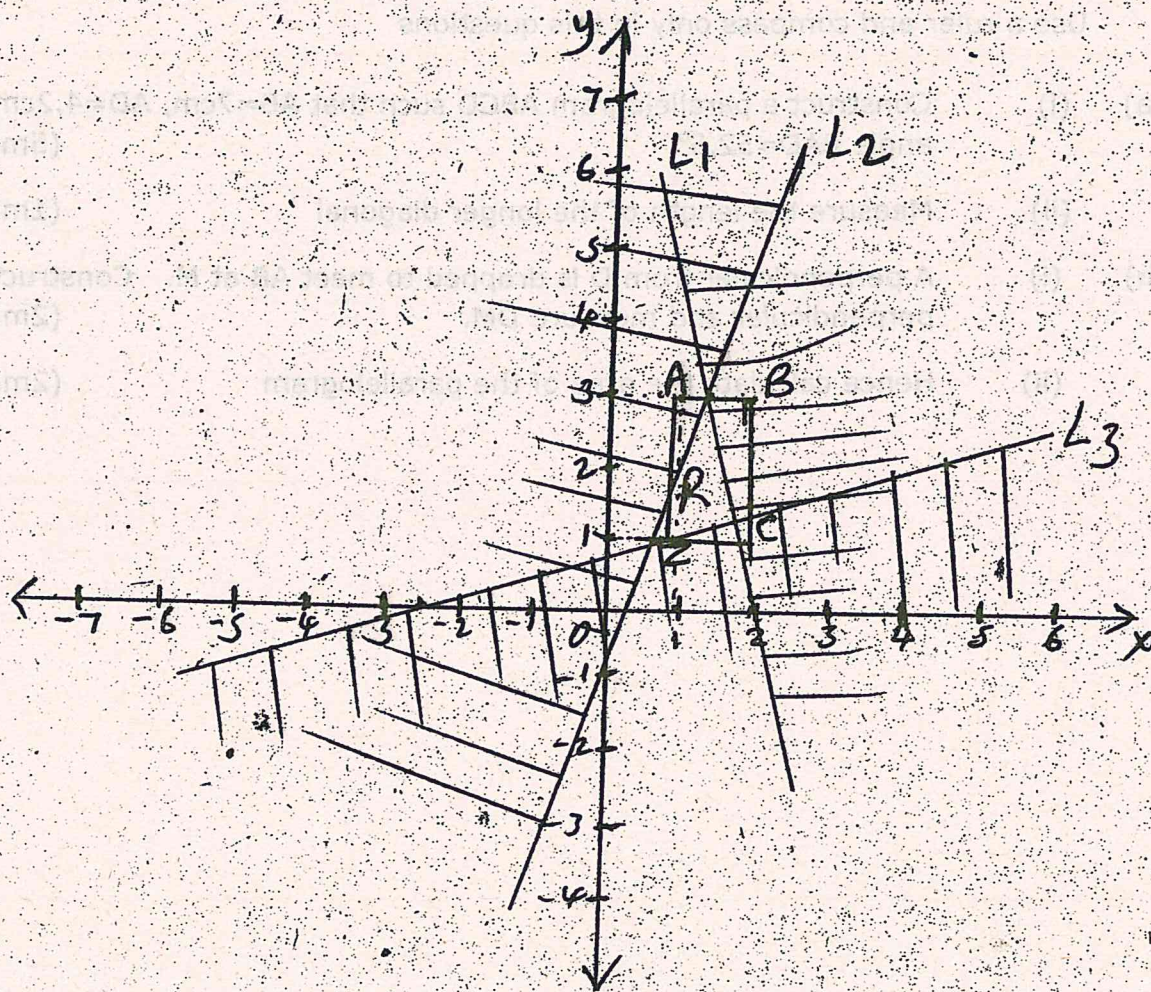
SECTION II: 50 MARKS

Answer only FIVE questions in this section

17. Use a ruler and compass only in this questions

- (a) (i) Construct a parallelogram ABCD such that $AB=7\text{cm}$, $AD=4.2\text{cm}$ and angle $BAD=52.5^\circ$ (5mks)
- (ii) Measure the length of the longer diagonal (1mk)
- (b) (i) A perpendicular from D is dropped to meet AB at M. Construct the perpendicular and measure DM. (2mks)
- (ii) Hence calculate the area of the parallelogram (2mks)

18. (a) Determine the inequalities that define the unshaded region R below (6mks)



- (b) Calculate the area of the region R

(4mks)

19. Mash bus leaves Voi for Nairobi at 7.00am at an average speed of 80km/h. Coast bus leaves Nairobi towards Voi at 7:30am on the same day at an average speed of 60km/h. The distance from Nairobi to Voi is 450km. After travelling for $1\frac{1}{2}$ hours coast bus developed a mechanical problem which took 45 minutes to repair before continuing at its speed in the same direction.

a) Determine the time when the two buses met (4mks)

b) Calculate the distance from Nairobi when the two buses met. (3mks)

c) For how long did the mash bus stay in Nairobi before coast bus arrived at Voi. (3mks)

20. A triangle ABC with vertices A(-4,2), B(-6,6) and C (-6,2) undergoes an enlargement scale factor -1 and centre (-2,6) to produce triangle A'B'C'

a) Draw triangle ABC and its image A'B'C' on the grid provided. State the coordinates of triangle A'B'C' (3mks)

b) Triangle A'B'C' is then reflected in the line $y=x$ to give A''B''C''. Draw triangle A''B''C'' and state the coordinates of its vertices (3mks)

c) If triangle A''B''C'' is mapped onto a triangle whose coordinates are A''' (0,-2), B''' (4,-4) and C''' (0,-4) by a rotation find the centre and angle of rotation (4mks)

21. The equation of a curve is given by $y = -x^3 + 4x^2 - 6x + 3$.
- a) Complete the table below (2mks)

x	-5	-4	-3	-2	-1	0	1	2
y			6			-6		16

- b) On the grid provided, draw the graph of $y = -x^3 + 4x^2 - 6x + 3$ for $-5 \leq x \leq 3$ (2mks)

- c) Use your graph to solve the following equation

i) $x^3 + 4x^2 - x - 6 = 0$ (1mk)

ii) $-3x^3 - 12x^2 + 15 = 0$ (2mks)

iii) $-x^3 - 4x^2 + 2x + 9 = 0$ (2mks)

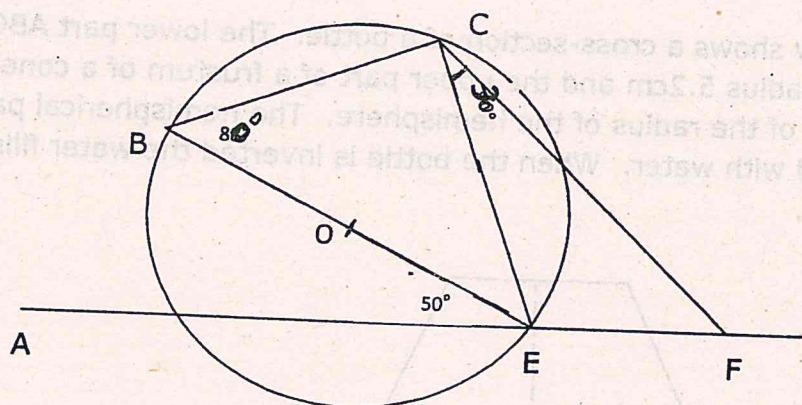
22. a) Use trapezoidal rule to estimate the area bounded by the curve $y = 3x^2 - 8x + 10$ and the line $y=0$, and $x = 0$ and $x = 10$. Use nine trapezia. (3mks)

- b) Use mid ordinate rule with 10 strips to estimate the area in (a) above (3mks)

- c) i) Calculate the exact area, calculate in (a) and (b) above (2mks)

- ii) Calculate the percentage error made when each method was used. (2mks)

23. In the figure below, O is the centre of the circle. Angle $AEB = 50^\circ$, angle $EBC = 80^\circ$ and angle $ECD = 30^\circ$.



Giving reasons calculate

(a) Angle CDE

(2mks)

(b) Angle DFE

(3mks)

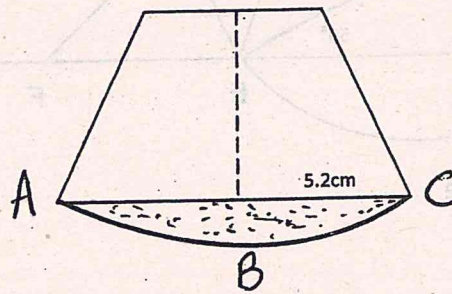
(c) Obtuse angle COE

(2mks)

(d) Angle ADE

(3mks)

24. The figure below shows a cross-section of a bottle. The lower part ABC is a hemisphere of radius 5.2cm and the upper part of a frustum of a cone whose top radius is a third of the radius of the hemisphere. The hemispherical part is completely filled with water. When the bottle is inverted the water fills the frustum part completely.



- (a) Determine the height of the frustum

(7mks)

- (b) The capacity of the bottle in litres to 2.s.f.

(3mks)