

Name: Index no

School: Candidate's sign

Date:

121/1
MATHEMATICS
PAPER 1
MARCH/APRIL 2011
TIME: 2 ½ HOURS

BUTERE EAST ZONE JOINT EXAMINATION

Kenya Certificate of Secondary Education (K.C.S.E.)

Mathematics
Paper 1

INSTRUCTIONS TO CANDIDATES:

- Write your **name**, index **number**, **Signature** and write date of examination in the spaces provided
- The paper contains two sections. Section I and Section II.
- Answer **ALL** the questions in section I and any Five questions in section II.
- Answers and working **must** be written on the question paper in the spaces provided below each question.
- Show all steps in your calculations below each question.

FOR EXAMINERS USE ONLY

SECTION 1

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

SECTION II

Question	17	18	19	20	21	22	23	24	TOTAL
Marks									

Grand Total

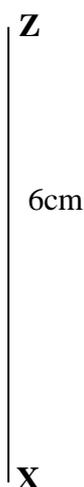
--

This paper consists of 11 printed pages. Candidates should check to ascertain that all papers are printed as indicated and that no questions are missing

SECTION I (50 MARKS)

Answer ALL the Questions in this section in the spaces provided.

1. Evaluate $\sqrt{\frac{35 - (-17)}{2} - \frac{15 - (-2)(-6)}{3}}$ (3mks)
2. Solve for x in $5^{2x-3} = \frac{1}{25}$ (2mks)
3. 4 men can build a road 32 m long in 12 days. Calculate the length of the road built by 8 men in 8 days if they work at the same rate. (2mks)
4. The size of an interior angle of a regular polygon is $3x$ while its exterior is $(x + 20)$. Find the number of triangles that make the polygon. (3mks)
5. In fourteen years time, a mother will be twice as old as her son. Four years ago, the sum of their ages 30 years. Find how old the mother was when the son was born. (4mks)
6. A student had 0.02 m^3 of a mixture consisting of 2.5kg of substance A and 7.5 kg of substance B Calculate the density of the mixture in g/cm^3 (4mks)
7. The line given below $ZX = 6 \text{ cm}$ is a diagonal of rhombus WXYZ. Given that $\angle XYZ = 45^\circ$ complete the rhombus using ruler and compass only. Hence measure the side of the rhombus. (4mks)



8. A1 (1,4) is the image of A (1-2) under an enlargement scale factor -1 . Find the centre of enlargement. (3mks)
9. A line makes an angle of 60° with x axis and passes through the origin. Find the equation if the line in the form $y = m x + c$. (3mks)
10. Musa bought a machinery worth 2,950,000 Japanese yens. In Kenya he was charged a custom duty of 20% on the value of the machinery. If the exchange rates were as follows.
1 us dollar 118 Japanese yens
1 us dollar = 76 Kenya shillings
Calculate the duty paid in Kenya shillings. (3mks)
11. Simplify the expression. $\frac{X^2 + 14x + 49}{X^2 - 49}$ (3mks)
12. Given that $8 \leq y \leq 12$ and $1 \leq x \leq 6$. Find the minimum possible value of $y + x$ to 4 s. f (3mks)
13. A metallic sphere of radius 10.5cm was melted. The molten material was then used to make a cube. Find the length of one side of the cube. (3mks)
14. A scale of map is given as 1: 20,000. Find the actual area in hectares of a region represented by a triangle of sides 6 cm and 4 cm and angle between sides is 30° (4mks)
15. Jane paid Sh. 4500 for a blouse after getting a discount of 10%. The retailer still made a profit of 25% on the sale of the blouse. What profit would the retailer have made if no discount was allowed. (3mks)
16. Solve the inequality and give compound statement for x in $4(1-x) < 3(3-x) \geq 21$ (3mks)

SECTION II

Answer only five questions.

17. A bus left Nairobi at 8.00am and traveled towards BUSia at an average speed of 80km/hr. At 8.30 am a car left Busia for Nairobi at an average speed of 120km/hr.

Given that the distance between Nairobi and Busia is 400km.

Calculate:

- a) The time the car arrived in Nairobi. (2mks)
 - b) The time the two vehicles met. (4mks)
 - c) The distance from Nairobi to the meeting point. (2mks)
 - d) The distance of the bus from Busia when the car arrived in Nairobi. (2mks)
18. A triangle whose vertices are A (1,4) B (2,1) and C (5,2) is given the following transformation:

i) Reflection in the line $y = -x$ to $A^1B^1C^1$

ii) $A^1B^1C^1$ is then given rotation of $+90^\circ$ about the origin to $A^{11}B^{11}C^{11}$

iii) $A^{11}B^{11}C^{11}$ is then given a translation vector $\begin{pmatrix} -2 \\ 1 \end{pmatrix}$ to $A^{111}B^{111}C^{111}$

iv) $A^{111}B^{111}C^{111}$ is then given an enlargement scale factor -2 centre $(0, 0)$ to $A^{IV}B^{IV}C^{IV}$.

On the given grid plot a triangle ABC and its images $A^1B^1C^1$, $A^{11}B^{11}C^{11}$, $A^{111}B^{111}C^{111}$ and $A^{IV}B^{IV}C^{IV}$.

And give coordinates of $A^{IV}B^{IV}C^{IV}$. (10mks)

19. A Post OT stand vertically on level ground John moves from O, the foot of the flag post to point R, on the level ground. The points T, O and R form a right angled isosceles triangle whose perimeter is 56m. S is another point on the level ground 35m from O calculate:

- a) The angle of elevation of T from S. (16mks)
- b) The distance ST. (2mks)
- c) Find the maximum possible distance between R and S. (2mks)

20. A salesman received a basic salary of sh. 50,000 a year together with a commission of 6% on the value of goods sold and a car allowance of sh. 2.50 per km.

- a) Find the total amount he received in a year in which he sells goods worth sh. 625,000 and travels 10,000km. (4mks)
- b) The next year he travels 12,000km and receives a total of sh. 134,000
 - i) Calculate the value of goods sold. (4mks)
 - ii) Calculate the percentage increase in the value of the goods sold. (2mks)

21. Two airports A and B are such that B is 500km due east of A. Two planes P and Q take off from A and B respectively and at the same time.

Plane P flies at 360km/hr on a bearing of 030°

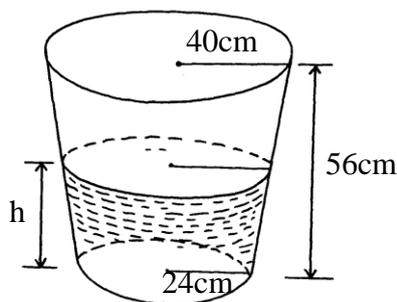
Plane Q flies at 240km/hr on a bearing of 315°

The two planes land after 90 minutes.

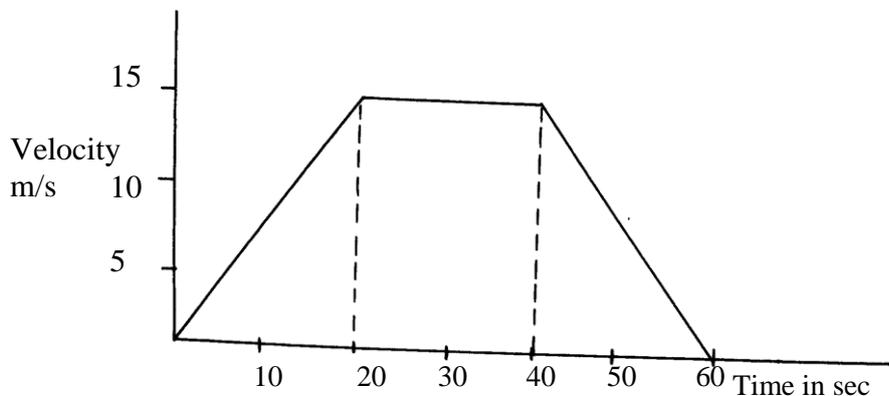
Using a scale of 1: 10,000,000

- a) Show the positions of the planes after 90 min. (6mks)
- b) Find the distance between the planes after 90 min. (2mks)
- c) Find the bearing of plane Q from plane P after 90 minutes (2mks)

22. The figure below shows a container in form a frustrum of an open top radius 40cm and base radiu24 cm. the depth is 56 cm.



- a) Calculate the volume of the container in litres. (4mks)
- b) Of the container is $\frac{3}{4}$ full of water by volume, Calculate the radius of the meniscus. (6mks)
23. Use a ruler and compass only in this question.
- a) Construct ΔABC such that $AB = 6\text{cm}$ $AC = 8.5\text{ cm}$ and $\angle BAC = 120^\circ$ (3mks)
- b) Construct the locus ℓ , of points equidistant from A and B (2mks)
- c) Construct the locus ℓ_2 of points equidistant from AB and BC (3mks)
- d) Find the points of intersection, P_1 and P_2 , of ℓ_1 and ℓ_2 and measure P_1P_2 (2mks)
24. The diagram below shows the graph of a moving matatu from one bus stop to another.



- a) Find the acceleration of the matatu. (2mks)
- b) Find the deceleration of the matatu (2mks)
- c) Calculate the distance the matatu while accelerating. (2mks)
- d) Calculate the distance the matatu covered while traveling at an acceleration of 0m/s^2 (2mks)
- e) Find the distance between the two bus stops. (2mks)