

NAME..... INDEX NO.....

SCHOOL..... SIGN.....

DATE.....

121/1

MATHEMATICS ALT. A

PAPER 1

JULY/AUGUST 2012

TIME 2 ½ HOURS

KERICHO DISTRICT JOINT KCSE TRIAL EXAMINATION-2012

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

121/1

MATHEMATICS ALT. A

PAPER 1

JULY/AUGUST 2012

TIME 2 ½ HOURS

INSTRUCTIONS TO THE CANDIDATES

- (a) Write your name and the index number in the spaces provided above.
- (b) Sign and write the date of examination in the spaces provided.
- (c) This paper consists of **TWO** sections: Section **I** and **II**.
- (d) Answer **ALL** the questions in section **I** and only **FIVE** questions from section **II**.
- (e) All answers and working must be written on the question paper in the spaces provided below each question.
- (f) Show all the steps in your calculations, giving your answers at each stage in the spaces below each question.
- (g) Marks may be given for correct working even if the answer is wrong.
- (h) Non-programmable silent electronic calculators and KNEC mathematical tables may be used, except where stated otherwise.

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

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This paper consists of 16 printed pages.

Candidates should check the question paper to ensure that all pages are printed as indicated and no questions are missing

1. Use logarithms tables to evaluate

$$\frac{\sqrt[5]{3.172 \times (0.008367)^2}}{\text{Log}9}$$

(4mks)

2. By using the substitution $y = 2^x$, solve the equation.

$$5 \times 2^{2x+1} - 3 \times 2^x - 34 = 0$$

(3mks)

3. Simplify completely

$$\frac{3x^2 - 1}{x^2 - 1} - \frac{2x + 1}{x + 1}$$

(3mks)

4. Without using mathematical tables evaluate.
- $$\frac{20 \times (-3)(-0.1)7(-2)^3}{8 \div 0.4}$$
- (2 mks)

5. A circle centre o, has the equation $x^2 + y^2 = 4$

The area of the circle in the first quadrant is divided into 5 vertical strips each of width 0.4cm.

- a) Use the equation of the circle to complete the table below for values of y correct 2 (1 mk) decimal places.

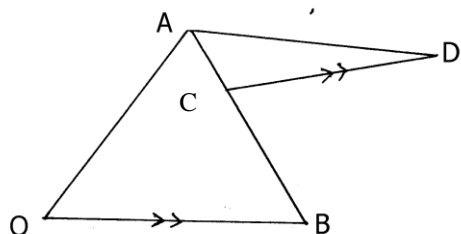
X	0	0.4	0.8	1.2	1.6	2.0
Y	2.00			1.60		0

- b) Use the trapezium rule to estimate the area of the circle. (2mks)

6. Three quantities t, x and y are such that t varies directly as x and inversely as the square root of y. Find the percentage decrease in t if x decreases by 44%. (4mks)

7. A circle whose centre $(-2,5)$ passes through point $P(10, 10)$. Find the equation of the circle in the form of $ax^2 + by^2 + cx + dy + k = 0$. Where a, b, c, d and k are constants. (3mks)

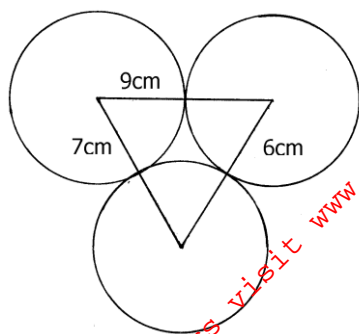
8. In the figure below $\vec{OA} = 3\vec{i} + 4\vec{j}$ and $\vec{OB} = 8\vec{i}$. C is a point on \vec{AB} such that $\vec{AC} : \vec{CB} = 3:2$, and \vec{D} is a point such that $\vec{OB} \parallel \vec{CD}$ and $2\vec{OB} = \vec{CD}$



Determine the vector \vec{DA} in terms of \vec{i} and \vec{j} (3mks)

9. Given that $\log 4 = 0.6021$ and $\log 6 = 0.7782$, without using mathematical tables or a calculation, evaluate $\log 0.096$. (3mks)

10. The figure below shows three circles each touching the other two externally.



If the centres of the circles form a triangle with sides of length 9cm, 7cm and 6cm. Calculate the radii of the circles. (3mks)

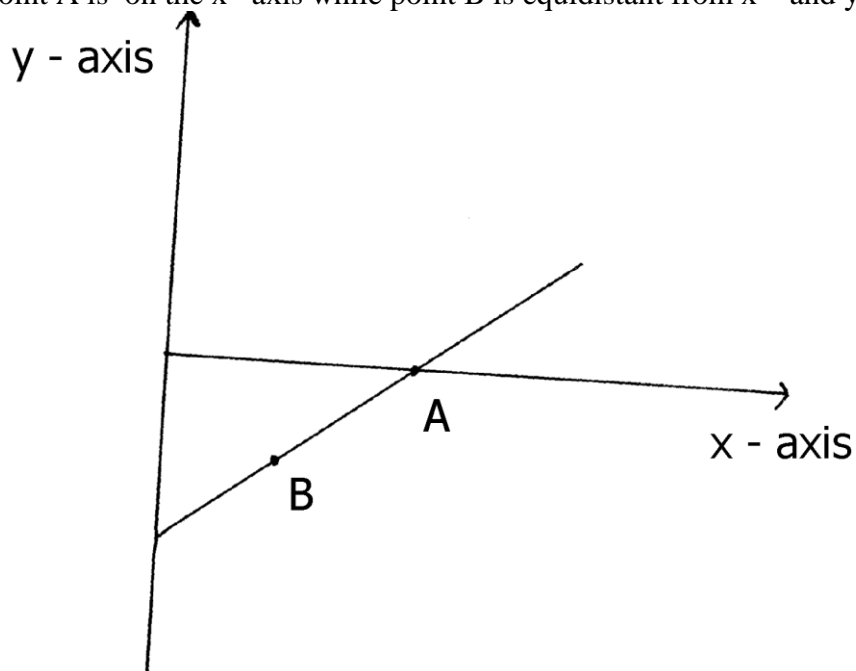
11. If $\cos \theta = \frac{-15}{17}$ and θ is obtuse, find without using tables the values of

a) $\tan \theta$. (2mks)

b) $\sin(180^\circ - \theta)$ (1mk)

12. The angles of a quadrilateral are $3x$, $2x$, $x + 14$ and $2(x - 7)$ degrees. Find the smallest angle. (3mks)

13. On the diagram below, the line whose equation is $7y - 3x + 30 = 0$ passes through points A and B. Point A is on the x-axis while point B is equidistant from x- and y-axis



Calculate the coordinates of points A and B.

(3mks)

14. A Kenyan businessman bought goods from Japan worth 2,950,000 Japanese Yen. On arrival in Kenya, custom duty of 20% was charged on the value of the goods. If the exchange rates were as follows.

If the exchange rates were as follows:-

1 us dollar = 118 Japanese yen

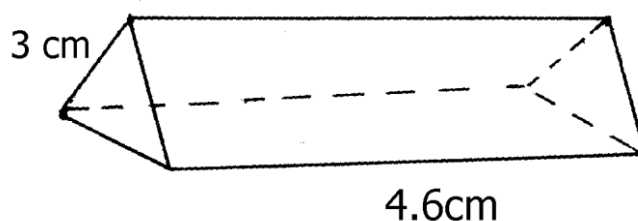
1 us dollar = 76 Kenya shillings

Calculate the duty paid in Kenya shillings.

(2mks)

15. a) Construct a net of the triangular prism shown, where the cross section is an equilateral triangle.

(2mks)



- b) Calculate the surface area of the prism.

(2mks)

16. Find the positive number m for which

$$\int_1^m 4x^3 dx = 80$$

(3mks)

SECTION II (50 MARKS)

Answer ANY FIVE questions from this section in the spaces provided

17. Two types of tea in Kericho grade A and grade B1 are mixed. Grade A costs sh. 85 per kg, and grade B costs sh. 70 per kg.
- a) If the tea are mixed in the ratio 2:1, find the cost 2kg of the mixture. (3mks)
- b) The tea is to be sold in 2kg boxes at a 30% profit. Find the selling price of the tea.(2 mks)
- c) At the end of the week the price of a 2kg box is reduced to sh. 125. Find the percentage reduction in the price . (2mks)
- d) Originally 200kg of grade A and 100kg of grade B were bought 240kg of the mixture was sold at the price of part b, and the rest was sold at the reduced price of part C. Find the overall percentage profit. (3mks)

18. Mr. Barmuriat a farmer in Ainamoi division Kericho District has a triangular field, ABC. The ratio of the length AB: AC = 6:7. If BC = 40m and the perimeter of the field is 118m,.

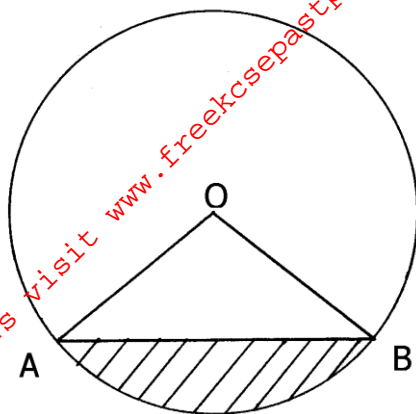
a) Calculate the length AB and the area of the field. (5mks)

b) A water tap is installed inside the field such that the tap is equidistant from each of the vertices of the plot. Calculate the distance of the tap from vertex A. (3mks)

c) Find the size of the acute angles between the edges AB and BC. (2mks)

19. A cylindrical water tank can be filled to a depth of 2.1 meters by a pipe p in 2 hours. Pipe Q takes 7 hours to fill the tank to the same depth. Pipe R can empty this amount of water in 6 hours.
- a) i) Starting with the tank empty, P runs alone for one hour. How many centimeters deep will the water in the tank than be? (3mks)
- ii) If pipe P is now turned off and pipe R left open for one hour what depth of water will remain in the tank? (3mks)
- b) If the tank is initially empty, and pipe P and Q are both running and pipe R is left open, how long will it take to fill the tank to a depth of 2 meters? (4mks)

20. In the figure below, O is the centre of the circle of radius 3cm and AB is a chord such that its shortest distance from O is 1cm.



Calculate :

- a) The length of the chord AB. (3mks)

- b) Angle AOB (2mks)

- c) The area of the minor sector OAB. (2mks)

- d) The area of the shaded segment. (3mks)

21. If $x^2 + y^2 = 29$ and $x + y = 3$

a) Without solving for x and y determine the values of

i) $x^2 + 2xy + y^2$ (2mks)

ii) $2xy$ (2mks)

iii) $x^2 - 2xy + y^2$ (2mks)

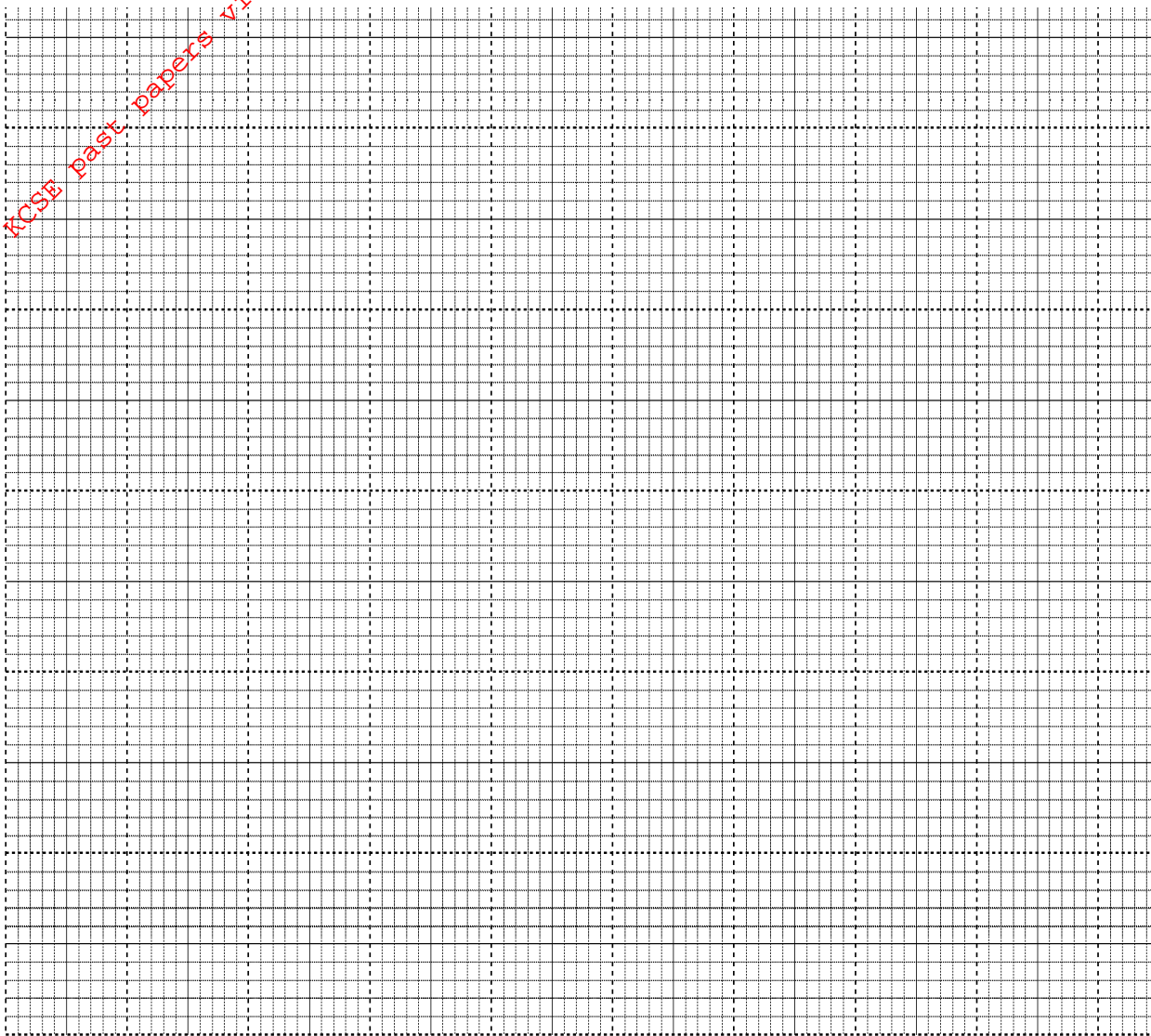
iv) $x - y$ (2mks)

b) Find the values of x and y . (2mks)

22. A frequency distribution of marks obtained by 120 candidates is to be represented in a histogram. The table below shows the grouped marks, frequencies for all the groups and also the area and height of the rectangle for the group 30 – 60 marks.

Marks	0 – 10	10–30	30 – 60	60 – 70	70 – 100
Frequency	12	40	36	8	24
Area of rectangle			180		
Height of rectangle			6		

- a) i) Complete the table. (4mks)
 ii) On the grid provided below, draw the histogram. (2mks)



- b) i) State the group in which the median mark lies. (1mk)
- ii) A vertical line drawn through the median mark divides the total area of the histogram into two equal parts. Using this information or otherwise, estimate the median mark. (3mks)

23. Four points B, C, Q and b lie on the same plane. Point Q. Point B is 42 km due south – west of point Q . Point c is 50km on a bearing of 560° E from Q. Point b is equidistant from B, Q and C.

- a) Using the scale : 1cm represents 10 km, construct a diagram showing the positions of B, C, Q and D. (6mks)

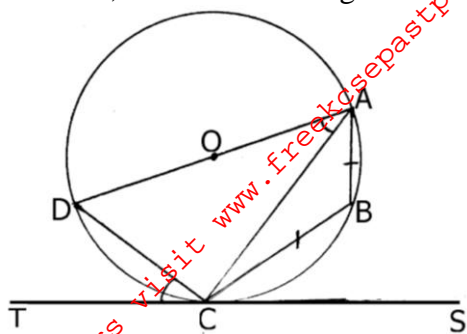
- b) Determine the:

i) distance between B and C . (1mk)

ii) bearing of D from Q. (1mk)

iii) bearing of D from B. (2mks)

24. In the figure below DA is a diameter of the circle ABCD centre O, radius 10cm. TCs is a tangent to the circle at C, $AB = BC$ and angle $DAC = 38^\circ$



- a) Find the size of the angle
- ACS (2mks)
 - BCA (2mks)
- b) Calculate the length of
- AC (2mks)
 - AB (4mks)

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