Name…… **Index No**……..

School…….. **Date**…….

Candidate's signature……..

121/2
MATHEMATICS
PAPER 2
JULY / AUGUST 2012
TIME: 2 ½ HOURS

LOITOKTOK DISTRICT JOINT EVALUATION TEST – 2012

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

121/2
MATHEMATICS
PAPER 2
JULY / AUGUST 2012
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INSTRUCTIONS TO THE CANDIDATES:

1. *Write your name and Index number in the spaces provided at the top of this page.*
2. *This paper consists of Iwo sections:* ***Section I and Section II***
3. *Answer all questions in section* ***I and Section II***
4. *Show all the steps in your calculations, giving your answers at each stage in the spaces below each question.*
5. *Marks may be given for correct working even f the answer is wrong.*
6. *Non- programmable silent electronic calculators* ***and KNEC*** *Mathematical tables may be used.*

SECTION I

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

SECTION II

17	*18*	*19*	*20*	*21*	*22*	*23*	*24*

TOTAL

This paper consists of 16 Printed pages.
Candidates should check to ascertain that all pages are printed as indicated and that no questions are missing.

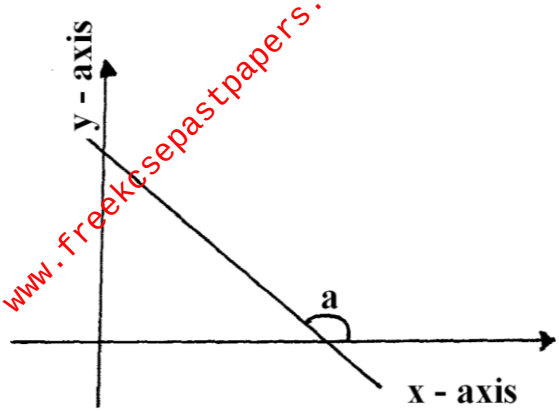
SECTION 1 (50 MARKS)

Answer all the question in this section on the spaces below each Question:

1. 1. Use logarithms to evaluate; $\frac{43.25 \times 0.9371}{\sqrt{2.64} \div 8.43}$ (4 marks)

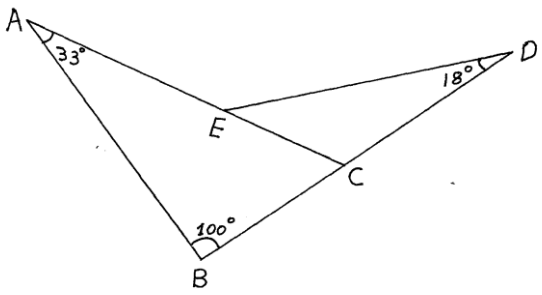
2. A. farmer has three containers of capacity 12, 15 and .1 litres. Calculate the capacity of the largest. container which can fill each one of them an exact number of times. (2 marks)

3. The figure below shows a sketch of the line3y = - x + 10 Find the value of **a** .(3marks)



4. Given that $g = kx^2$ make x the subject of the equation by first simplifying using the laws of logarithms. (3mks)

5. In the figure ABCDE below angle ABC = 1000, angle BAC = 33° and angle CDE = 18°. Calculate the size of angle AED. (2 marks)



6. A rectangular plot of land measures 745 m by 230 m has two support posts on every corner.. A gate 5m wide With double posts on side is at one side of the plot. Find the number of posts required to fence the plot if they are placed 5m apart. (4 marks)

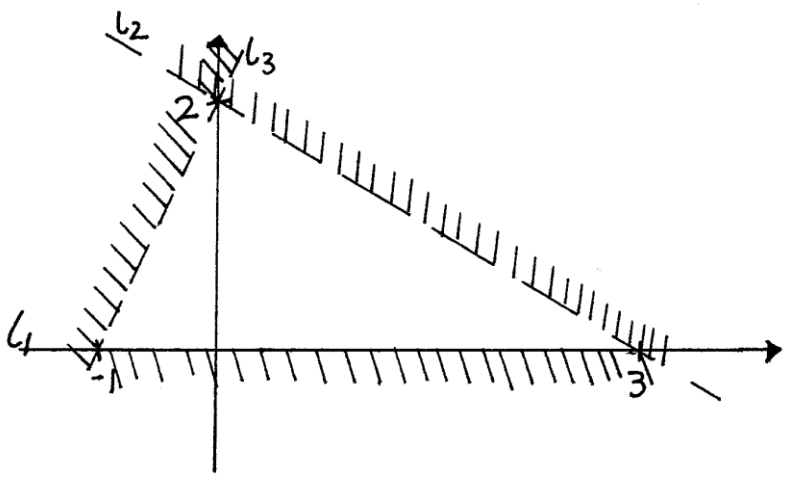
7. Factorize completely and simplify; $\frac{6-3x-18x^2}{12-27x^2}$ (3mks)

8. From a point P a boy notices that the angle of elevation of the top of a tall building is 45°. He moves 270m from P to Q and realizes that the new angle of depression is 30°. Given that Q is on the same side of the building as P, find the height of the building. (3 marks)

9. Solve for x in the trigonometric, equation 3 sin 2x = -0.1545. (3 marks)

10. A student misread the number 0.4 07 for 0.407 . Calculate the percentage error incurred in using the wrong number (3 marks)

11. From the graphs below, determine the inequalities l1, l2 and l3 satisfy the un shaded region (3 mks)



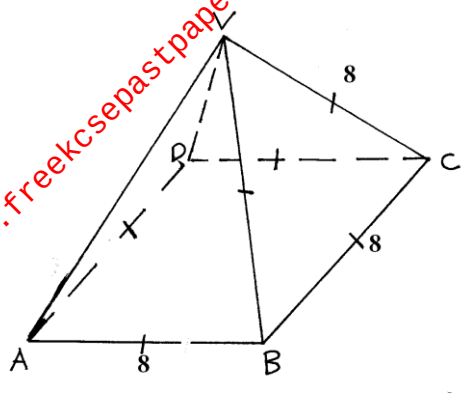
12. A chord XY of a circle is 5cm long and subtends an angle of 30° on the major arc of the circle centre 0 Calculate to 4 s.f.

(a) the distance of the chord from the centre of the circle. (2 marks)

(b) the radius of the circle: (2 marks)

13 Solve without using tables or calculators, $\frac{\sin 480^0 - \tan 225^0}{\tan 45^0 - \cos(-330^0)}$ (4mks)

14. The figure below shows a square based non- right pyramid ABCDV. Side BCV is an equilateral triangle of side 8 cm and is perpendicular to base ABCD. Calculate to4 s.f the volume of the pyramid. (3mks)



15. In a class there are 19 girls and the rest are boys. The probability of picking a boy from the class is. 0-4. Find the total number of students in that class. (2 marks)

16. Evaluate using square root, cubes and reciprocal tables; (4 marks)

$$\frac{4}{\sqrt{0.07}}+\frac{1}{(134.67)^3}$$

SECTION II (50 MARKS)

Answer any FIVE questions from this section

An aircraft leaves town P (30^0S, 17^0E) and moves directly northwards to Q (60°N, 17°E). It then moved at an average speed of 300 knots for 8 hours westwards to town R. Determine;

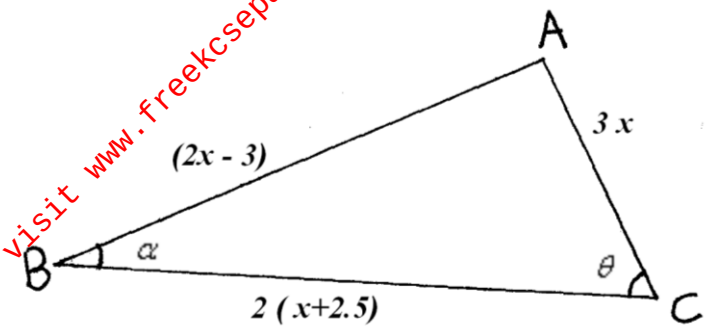
a) The distance PQ in nautical miles. (3marks)

b) The position of town R. (3marks)

c) The local time at R if local time at Q is 3.12p.m. (2marks)

d) The total distance moved from P to R in kilometers. Take 1 nautical 1.853 kilometers (2marks)

18. Triangle ABC below has an area of 30 cm^2. In triangle,< ABC = α , <ACB = θ and sin α - cos θ =0. Sides AB = (2x – 3) cm, AC = 3x cm and BC = 2 (x + 2.5) cm.



From the triangle, find;

(a) The value of x. (3marks)

(b) The perimeter of the triangle. (2marks)

(c) The perpendicular height from A to base BC (2marks)

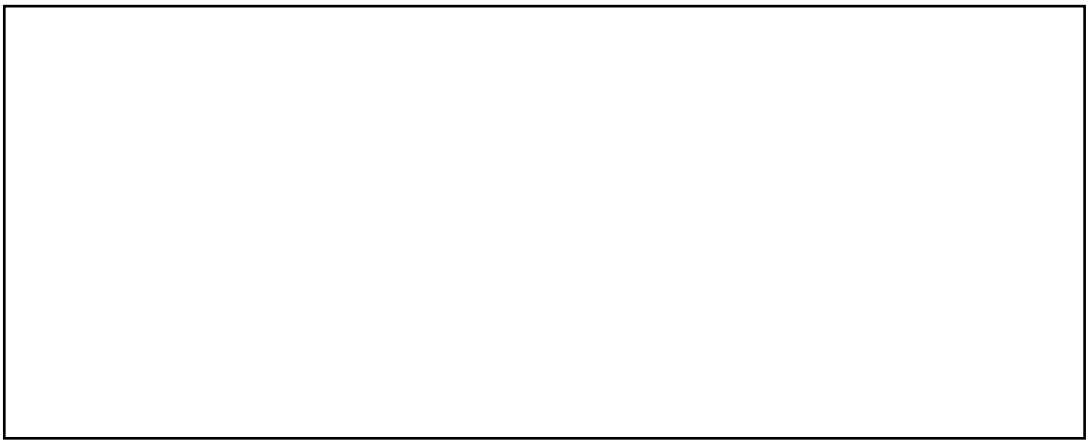
d) The size of angles a and α (3 marks)

19. A curve passes through the point (3,-6) and its gradient function is $\frac{dy}{dx} = 2x - 1$

(a) Find the equation of the curve. (3 marks)

(b) Determine the x-co-ordinate of the points where the curve cuts the x-axis. (3 marks)

(c) In the enclosed space below, sketch the curve. (1 mark)



(d) By integration, find the area enclosed by the curve and the x-axis (3 marks)

20. The table below shows monthly income tax rates.

Income: K£ .P.m	**Rate of tax Sh. Per £**
1 – 342	2
343 – 684	3
685 – 1026	4
1027 – 1368	5
1369 – 1710	6
Over 1710	7

A civil servant earns a salary of Sh.42000 and is provided with a house at a nominal rent of Sh. 1500 per month.

(a) Taxable pay is the employee's salary plus 15% of salary less nominal rent. Calculate the civil servant's taxable income in K£ p.m. (2 mark)

(b) If the employee is entitled to a personal relief of Sh.900 p.m., what is his PAYE? (5 mks)

(c,) The following deductions are made from his gross monthly pay; NHIF - Sh 630, WCPS - Sh 540, Union dues - Sh 330, SACCO loan recovery - Sh.7000 and Co - operative shares Sh.2500 Calculate his net monthly pay. (3 marks)

21. Two pulleys of radii 3.6 cm and 2.0 cm have their centre 0_1 and 0_2, 10cm apart.

(a) Construct transverse common tangents AB and CD to the pulleys.

Measure the tangent AB. (6 marks)

(b) A continuous belt is fitted around the two pulleys in a transverse way.

Calculate the length of the belt. (4 mks)

22. The relationship between two quantities x and y are suspected to be of the form $y = ab^x + 2.1$ where a and. b are constants. The table below show corresponding values of x and y.

x	1.4	2.3	3.2	4.0	5.0	6.1
y	9.5	10.0	12.6	17.5	33.2	90.4

a) By drawing a suitable straight line graph, estimate the values of a and b. (8 mks)

(b) Hence, determine the value of;

i) y when x is 13.2. (1 mark)

ii) x when y is 47.6. (1mk)

23. Complete the table below for the functions $y = 2 \sin (x - 30^0)$ and $y = \text{Cos } 2x$. (2marks)

X^0	0	30	60	90	120	150	180	210	240	270	300	330	360
$2 \sin (x- 30^0)$	-1			1.73	2			0	-1			-1.72	-1.0
Cos 2x	1			-1	-0.5			0.5	-0.5			0.5	1

(a) On the same set of axes, draw the graphs of $y = 2 \text{ Sin } (x - 30)$ and $y = \cos 2x$ in

The range $0^0 < 360^0$

(5 marks)

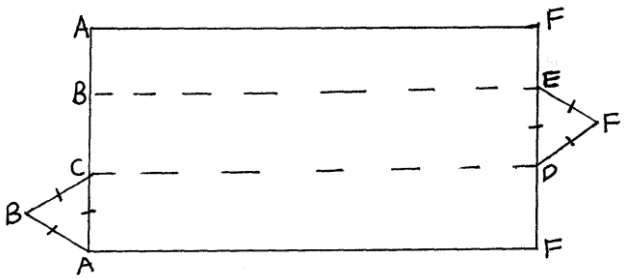
(b) Use your graph to solve the equation $2 \sin (x - 30^0) = \cos 2x$ (1mk)

(c) State the,

(i) phase angle for the wave $y = 2 \text{ Sin } (x - 30°)$ (1mk)

(ii) period for the wave $y = \cos 2x$. (1mk)

24. The figure below shows a net of a solid figure. The dimensions AC = CB = BA = 5cm,AF 10cm and the triangles ABC and DEF are equilateral and equal.



(a) Taking BCDE as the base of the solid, draw a proportionately well labeled and dimensioned solid that can be made from the net. (2 marks)

(b) Name the solid arising from the net. (1 mark)

(c) Using the sketch, calculate;

i) the angle between line CF and the plane BCDE. (3 marks)

ii) the angle between lines BD and DF (3 marks)

(iii) the angle between the planes BCDE and CDFA (1 mark)