Name: ………………………………………………………………… Index no ……..…...................................

School: ………………………………………………………...…. Candidate's sign ……………………....

Date: …………………………………………………………………

121/2
MATHEMATICS
PAPER 2
JULY/AUGUST 2011
TIME: 2 ½ HOURS

MUMIAS DISTRICT JOINT EVALUATION EXAM

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

Mathematics
Paper 2

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.*
- *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.*

FOR EXAMINER'S 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									

TOTAL MARKS | |

This paper consists of 12 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.

1. Simplify the expression $\frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}}$ giving your answer in the form of $a+b\sqrt{c}$. (3mks)

2. The diameter of circle has its ends with co-ordinates A (6,10) and B(0,2). Determine the equation of the circle giving your answer in the form of $x^2+y^2+ax+by+c=0$. (3mks)

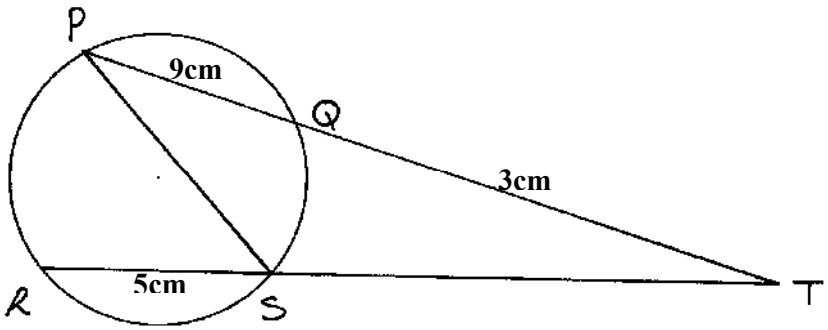
3. Find the limits within which the area of a parallelogram whose base is 8cm and height is 5cm lies. Hence find the relative error in the area. (4mks)

4. Make y the subject of the formula.

$2a = \sqrt{\frac{b-2a}{y} + b}$ (3mks)

5. Given that the matrix $\begin{pmatrix} 4 & k-6 \\ 8 & 6 \end{pmatrix}$ is a singular matrix, find the value of k. (2mks)

6. In the circle below, two chords PQ and RS intersect externally at T. Find the length of TS if QT=3cm and RS=5cm and PQ=9cm. (3mks)



7. Expand $(x-{}^{1}/_{2x})^{6}$ upto the fourth term and state its constant term, hence use the first four terms to solve $(9.95)^{6}$ to (4 s.f) (4mks)

8. State the nature of the turning points of the curve.
$y=x^3+6x^2-15x+24$ (4mks)

9. Town X is east of town Y where town Y is (15^{o}N, 3^{o}W). The local time at X is 2.00pm when the local time at Y is 4.00pm. Find the position of town X. (4mks)

10. Given that 9x2+36x-40+k is a perfect square, find the value of k. (3mks)

11. Solve for θ for-90≤ θ≤ 180o in the equation $3\sin^2 \theta - 1 = 2\sin \theta$. (3mks)

12. The probability that a healthy animal being brought into contact with an infecting agent and gets the germ is 0.80. The probability that an animal infected with germs develops the disease is 0.90. The probability that an animal which has developed the disease will survive is 0.75. What is the probability that a healthy animal brought into contact with the infecting agent will die? (3mks)

13. OA=3i+4j-6k and OB=2i+3j+k. P divides a line AB in the ratio 3:-2. Write down the co-ordinates of P. (3mks)

14. Evaluate using logarithms. $\sqrt{\frac{\text{Tan}80^{o}}{76.8\text{X}0.7034}}$ (3mks)

15. A contractor employs 40 men to do a piece of work in 60 days each man working 9 hours a day. He is then requested to do the job in 48 days. How many more men working 10 hours a day does he need to employ. (4mks)

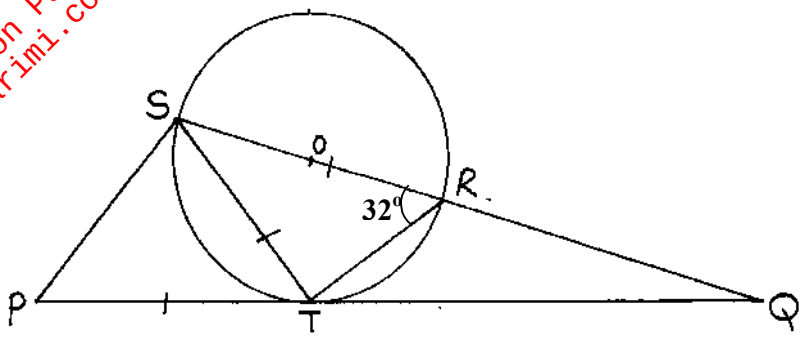
16. Find the number of terms in the series

a+3a+9a+……+243a . (3mks)

SECTION II (50MARKS)

Answer only five questions in this section.

17. In the figure below O is the centre of the circle and PTQ is the tangent at T. If PT=ST and angle SRT=52^o. Determine the size of the angles below giving reasons:



(a) PTS (2mks)

(b) RTQ (2mks)

(c) TSR (2mks)

(d) TQR (2mks)

(e) PSQ (2mks)

18. A transporter wishes to transfer 1000 bags of sugar to a go-down. He has two types of lorries to use, FTR with capacity of 80 bags and a canter with the capacity 20bags. The canter has to make at most twice as many trips as the FTR makes. The total number of trips made by both lorries must be less than 30, and the canter has to make more than 10 trip.

(a) Write down all the possible inequalities to represent this information.
(Take trips made by FTR be x and trips made by canter be y) (4mks)

(b) Represent the information above on the graph provided. (3mks)

(c) If the FTR uses Ksh.1800 worth of fuel per trip, estimate the maximum amount that can be spent on fueling the lorries. (3mks)

19. Three hundred and sixty litres of a homogeneous paint is made by mixing three paints A, B, and C. The ratio by volume of paint A to paint B is 3:2 and paint B to paint C is 1:2. Paint A costs sh. 180 per litre, paint B sh. 240 per litrre and paint C sh. 127.50 per litre. Determine:

(a) The volume of each type of paint in the mixture. (5mks)

(b) The amount of money spent in making one litre of the mixture. (3mks)

(c) The percentage profit made by selling the mixture at sh.221 per litre. (2mks)

20. (a) Complete the table below giving your values correct to 2decimal places. (2mks)

x	0^o	15^o	30^o	45^o	60^o	75^o	90^o	105^o	120^o
3 cos x^o	3.00		2.60		1.50	0.78	0	-0.75	
4 sin(2x-10)^o	-0.69	1.37		3.94	3.76		0.69		-3.00

(b) Taking 1cm to represent 15^o on the x-axis and 2cm to represent 1 unit on the y-axis. Draw the graphs of y = 3 Cos x and y = 4 Sin (2x-10) on the same set of axes on the grid provided. (4mks)

(c) Use your graph to find the values of x for which 3cosx-4sin(2x-10^o)=0 (2mks)

(d) State (i) the amplitude of the graph y = 3 Cos x. (1mk)

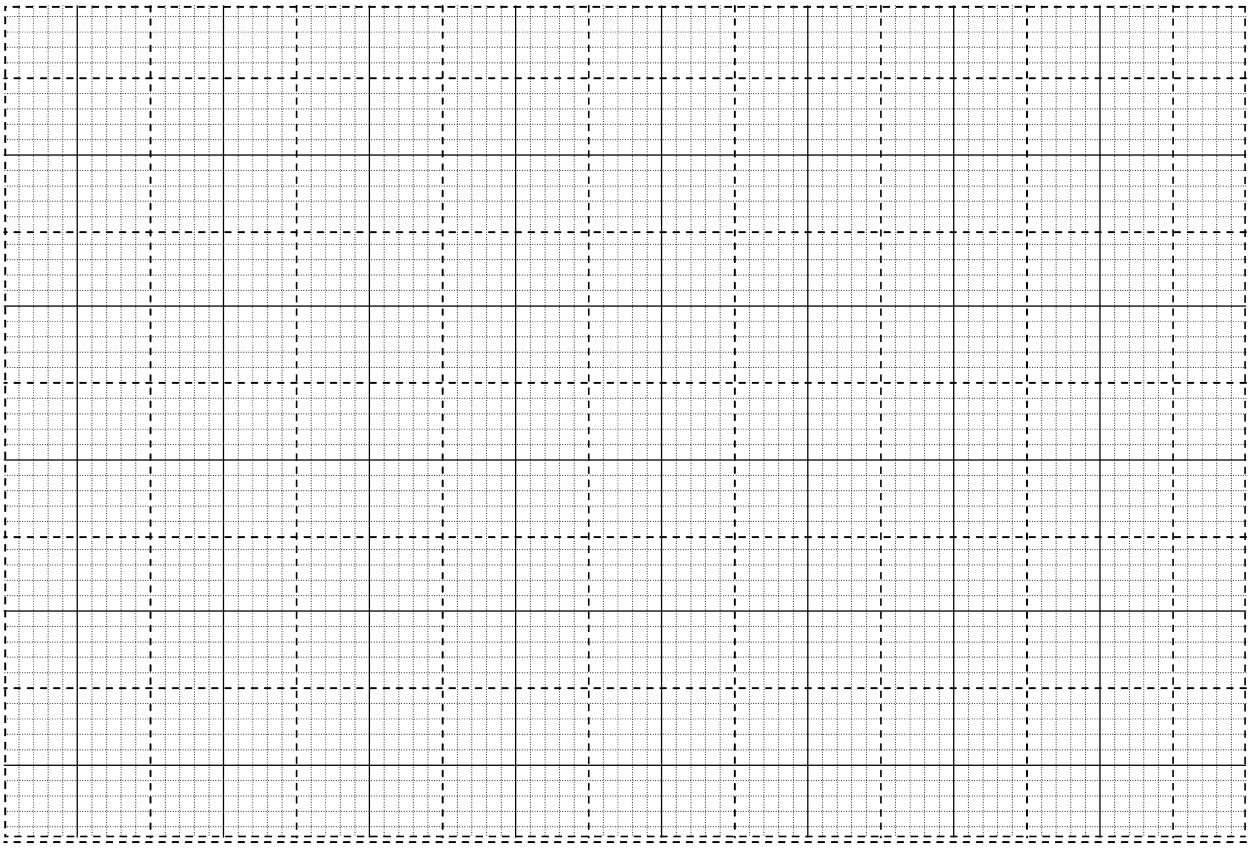
(ii) the period of the graph y = 4sin(2x-10^o) (1mk)

21. The table below shows marks obtained by students in a mathematics mock paper.

Marks	10-14	15-19	20-24	25-29	30-34	35-39	40-44
No of students	8	12	18	20	15	4	3

(a) Calculate the median mark. (3mks)

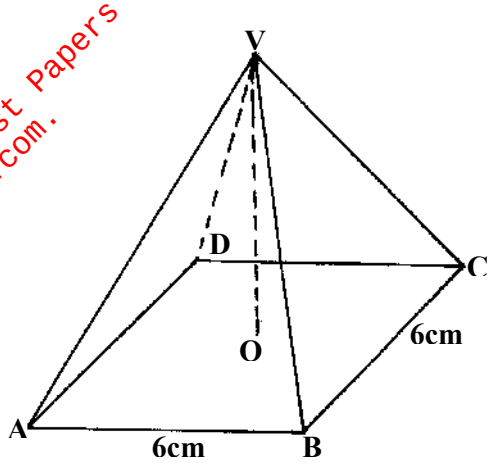
(b) On the grid provided draw an ogive and estimate the:



(i) Semi-inter quartile range (5mks)

(ii) 8^{th} decile (2mks)

22. The figure below is a square based pyramid ABCDV with AD=DC=6cm, and height VO=10cm.



(a) State the projection of VA on the base ABCD. (1mk)

(b) Find:

(i) The length of VA (3mks)

(ii) The angle between VA and ABCD (2mks)

(iii) The angle between VDC and ABCD. (2mks)

(iv) Volume of the pyramid. (2mks)

23. A particle P moves in a straight line so that its velocity, Vm/s at time t seconds where $t \geq 0$ is given by $V=28 + t - 2t^2$.

Find;

(a) The time when P is instantaneously at rest. (2mks)

(b) The speed of P at the instant when the acceleration of P is zero. (3mks)

(c) Given that P passes through the point O of the line when t = 0.

(i) Find the distance of P from O when P is instantaneously at rest (3mks)

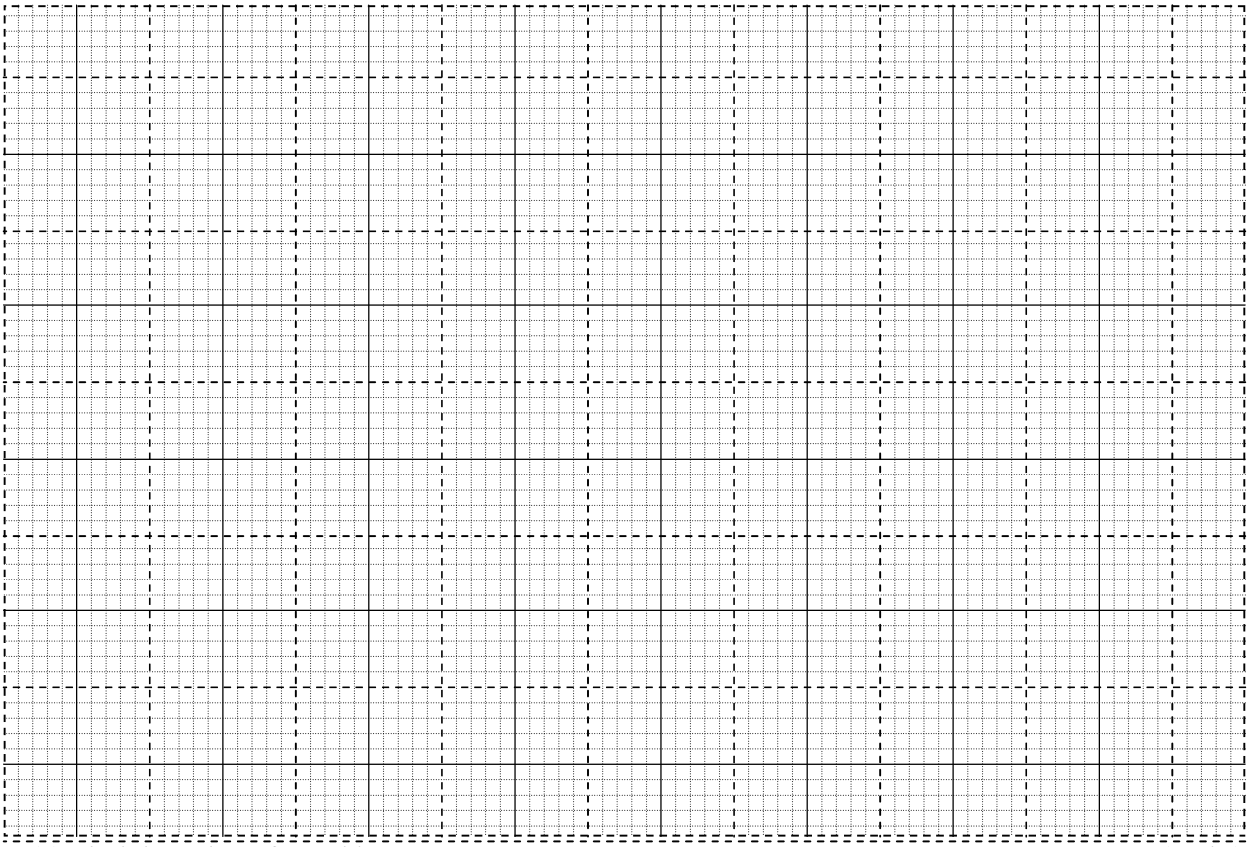
(ii) Find the distance covered by the particle during the 3rd second. (2mks)

24. The two variable P and Q are connected by $Q=K(a^p)$ and the table of values of P and Q is given below.

P	0	1	2	3	4	5	6	7	8
Q	600	606	612	618	624	631	637	643	650

(a) Write the equation $Q=K(a^p)$ in the form $y = mx + c$. (1mk)

(b) Draw the linear graph. (5mks)



(c) Find the value of a and k. (3mks)

(d) Write the equation connecting Q and p. (1mk)