NAME…… INDEX NO……..

SCHOOL…….. SIGN……

DATE……..

121/2
MATHEMATICS ALT. A
PAPER 2
JULY/AUGUST 2012
TIME 2 ½ HOURS

MARAKWET WEST DISTRICT JOINT EVALUATION TEST– 2012(MAWESSE)

Kenya National Examination Council (K.C.S.E)

121/2
MATHEMATICS ALT. A
PAPER 2
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

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.

SECTION I (50 MKS)
Answer all the questions

1. Use logarithms only to evaluate (4mks)

$$\sqrt[3]{\frac{3\log 7.2}{\cos 50^0}}$$

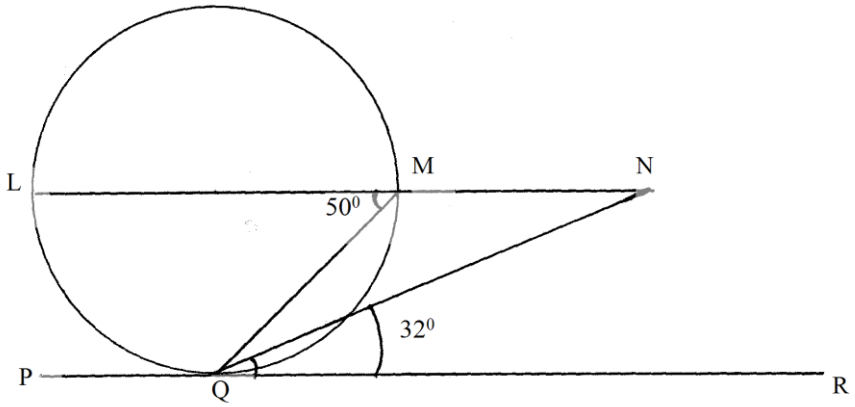
2. A shamba is in the shape of a parallelogram with the lengths of the adjacent sides being 12cm and 15cm.
If the area of the parallelogram is $72cm^2$, find the angle between these two sides. (3mks)

3. Solve for t given that 28cm(3t)-100 for $90^0 \leq t \leq 360^0$ (3mks)

4. Make x the subject of the formula (3mks)

$$P = 2t\sqrt{\frac{x}{3x-4}}$$

5. In the figure below LM is a diameter of the circle and LMN is a straight line. The line PQR is a tangent to the circle at Q.Angle NQR=32^0 and angle QML =50^0.



Calculate

(a) angle MQN (2mks)

(b) angle QNM (1mk)

6. Expand $\left(1+\frac{3}{x}\right)^5$ upto the fifth term (2mks)

Hence use your expansion to evaluate (2.5)5 to 3dp (2mks)

7. Find the equation of the normal to the curve $y=2x^2+3x+4$ at $x=2$ (3mks)

8. Find the percentage error in calculating the volume of a sphere radius 4.9cm. (3mks)

9. Mama Jeru deposited sh.1850 for 18 months at an interest rate of 16% p.a compounded half yearly.
How much interest did she pay at the end of the of the period? (3mks)

10. Find the equation of the locus of all points equidistant from P and Q where P(6,9) and Q(0,-5) (3mks)

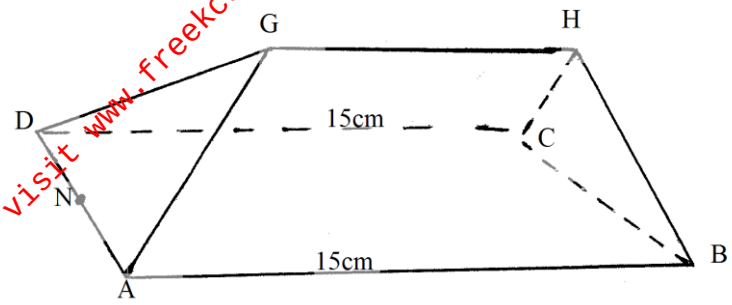
11. Simplify by rationaling the denominator leaving your answer in surd form. (3mks)

$$\frac{1}{\sqrt{2}-1}-\frac{\sqrt{2}}{\sqrt{2}+1}$$

12. The position vector of A and B are $\underset{\sim}{a}=4j+4j-6k$ and $\underset{\sim}{b}$ =10i+4j+12k.Dis a point on AB such that AD:DB is 2:1.
Find the co-ordinates of D.

13. Find the area of the region enclosed by the curve y=x-6 and the line x=-1 and x-2. (3mks)

14. In the fig.ABCDGH is a rectangular based wedge with AD=6cm and CD=15cm.The midpoint of AD is N and DG =GA=BH=HC =9cm.If GH =7cm, calculate the angle between planes ADG and the base ABCD. (3mks)



15. Avariable u is partly constant and partly as the square of t. When t=2,u=0 and when t=1,u=3.Find
(a) the law connecting u and t. (3mks)

(b) the value of u when $t=\frac{1}{4}$ (1mk)

16. An equilateral triangle of sides 9cm is completely enclosed in a circle of radius rcm.Find the least value of r. (2mks)

SECTION II (50 MARKS)
Answer only five questions

17. A cattle dip is 150cm wide and 12m long. The depth of the water increases uniformly from a shallow end of 60cm to a maximum of 6m.

(a) Find the volume of water that can be held by the full dip in litres (5mks)

(b) If the dip is drained by a pipe of radius 15cm at the rate of 6m/l, how long will it take to drain a full dip? (5mks)

18. R1 denotes reflection along line x=14.R2 denotes reflection along line x =2.T denote translation vector $\begin{pmatrix} -1 \\ 2 \end{pmatrix}$

A triangle ABC has vertices A (6,4), B (3,4) and C (3,6)

(a) Show the image $A^1B^1C^1$ under R^1 (2mks)

(b) Find and draw $A^{11}B^{11}C^{11}$ the image of $A^1B^1C^1$ under R^2. (3mks)

(c) Find and draw $A^{111}B^{111}C^{111}$ the image of $A^{11}B^{11}C^{11}$ under T. (3mks)

(d) Describe a single transformation which maps the object onto the final image. (2mks)

19. The probability that a pupil goes to school by a boda-boda is $\frac{2}{3}$ and by a matatu is ¼ .If he uses a boda-boda the probability that he is late to school is $\frac{2}{5}$ and if he uses a matatu the probability of being late is $\frac{3}{10}$. If he use other means of transport the probability of being late is $\frac{3}{20}$.

(a) Draw a tree diagram to represent this information. (3mks)

(b) Find the probability that he will be late for school. (3mks)

(c) Find the probability that he will be late for school if he does not use a matatu. (2mks)

(d) What is the probability that the will not be late to school (2mks)

20. (a) Fill the table below and use it to draw the graph of y=2cos $(\theta - 30^0)$ for $0^0 \le \theta \le 360^0$.

θ	0^0	30^0	60^0	90^0	120^0	150^0	180^0	210^0	240^0	270^0	300^0	330^0	360^0
θ-30^0			30^0			120^0			210^0		270^0		330^0
Cos(θ-30^0)		1			0	-0.5		-1			0		
y=2cos(θ-30)					0		-		-1.732		0	1	

(b) State the amplitude and period of the graph (2mks)

(c) Use your graph to solve the equation cos $(\theta - 30^0)$=0.25 (2mks)

21. A plane flies from airport x(60^0S,30^0E) due North to airport Y.(30^0N,30^0E) at 180knots. After 20 minutes stop over for fueling at Y, the plane flew due wet to an airport Z(30^0N,15^0E) at the same speed.

(a) (i) Calculate the total distance covered by the plane in nautical miles (4mks)

(ii) Calculate the total time taken to complete the journey from X through Y to Z. (4mks)

(b) From a certain latitude a plane is first visible over the north pole. The plane is flying at a height of 800km above the North Pole, calculate the latitude angle (2mks) (R=6370km)

23. Without using a et square or a protractor

(a) Construct a horizontal line AB, 6cm long and triangle ABC such that $<ABX=30^0$ and line AB =10cm. (3mks)

(b) Construct a perpendicular from a to meet BC produced at N.
Measure CN. (3mks)

(c) Construct triangle A^1BC such that the area of triangleA^1BC is three quarters of triangle ABC and A^1 is on the same side of BC as A and lies on AB.measure A^1B. (4mks)

23. The marks obtained by 50 candidates in an examination were recorded as shown

Marks	0-9	10-19	20-29	30-39	40-49	50-59	60-69
No of candidates	4	10	12	9	8	5	2

Draw a cumulative frequency curve hence use your graph to estimate

(a) the median (1mk)

(b) the quartile deviation (2mks)

(c) the percentage of candidate failing if 25 marks is the pass mark (2mks)

(d) the range of marks scored by the middle 60% of he candidates (2mks)

24. (a) Claire earns sh.15,900 p.m and gets a tax relief of sh.7,200 p.a.How much should she pay as income tax p.m if taxation rates are as shown below.

Income (K£)p.a	Rate 9Ksh(per k£)
1-4512	2
4513-9024	3
9025-13536	4
13537 and above	5

(4mks)

(b) Mr.Mutuku earns sh.15,500 p.m .He is housed by his employer and pay a rent of sh.1200 per month for taxation purposes his taxable income is raised by 155.If he gets tax relief of sh.720 per month calculate his P.A.Y.E (6mks)