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

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

Date: ……………………………………….…

121/1
MATHEMATICS
PAPER 1
JULY/AUGUST 2011
TIME: 2 ½ HOURS

NYAMIRA DISTRICT JOINT EVALUATION TEST

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

Mathematics
Paper 1

INSTRUCTIONS TO CANDIDATES:

- *Write your **name**, **index numbe**r , **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.*
- *Marks may be given for correct working even if the answer is wrong.*
- *Non programmable silent electronic calculators and KNEC mathematical table may be used, except where stated otherwise.*

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 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)

1. Evaluate without using tables or calculators

   $\dfrac{0.11 \times 0.29 \times 72.25}{0.55 \times 5.8 \times 1.7}$ (3mks)

2. Find the L.C.M of the following number, $18, 12x^2P, 3P^3$ (3mks)

3. Solve the equation $(\log x)^2 - \log x - 2 = 0$ (3mks)

4. The interior angle of a regular polygon is 9 times the exterior angle. How many sides does the polygon have?   (3mks)

5.	Simplify the expression	$\dfrac{x^2 + 3x + 2}{x^2 - 1}$	(2mks)

6.	Find the equation of the tangent to the curve $y = 3x^2 - 2x + 5$ at the point where $x = 2$	(4mks)

7.	Find all solutions between 0° and 180° of the equation, $4 \cos 2\theta + 3 = 0$	(4mks)

8.	The diagram below shows an isosceles right-angle triangle. Construct the locus of P, for which $\angle APB = 45^o$	(2mks)

9. Let $x = \dfrac{8}{3 - \sqrt{5}}$

Write x in the form $a + b\sqrt{5}$ where a and b are integers. (2mks)

10. The height of a cylinder is 10cm and its radius is 20cm, where both figures are given to the nearest cm. Taking $\pi = 3.142$, find the least possible volume of the cylinder. (3mks)

11. Find the equation of the image of the line $y = 3x + 5$ under reflection in the line $x = y$ (3mks)

12. In the diagram below, O is the centre of the circle of radius 5.0cm. If the area of the shaded region is $26.5cm^2$, calculate the area of the major segment cut off by the chord AB. (4mks)
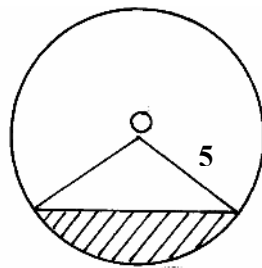
13. If Tan A = ¾, show that $Cos^2 A + Sin^2 A = 1$ (3mks)

14. Arrange the following fractions in descending order (3mks)

$$\frac{7}{12}, \frac{9}{16}, \frac{1}{20}, \frac{5}{18}$$

15. During a certain ceremony, goats and chicken were slaughtered. The number of heads for both goats and chicken was 45. The total number of legs was 100. Determine the exact number of goats and chicken slaughtered. (4mks)

16. Find all the intergral values of x which satisfy the inequalities (4mks)
    x + 11 > 4x – 9 ≥ 2 (2 – x)

17. A bag contains 8 red balls and 6 blue balls. All identical in size and shape. Kemunto selected 3 balls at random without replacement.

(a) Draw a tree diagram to represent this information. (2mks)

(b) Calculate the probability that she chooses;
(i) Two blue balls and one red ball. (2mks)

(ii) Two red balls and one blue ball (2mks)

(iii) At least one blue ball (2mks)

(iv) Three balls of the same colour. (2mks)

18. (a) Complete the table below

x	0°	30°	60°	90°	120°	150°	180°	210°	240°
Sin x	0	0.5		1			0	-0.5	
3 sin ¾ x	0				3				0

(b) Sketch the graph of y = sin x and y = 3 sin ¾ x for 0° ≤ x ≤ 240°   (2mks)

(c) Use your graph to solve the equation sin x = 3 sin ¾ x in this range.

(d) State the amplitude and period of 3 sins ¾ x   (2mks)

(e) Describe the transformations which take y = sin x to y = 3 sin ¾ x.

19. The table below shows the tax levied at different rates for different level of income.

Monthly taxable pay (shs)	Rate of tax
1 – 9680	10%
9680 – 18800	15%
18801 – 27920	20%
27921 – 37040	25%
Over 37040	30%

Relief: Every taxpayer receives a tax relief of sh. 1096 per month.

a) Madeline has a monthly salary of sh. 26,000. She is provide with a house at a nominal rent of sh. 800 per month. The value of the house is calculate as 15% of her salary, less the rent

(i) Find her taxable income. (2mks)

(ii) The amount of tax she pays. (4mks)

b) A man invests Ksh. 10,000 in an account which pays 16% interest p.a. The interest is compound quarterly. Find the amount in the account after 1 ½ years. (4mks)

20. (a) A racing cyclist completes, the uphill section of a mountain course of 75 km at an average speed of V km/hr. He then returns downhill along the same route at an average speed of (v + 20)km/h. Given that the difference between the timer is one hour, form and solve an equation in V. Hence

(i) Find the total time taken to complete the uphill and the down hill sections of the course. (4mks)

(ii) Calculate the cyclist's average speed over the 150km (1mk)

(b) A train moving at an average speed of 72km/hr takes 15 seconds to complete cross a bridge that is 80m long.

(i) Express 72km/hr in metres per second. (2mks)

(ii) Find the length of the train in metres. (3mks)

21.   (a) The angle of elevation of the top of a tree from a point P on the horizontal ground is 24.5°. From another point Q, five metres nearer to the base of the tree, the angle of elevation of the top of the tree is 33.2°. Calculate to one decimal place the height of the tree.   (4mks)

(b) A Town P is 200 km East of Q. Town R is at a distance of 80km on a bearing of 049° from P. Town S is due west of R and due North of Q. By scale drawing, determine the bearing of S from P.   (6mks)

22. (a) Using a ruler and a pair of compasses only construct triangle ABC in which BC = 6cm, AB = 8.8
    angle $\angle ABC = 22 \frac{1}{2}°$ (4mks)
    (b) Measure AC and angle $\angle ACB$ (2mks)
    (c) Construct a circle that passes through A, B and C (3mks)
    (d) What is the radius of this circle? (1mk)

23. A particle moves in straight line so that t seconds after passing a fixed point in the line, its velocity V m/s is given by $V = \frac{1}{2}t^2 - 3t + 7$. Calculate;

a) The velocity after 8 seconds. (2mks)

b) The acceleration when $t = 0$ (2mks)

c) The minimum velocity (2mks)

d) The distance traveled in the 1st two seconds of motion. (2mks)

e) The distance traveled in the third second. (2mks)

24.   Momanyi bought a second hand car and later sold it through a sales agent who charged 7 ½ % commission on the price of the car. He received sh. 222,000 from the agent after the latter had deducted his commission. Momanyi incurred a loss of 25%. On the price at which he had bought the car.

a) Calculate the price at which the agent sold the car.   (3mks)

b) Find the price at which Momanyi had bought the car.   (2mks)

c) If the amount Momanyi paid for the car was 26 % less that the price of the new car, calculate the price of the new car.   (3mks)

d) Express as percentage the amount Momanyi received for his car to its price when New. (2mks)