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

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

Date: ………….……………………………………………

121/1
MATHEMATICS
PAPER 1
JULY/AUGUST 2011
TIME: 2½ HOURS

RACHUONYO SOUTH DISTRICT JOINT EVALUATION TEST

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

Mathematics
Paper 1

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.*
- *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 11 printed pages. Candidates should check to ascertain that all papers are printed as indicated and that no questions are missing

SECTION I
Answer all questions in the spaces provided.

1.   Without use of mathematical tables or calculators evaluate.   (3mks)

$$\sqrt{\frac{297}{0.11 \times 0.03}}$$

2   If log 2 = 0.30103 and log 3 = 0.47712, find the logarithm of 36 without using tables or a calculator.
                                                                                                (3mks)

3.   The vertices of a triangle are A (1,1) B (5,12) and C (4,5). Find the area of the triangle.   (3mks)

4.   A map is drawn to a scale of 1:200,000 what is the area in Km^2 represented by a rectangle
      measuring 4.5cm by 3.5 cm   (3mks)

5.   Under an enlargement the images of the points A (3,1) and B (1,2) are A^1 (3,7) and B^1 (7,5).
      Find the centre and the scale factor of the enlargement.   (2mks)

6.   Find the equation of the line which passes through the point of intersection of the lines y + 2x =8
      and 2y-x =6 and the point (4,3)   (4mks)

7. By using the substitution $y=3^x$ or otherwise solve $9^{x+1} - 3x = 3^{x+3} - 3$ (4mks)

8 The angle of elevation of the top of a building from a boy 1.2 metres tall is 30°. If the boy is 10 meteres from the building, calculate the height of the building. (3mks)

9. When a shopkeeper sells articles at sh. 24.05 each, he makes a 30% profit on the Cost price. During a sale he reduces the price of each article to sh.22.95. Calculate the percentage profit on an article sold at the sale price. (4mks)

10. Given that $(x +a)(x+3) = x^2 + bx + 12$, for all values of x, find
    (i) a (2mks)

    (ii) b (1mk)

11. Express $3.24\overset{\bullet\bullet}{24}$………as a fraction in its simplest form (2mks)

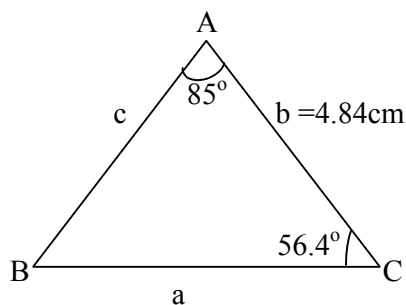12. Simply $\dfrac{2(x^2 - 36)}{2x^2 - 7x - 30} \div \dfrac{x - 4}{2x +5}$ (3mks)

13. Solve the simultaneous equations. (4mks)

$$\frac{P}{q+1} = \frac{1}{4}, \quad \frac{p-3}{p+q} = \frac{2}{3}$$

14. In the triangle ABC below < A = 85° , < C = 56.4^o b = 4.84 cm
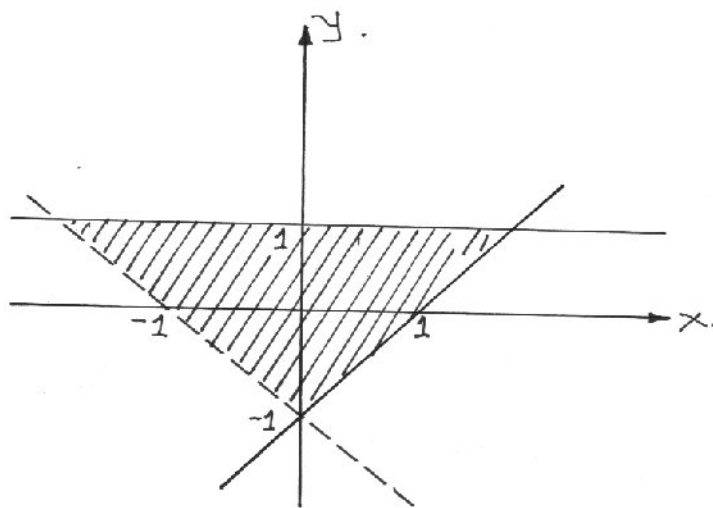

Calculate

(a) the length of **a** (2mks)

(b) the length of **c** (1mk)

15. Naomi and Mooney live 40km a part Naomi starts from her home at 8.00 a.m and cycles towards Mooney's house at 16 km/hr. At 8.30 a.m, Mooney starts from her home and cycles at 8km/h towards Naomi's. At what time and spot do they meet? (3mks)
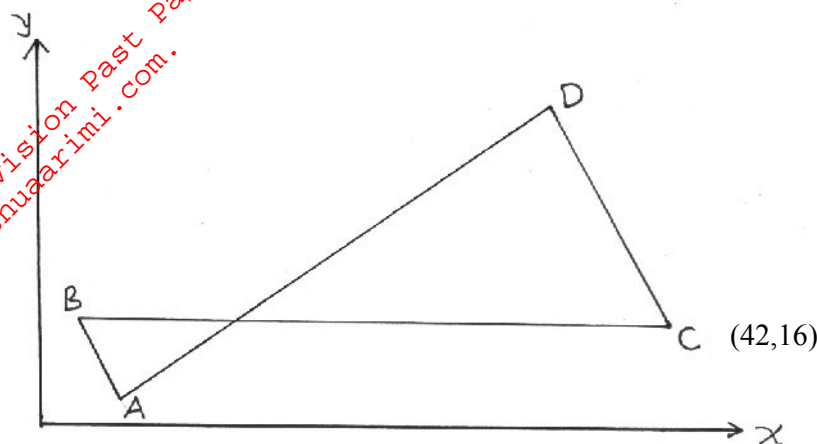
16. Find the inequalities that define the shaded region in the diagram below. (3mks)

SECTION II (50 MARKS)
Answer only five questions in this section.

17.

In the diagram above, A is the point (10,1) and $\underset{\sim}{AB} = \begin{bmatrix} -8 \\ 15 \end{bmatrix}$

(a) Find

 (i) $|\underset{\sim}{AB}|$ (1mk)

(ii) The coordinates of B (2mks)

(b) The point C is (42,16) and $\underset{\sim}{CD} = 3 \underset{\sim}{AB}$. Find
 (i) The vector CD. (1mk)

 (ii) The coordinates of D (2mks)

(c) The point E is (K,16),
 (i) Find, in terms of k, the vector AE (1mk)

 (ii) Given that AED is a straight line find k (3mks)

18. (a) A ladder 10m long leans against a wall and makes an angle of 60° with the horizontal line.
    (i) How high up the wall does the ladder reach?   (2mks)

    (ii) How far from the wall is the foot of the ladder?   (2mks)

    (iii) State the angle of depression of the ladder?   (1mk)

    (b) A vertical post AB casts a shadow of 12 metres.
    (i) When the angle of elevation of the sun is 53o. Find the height of the post above the
        ground.   (2mks)

    (ii) Find the direct distance from the tip of the post to the tip of the shadow using Pythagoras theorem
         correct to 2 significant figures.   (3mks)

19. Two business partners Paul and Jerry contributed Ksh. 112,000 and Ksh 128,000 respectively to start a business. They agreed to share their profits as follows:

35% to be shared equally
25% to be shared in the ratio of their respective contributions, and 40% to be retained for the running of the business.
If their profits for the whole year was Ksh. 864,000, Calculate

(a) The amount each received. (7mks)

(b) The amount retained fort he business. (1mk)

(c) Their percentage profit for the whole year (2mks)

20	(a) Express as a single fraction in its simplest form $\dfrac{200}{x} - \dfrac{200}{x+4}$	(2mks)

(b) When driven in town, a car runs x km on each litre of petrol.
   (i) Find, in terms of x, the number of litres of petrol used when the car is driven 200km
       in town.	(1mk)

   (ii) When driven out of town, the car runs x+ 4 km on each litre of petrol. It uses 5 litres less petrol
        to go 200km out of town than to go the same distance in town. Use this information to write
        down an equation involving x, and show that it simplifies to $x^2 + 4x - 160 = 0$	(3mks)

 (c) Solve the equation $x^2 + 4x - 160 = 0$	(3mks)

   (d) Calculate the total volume of the petrol when the car is driven 40km in town.	(1mk)

21. A closed container is made by joining together a cylinder of radius 9 cm and a hemisphere of radius 9 cm, as shown in the figure below. The Length of the cylinder is 18cm. The container rests on a horizontal surface and is exactly half full of water.

18cm
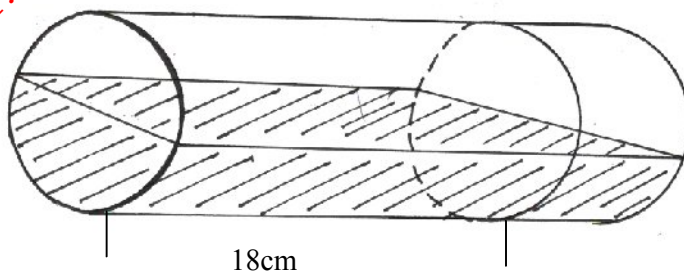
(a) Calculate the surface area of the inside of the container that is in contact with the water.   (4mks)

(b) The Container is held with its axis vertical, the hemisphere being at the bottom as shown in the diagram below.
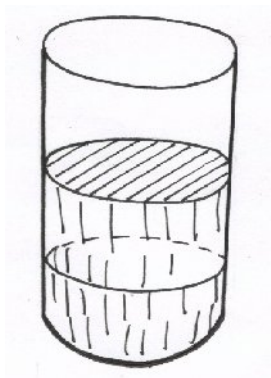
    Calculate the depth of the water.   (4mks)

(c) The container above turned upside down. Find the new depth of the water.   (2mks)

22.   Under a translation T, the image of a triangle A B C is $A^1B^1C^1$ and A (1,2), B (-1,1) A^1 (2,1) and C^1 (1,-2)

(a) Find the vector describing T and the coordinates of B^1 and C   (4mks)

(b) Find the coordinates of $A^{11}B^{11} C^{11}$, the image of $A^1B^1C^1$ under a reflection in the
line x+ y = 2   (6mks)

23.   The table below shows the marks scored by 40 students in a test.

Marks	10-19	20-24	25-29	30-34	35-39	40-49
Frequency	3	4	7	10	9	7

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

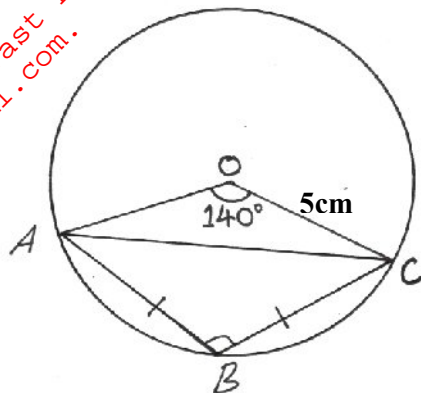(b) Calculate the median mark   (3mks)

(c) Calculate the standard deviation.   (4mks)

24.   In the figure below, not drawn to scale, O is the centre of the circle , AB=BC and are chords,
       AC is also a chord OC= 5cm.

(a) (i) Determine the value of angle ABC   (2mks)

(ii) Calculate the length of BC   (5mks)

(b) Determine the are of the quadrilateral ABCD   (3mks)