Name……... **Index No** ……...

Candidate's Signature …….

Date: ……...

121/2
MATHEMATICS
PAPER 2
JULY/AUGUST 2014
TIME: $2^1/_2$ HOURS

NYAMIRA SUB-COUNTY JOINT EVALUATION EXAM

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

121/2
Mathematics
Paper 2
2 ½ hours

INSTRUCTIONS TO THE CANDIDATES

- *Write **your name** and **index number** in the spaces provided above*
- *This paper contains two sections; **Section** 1 and **Section 11**.*
- *Answer all the questions in **section 1** and only **five** questions from **Section 11***
- *All workings and answers 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 **EXCEPT** where stated otherwise*
- *Show all the steps in your calculations, giving your answers at each stage in the spaces below each question.*

FOR EXAMINERS'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 1I

Question	17	18	19	20	21	22	23	24	**Total**
Marks									

GRAND TOTAL

This paper consists of 15 printed pages. Candidates should check carefully to ascertain that all the pages are printed as indicated and no questions are missing.

SECTION I (50 MARKS).

Answer All Questions from this section in the spaces provided

1. Without using a calculator or mathematical table evaluate (3mks)

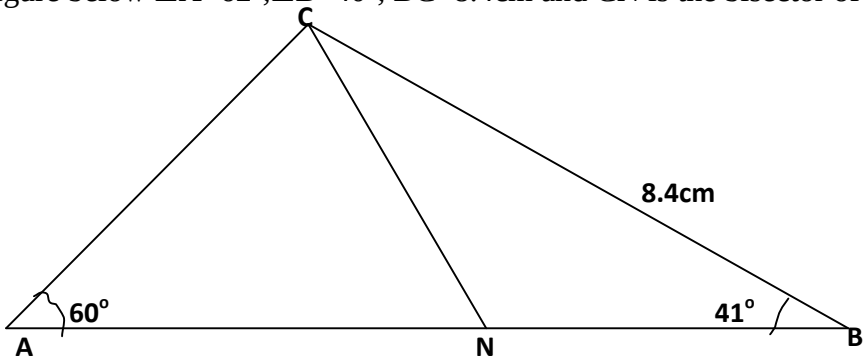
$$\frac{1}{3}of\left(2\frac{3}{4}-5\frac{1}{2}\right)x3\frac{6}{7}\div\frac{9}{4}$$

2. The interior angle of a regular polygon is 162o. determine the sum of all interior angles of the polygon (3mks)

3. Simplify $\dfrac{2x-2}{6x^2-x-12}\div\dfrac{x-1}{2x-3}$ (3mks)

4. Mogaka invested Ksh.32,000 in a bank compounded quarterly at a rate of 20% p.a. another person invested sh. 40,000 compounded semi-annually at a rate of 12% p.a. after how long will the amount be equal for both of them. Leave your answer to one decimal place (4mks)

5. The figure below $\angle A=62^o$,$\angle B=40^o$, BC=8.4cm and CN is the bisector of $\angle ACB$



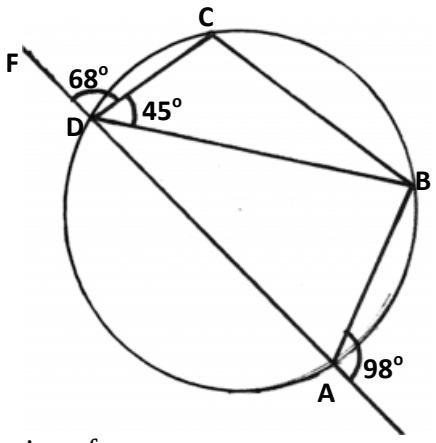
Calculate the length of CN to 1 decimal place (3mks)

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

$$v = m\sqrt{\frac{a-x}{x}}$$

7. Expand $\left(1-\frac{3}{2}x\right)^6$ up to the term in x^3. Hence use the expansion to evaluate $(1.03)^6$

8. In the figure below ABCD is a cyclic quadrilateral and BD is a diagonal. EADF is a straight line. $\angle CDF=68^o$ $\angle BDC=45^o$ and $\angle BAE=98^o$



Calculate the size of

(a) $\angle ABD$ (2mks)

(b) $\angle CBD$ (2mks)

9. The first, the third and the seventh term of an increasing arithmetic progression are three consecutive terms of a geometric progression. If the first term of the arithmetic progression is 10, find the common difference of the arithmetic progression (3mks)

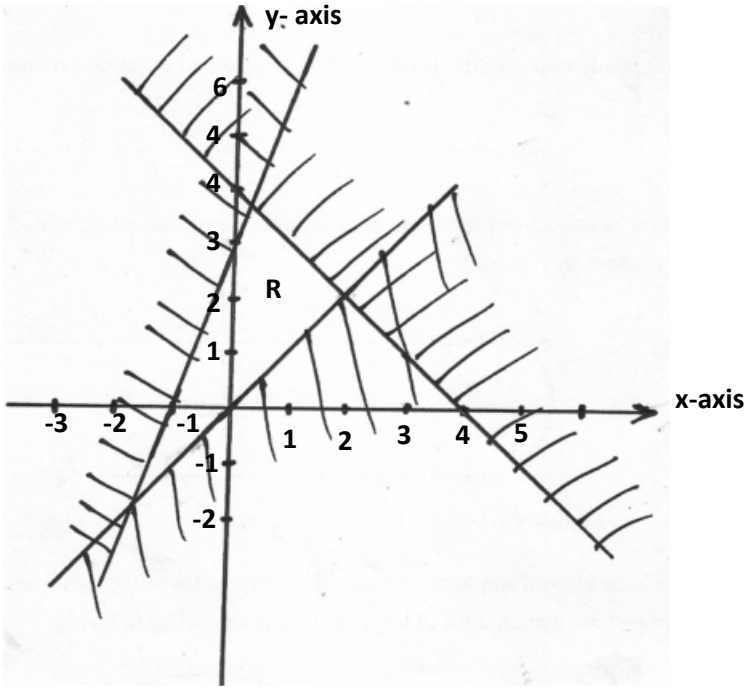
10. Simplify $\frac{3-\sqrt{7}}{3+\sqrt{7}} - \frac{\sqrt{7}}{3-\sqrt{7}}$ leaving your answer in the form $a+b\sqrt{7}$ where a and b are constants

(3mks)

11. Find the values of x in the equation (3mks)

$$\frac{243x3^{2x}}{729x3^{x} \div 3^{(2x-1)}} = 81$$

12. Form the three inequalities that satisfy the given region R

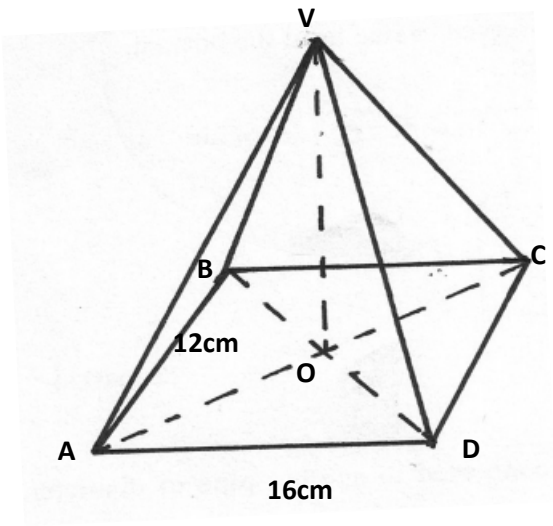


13 Find without using mathematical tables or a calculator the value of x which satisfy the equation

$\log_2(x^2-9) = 3\log_2 2 + 1$ (3mks)

14. The cost of 2 brands of coffee A and B per kilogram are 59.40 and Sh.72 respectively. The two brands are mixed in the ratio x:y and sold at a profit of 20% above the cost. If the selling price per kilogram mixture is Ksh.72. find the value of x and y (3mks)

15. The figure below represents a rectangular based pyramid VABCD. AB=12cm and AD=16cm. Point O vertically below V and VA=VC=VB=VD=26cm



Calculate the angle between edge VD and the base ABCD (3mks)

16. Exchange rates in a commercial bank were given as follows

	Buying	Selling
1 US dollar	Ksh.73	Ksh.75
2 sterling pound	Ksh.123	Ksh.126

Bosibori arrived from the US with 6300US dollars and exchanged the amount for Kenya shillings. She spent Ksh.146,090. She converted the rest of the monies into sterling pounds. Determine the amount he had in sterling pounds. Leave your answer to the nearest hundreds (3mks)

SECTION B (50 MARKS)

Answer any five questions from the section in the spaces.

17. The table below shows the distribution of marks of 40 candidates in a test

Marks	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100
Frequency	2	2	3	x	12	5	2	3	1	1

(a)(i) Find the value of x (1mk)

(ii) State the modal class (1mk)

(b)(i) Calculate the mediun (2mks)

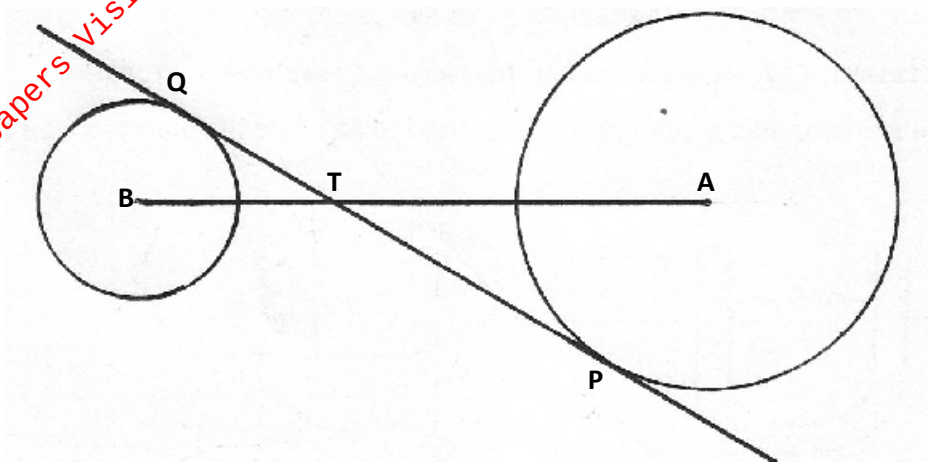
(ii) Using an assumed mean of 55.5 and $d = \frac{x - A}{10}$ find the actual mean (3mks)

(c) Calculate the standard deviation (3mks)

18. In the figure below A and B are centres of circles. PQ =12cm is an internal tangent, AB=15cm and the ratio of the radii is 2:3. Calculate

(a) The radii of the circles (4mks)

(b) AT and TQ (6mks)



19. Using mid-ordinates rules, estimate the area under the curve $y= \frac{1}{2} x^2-2$, using six strips between x=2 and x=8 and x-axis (5mks)

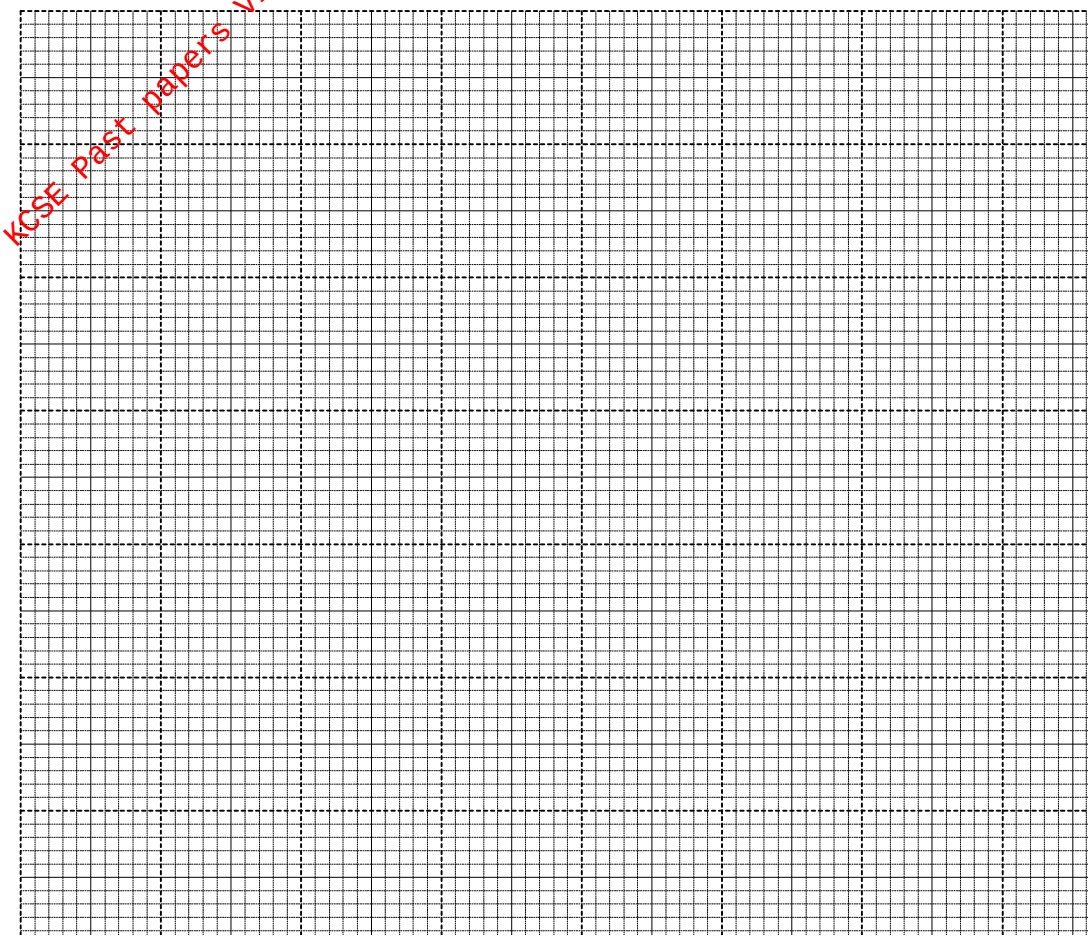
(b)(i) Use intergration to determine the exact area under the curve (3mks)

(ii) Find the percentage error in calculating the area using the mid-ordinate rules (2mks)

20. Two variables qualities x and y are believed to follow the rule $y=mx+nx^2$. The following table gives their corresponding values in an experiment.

x	1	2	3	4	5	6	7	8
y	6	8	6	0	-10	-24	-42	-64

(a) Use the given table and suitable straight line graph to find the value of the constants m and n (7mks)



(b) Use the graph to find the law connecting x and y (1mk)

© Hence calculate the value of y when x=3 ½ (2mks)

21. A cinema has seats for 400 people. The seats are in two catergories; A and B which are charged at Sh.200 and Sh.500 per show respectively. The number of catergory B booked per show does not exceed that of catergory A. for the hall expenses to be covered, atleast 70 category B seats must be booked and they must be more than quarter of the total number of seats booked.

(a) Write down inequalities other than $> < \geq 0$ and $y \geq 0$ to represent the conditions satisfied by the seats per show (4mks)

(b) Represent these inequalities on a graph (4mks)

(c) If the hall is charged at sh.45000 per day and the operator runs 3 shows per day, find the maximum possible profit in a day (2mks)

22. A plane leaves P(75°N, 30°E) and follows a longitude via the north pole flying at 300knots to Q it takes 10hrs to reach point Q

(a) Calculate

(i) The distance covered by the plane in nautical miles (1mk)

(ii) The position of Q (4mks)

(b) After spending 2 ours at Q, it then flies westwards to T which is 1360km west of Q, find

(i) the longitude of T (using R=6370km) to the nearest degree (3mks)

(ii) The local time at T when the local at T which the local time at Q is 5.30pm (2mks)

23. (a) A triangular garden ABC is such that AB=8cm ∠BAC=45o and ∠ABC=75o. Using an appropriate scale draw the garden using a ruler and a pair of compasses only (3mks)

(b) A water tap P is to be mounted in the garden that it is equal in distance from A,B and C. on the diagram in (a) above show the position of P (3mks)

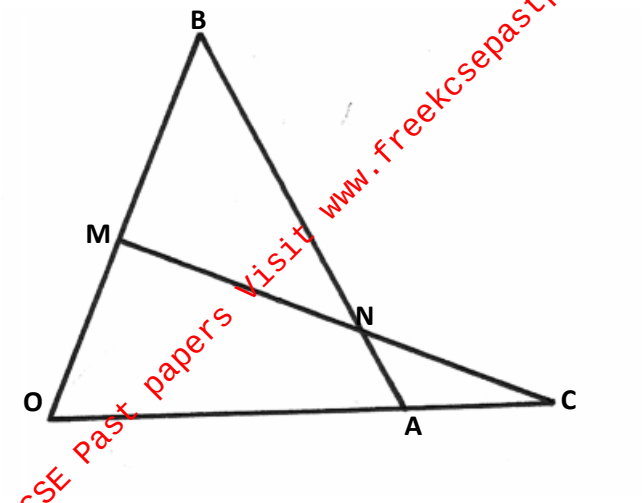
(c) A section of the plot is enclosed such that a region R is formed under the following conditions

(i) CR≥1.5cm (1mk)

(ii) R is more than 2m from line AB (1mk)

(iii) R is nearer to CB than CA. shade the region R (2mks)

24. In the triangle OAB below $\underset{\sim}{OA}=\underset{\sim}{a}$ $\underset{\sim}{OB}=\underset{\sim}{b}$ and OC= 3/2OA. M divides OB in the ratio 3:2



(a) Express in terms of a and b the vectors

(i) AB (1mk)

(ii) MC (1mk)

(b) Given that MN=hMC and BN=kBA, express vector MN in two different ways and hence find the values of h and k (6mks)

(c) Show that the points M,N and Care collinear (2mks)