NAME: ……………………………………………………………………… **INDEX NO:**……………………………………

SCHOOL: ……………………………………………………………………… **Candidate's signature:** ……………………

Date: ………………………………………………

121/2
MATHEMATICS
PAPER 2
July/August
2 ½ HOURS

LOWER YATTA DISTRICT JOINT EVALUATION EXAM - 2011

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

121/2
MATHEMATICS
PAPER 2
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INSTRUCTIONS TO CANDIDATES

(a) Write your name and index number in the spaces provided above.
(b) This paper consists of **TWO** sections. Section I and Section II .
(c) Answer **ALL** the questions in section I and only five questions from Section II.
(d) All answers and working must be written on the question paper in the spaces provided below each question.
(e) Show all the steps in your calculations, giving your answers at each stage in the spaces below each question.
(f) Marks may be given for correct working even if the answer is wrong.
(g) Non- programmable silent calculators and KNEC mathematical tables may be used except where stated otherwise.
(h) This paper consists 17 printed papers
(i) Candidates should check the question paper to ascertain that all the papers are printed as indicated and that no questions are missing.

FOR EXAMINERS ONLY

SECTION 1

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

 Turn Over

<u>SECTION I (50 MARKS)</u>
Answer <u>ALL</u> questions in this section

1. Evaluate without using logarithm tables or calculators.

   $3\log \quad + \log \quad - \log$ (3 Marks)

2. Solve the equation $2\sin \quad + 1 = 0$ for $0^o \leq \quad \leq 360^o$ (3 Marks)

3. Make x the subject of the formula.

   $N = \frac{}{\sqrt{}}$ (3 Marks)

4. The volume (v) of a cylinder varies jointly with its height (h) and the square of its radius (r). Calculate the percentage increase in volume ,v, when radius ,r, increases by 5% and height ,h, by 10%. (4 Marks)

5. a) Given that the circle whose equation is $x^2 + y^2 - 7x + 2y + c = 0$ passes through (7, 1). Find c. (1 Mark)

   b) Find also the centre and the radius of this circle. (3 Marks)

6. Expand $(1 + - x)^7$ upto the term in x^3. Use the expansion to expansion to estimate $(0.96)^7$ correct to 3 decimal places. (4 Marks)

7. Simplify the quadratic expression;

$$\frac{\qquad\qquad}{}$$ (3 Marks)

8. Draw a line AB = 7cm. Use a ruler and a pair of compasses only to construct, on the upper side, the locus of a point P such that, angle APB = 90^o. Given further that triangle APB has an area of $10.5cm^2$, locate two possible positions P, and P_2 of P. (4 Marks)

9. The position vector A and B are given as $\underset{\sim}{OA} = 4\underset{\sim}{j} + 3\underset{\sim}{k}$ and $\underset{\sim}{OB} = 2\underset{\sim}{i} - 2\underset{\sim}{j} + \underset{\sim}{k}$. C divides AB in the ratio 5 : -3. Find the coordinates of C. (3 Marks)

10. A ship leaves an island (5^oN, 45^oE) and sails due East for 120hours to another island. The average speed of the ship is 27knots. Calculate the distance between the two islands.

a) In nm. (1 Mark)

b) In km (use 1nm = 1.853km). (1 Mark)

c) Calculate the speed of the ship in km/h. (2 Marks)

11. Given that x = 2.65cm and y = 6.41cm. Find the maximum value of $\frac{\quad}{\quad}$ (2 Marks)

12. Find the period and phase angle of the function $y = 2\sin\frac{(\quad)}{\quad}$ (2 Marks)

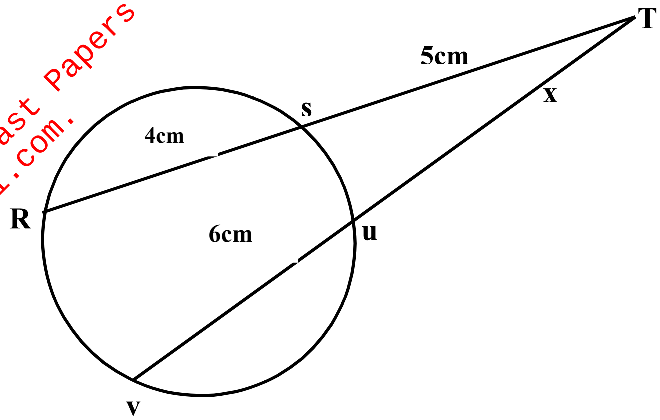
13. Without using tables or a calculator simplify;

(3 Marks)

14. Sh. 200,000 is deposited in a bank at the rate of 6% p.a compound interest. If the interest is added half-yearly, find the amount after 2 years. (3 Marks)

15. The most effective way of avoiding HIV/AIDS is abstinence. The letters of the word ABSTINENCE are placed in a box. A letter is then selected at random and placed in the box before a second letter is selected. Find the probability of obtaining letter E twice. (3 Marks)

16. In the figure below find the value of x. (3 Marks)



SECTION II (50 MARKS)

Answer ONLY five questions from this section.

17. a i) Given that $y = 5 + 3x - x^2$, complete the table below.

x	-3	-2	-1	0	1	2	3	4	5	6
y	-13			5				1		-13

(2 Marks)

ii) On the grid provided, using a suitable scale, draw the curve $y = 5 + 3x - x^2$ for $-3 \leq x \leq 6$.

(3 Marks)

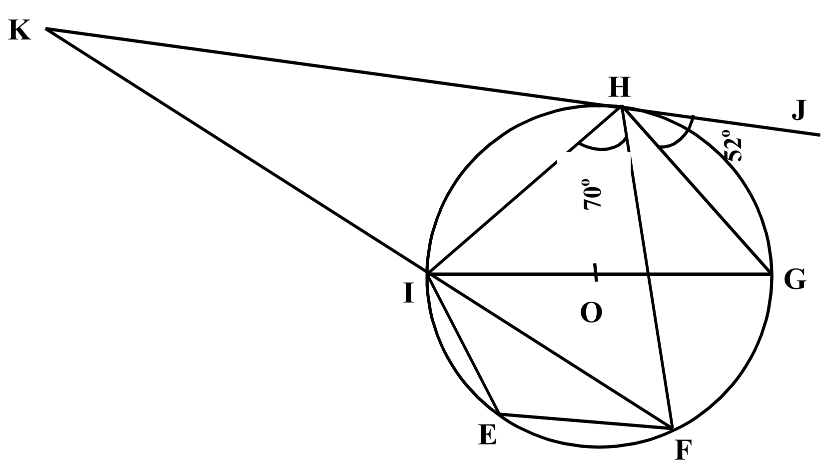
b) Use your curve to solve the equations;

i) $5 + 3x - x^2 = 0$ (2 Marks)

ii) $-x^2 + 4x + 3 = 0$ (3 Marks)

18. In the figure below E F G H I is a circle. G I is a diameter and angle F H I = 70^o, angle J H G = 52^o

J K is a tangent to the circle at H.



Find stating the reasons.

a) <I G F (1 Mark)

b) < F H G (1 Mark)

c) < H I G (2 Marks)

d) < H K I (2 Marks)

e) < F E I (2 Marks)

f) < I G H (2 Marks)

19. The table below shows income tax rates.

Monthly taxable pay (K£)	Rate of tax in ksh in 1k£
1 - 484	2
485 – 940	3
941 – 1396	4
1397 – 1852	5
Excess over 1852	6

Mr. Mutua who is a teacher earns monthly basic salary of Sh.35,000 and is also given taxable allowances amounting to ksh.11,500.

a) Calculate the total income tax. (4 Marks)

b) If he is entitled to a personal relief of sh.1,056 per month. Determine the net tax. (2 Marks)

c) If the employee received a 50% increase in total income, calculate the corresponding % increase on the income tax. (4 Marks)

20. Three solids, a sphere, a closed cylinder and a closed cone are such that their radii are equal and their surface area are also equal.

a) Given that the volumes of the sphere is —Πcm^3, determine its radius. (2 Marks)

b) Calculate;

i) The height of the cylinder. (3 Marks)

ii) The height of the cone. (3 Marks)

iii) The volume of the cone. (2 Marks)

21. The marks below shows the frequency distribution of mathematics marks in mwala secondary school for 90 candidates in an examination.

Marks	1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100
No. of candidates	2	6	10	14	18	17	11	6	4	2

a) On the grid provided, draw a cumulative frequency curve to represent this data. (4 Marks)

b) From the graph, find;

i) The quartile deviation. (3 Marks)

ii) The number of candidates who scored more than 45 marks. (1 Mark)

iii) The pass mark if 80% of the candidates passed. (2 Marks)

22. There are two examiners A and B marking a mathematics examination. After marking ten scripts, examiner A marks 6 scripts out of ten accurately but deviates in the rest while examiner B marks 7 scripts accurately out of ten but deviates in the rest. Determine the probability that,

a) Both will mark with deviations a given set of scripts. (2 Marks)

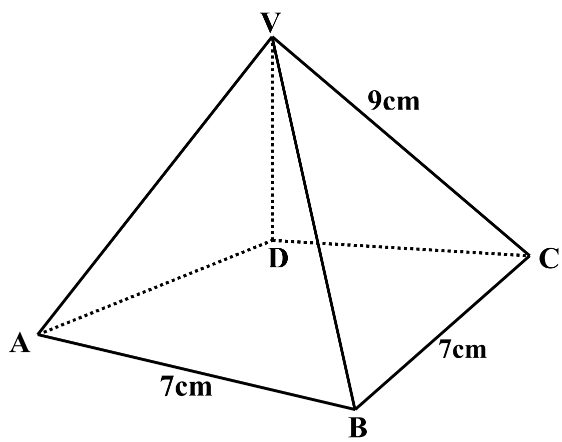
b) Only one will mark accurately. (2 Marks)

c) Both of the examiners will mark accurately a given set of scripts. (2 Marks)

d) Atleast one will mark accurately. (2 Marks)

e) Atmost one will mark accurately. (2 Marks)

23. The figure below is a square based pyramid, A B C D V, such that A B = 7cm and V A = V B = V C = V D = 9cm.



a) Find the height of the vertex V above the centre of the base. (3 Marks)

b) Find the angle between BV and the ABCD. (2 Marks)

c) Calculate the angle between the plane BVC and BVA. (5 Marks)

24. a) The table below shows some value of a function of $y = x^3 + 2x^2 + 1$

x	1	1.5	2	2.5	3	3.5	4
y	1	8.875	17	29.125	46	68.275	97

Use the midordinate rule with three ordinates to estimate the area of the region bounded by $y = x^3 + 2x^2 + 1$, the line $y = 0$ and $x = 4$. (2 Marks)

b) The velocity of a particle moving in a straight line after t seconds is given by $V = 4 + 8t - 4^2 m/s^2$

Calculate;

i) The acceleration of the particle after 3 seconds. (2 Marks)

ii) The distance covered by the particle between t = 2sec and t = 6sec. (3 Marks)

iii) The time when the particle is momentarily at the rest. (3 Marks)