NAME: …………………………………………………………………. INDEX NO:………………………………

SCHOOL: ……………………………………………………… Candidate's signature: ……………….…

Date: ………………………………..…..…

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

MASINGA DISTRICT JOINT EVALUATION TEST - 2011

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

121/2
MATHEMATICS
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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 18 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

SECTION I (50 MARKS)

Answer all questions in this section

1. Use logarithm tables only to evaluate the following question giving your answer correct to 3 significant figures.

$$\frac{(\ \ .\ \ \ )\ \ \ \ \ \ .}{\sqrt{\ \ .\ \ }}$$

(4 Marks)

2. Given that $1.5 \leq x \leq 3.8$ and $2.4 \leq y \leq 5$, determine the smallest and the greatest value of $x - y$ and hence the range of $x - y$. (3 Marks)

3. Make A the subject of the formula given that $B + 10 = \frac{\ \ }{\sqrt{\ \ }}$. (2 Marks)

4. Simplify (3 Marks)

5. The average of the first and fourth terms of a G.P is 140. Given that the first term is 64, find the common ratio. (3 Marks)

6. Ruth deposited sh20,000 in a fixed deposit account for a period of 1½ years. The bank pays compound interest on quarterly basis. At the end of this period her account had shs46,200. Determine the rate at which interest was paid per annum. (3 Marks)

7. Show that;

$$\frac{(\quad\quad)(\quad\quad)}{(\quad\quad)(\quad\quad)} = \quad)$$

(2 Marks)

8. Find standard deviation of
3, 5, 7, 9 and 11. (3 Marks)

9. The sum of two numbers m and n is 7. The sum of m and the reciprocal of n is 3 ¼. Find the two possible values of m and n. (4 Marks)

10. A industrialist has 450 litres of a chemical which is 70% pure. He mixes it with a chemical of the same type but 90% pure so as to obtain a mixture which is 75% pure. Find the amount of the 90% pure chemical used. (3 Marks)

11. a) Expand $(2 + -)^5$ upto the term in x^3. (1 Mark)

b) Use your expansion to estimate the value of $(1.975)^5$. Give your answer in 3 significant figures. (2 Marks)

12. Use the trapezium rule to estimate the area under the curve $y = x^2 + x - 6$ over the interval $0 \leq x \leq 8$ using 4 trapezia. (3 Marks)

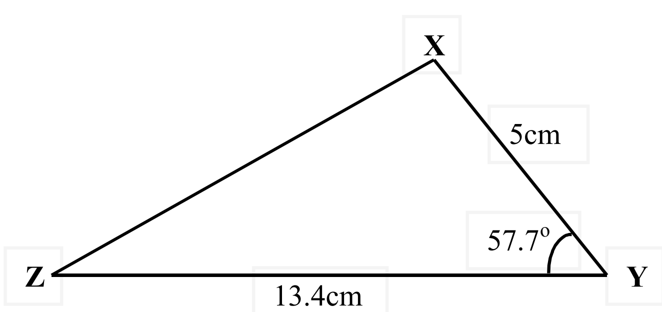
13. without using tables or a calculator, find the value of: (3 Marks)

14. find the distance between two points A(50^{o}N, 20^{o}E) and (50^{o}N, 50^{o}E) in;

i) Kilometers (2 Marks)

ii) Nautical miles (Take R = 6400km and = 3.142) (2 Marks)

15. Given that in triangle XYZ, YZ = 13.4 cm, XY = 5cm and <XYZ = 57.7^{o}, find;



a) The length XZ (2 Marks)

b) The circum radius of the triangle (2 Marks)

16. Given that x^o is an angle in the first quadrant such that $8\sin^2 x + 2\cos x - 5 = 0$, find tan x. (3 Marks)

SECTION II (50 MARKS)

Answer only five questions from this section

17. The probabilities that Mueni, Auma and Wanjiku are time barred to vote for their favourite presidential candidates are –,– – respectively. On the day of voting, what is the probability that;

i) None of them will be time barred. (2 Marks)

ii) Only one of them will be time barred. (2 Marks)

iii) At least one of them will be time barred. (2 Marks)

iv) Only Auma and Wanjiku will be time-barred. (2 Marks)

18. The table below shows the rate of taxation in a certain year.

Income in K£ p.a	Rate of taxation shs per K£
1 – 3900	2
3901 – 7800	3
7801 - 11700	4
11701 – 15600	5
15601 – 19500	7
Above 19500	9

In that period Mrs. Kalii earns a basic salary of kshs22,000 and is entitled to a house allowance of ksh10,000 per month. If she gets a personal relief of sh.1056 per month.

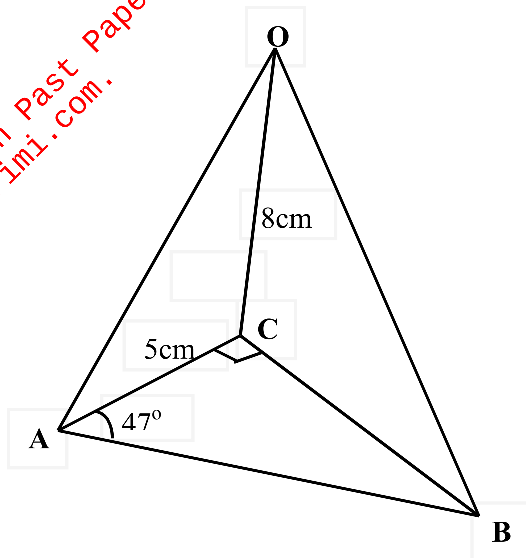
a) Calculate how much income tax she paid per month. (7 Marks)

b) Mrs. Kalii's other deductions per month were;

- Co-operative society contributions of Ksh.2,000
- Loan repayment kshs.2260
- Provident fund deducted through check off system at 2% of his basic salary.

Calculate his net monthly pay. (3 Marks)

19. The triangular base ABC of the pyramid OABC is right angled at C and lies in a horizontal plane. The edge OC is vertical. AC = 5cm, OC = 8cm and angle CAB = 47°.



Calculate;

a) The length AB. (2 Marks)

b) The inclination of the edge OB to the horizontal. (2 Marks)

c) The inclination of the face OAB to the horizontal. (4 Marks)

d) The angle between the edge OB and AB. (2 Marks)

20. a) i) Sketch the curve $y = x^2 - 2x$. (2 Marks)

ii) Use your sketch to find the areas between the x-axis and $y = x^2 - 2x$ from $x = 0$ to $x = 3$. (1 Mark)

b) i) A ball is thrown upwards from the top of a cliff h metres above sea level with acceleration of $-9.8 m/s^2$ and an initial velocity of 9.8m/s

i) Write down an expression for the height h of the ball above sea level if the height of the cliff is 100m. (2 Marks)

ii) Calculate the greatest height reached by the ball above sea level. (2 Marks)

c) $\int$ —— . (2 Marks)

21. a) Complete the table below. (2mks)

x	-180^0	-135^0	-90^0	-45^0	00	45^0	90^0	135^0	180^0
2sin (½ x – 30)	-1.73			-1.59		-0.26	0.52	1.23	
½ cos 2x		0		0	0.5	0		0	

b) Draw the graphs of $y = 2\sin(\frac{1}{2}x - 30)^0$ and $y = \frac{1}{2}\cos 2x$ for $-180^0 \leq x \leq 180^0$. Use a scale of 2cm for 45^o on x-axis and 1cm to 0.5 units on y-axis. (5 Marks)

c) Use your graph to solve the equations.

i) $2 \sin (\frac{1}{2} x - 30) = 0.55$ (1 Mark)

ii) $4 \sin (\frac{1}{2} x - 30) - \cos 2x = 0$ (1 Mark)

d) State period of the equation $y = 2 \sin (\frac{1}{2} x - 30)^{o}$. (1 Mark)

22. A triangle T whose vertices are A(2, 3), B(5, 3) and C(4,1) is mapped onto triangle T_1 whose vertices are $A^1(-4, 3)$, $B^1(-1, 3)$ and $C^1(X, Y)$ by a transformation M. find;

a) The transformation matrix represented by M. (4 Marks)

b) Co-ordinates of C. (2 Marks)

c) Triangle T_2 is the image of triangle T_1 under a reflection in the line y = x, find the matrix representing this transformation hence the co-ordinates of T_2. (2 Marks)

d) Find a single matrix that maps T onto T_2. (2 Marks)

23. At Mweinga farm, a cow takes at least 180 units of vitamin A and not less than 160 units of vitamin B. Vitamin A and B are available in two types of feeds, x and y. Type x feeds contains 45 units per kg of vitamin A and 20 units per kg of vitamin B while type Y feeds contains 30 units per kg of vitamin A and 40 units of vitamin B. Taking x and y to be the number of Kgs of feed x and y respectively taken by the cow per day.

a) Form all the inequalities that represent the above information. (3 Marks)

b) Show the region described by the all inequalities in (a) above graphically. (3 Marks)

c) Given that 1kg of x costs sh40 and 1kg of y costs sh50, use your graph in (b) above to determine the least cost of maintaining a cow at the Mweinga farm. (4 Marks)

24. The table below shows the age distribution of visitors who participated in Masinga district career day festival 2010.

Age in years	16 - 20	21 - 25	26 - 30	31 - 35	36 - 40	41 - 45	46 – 50
Number of visitors	2	10	12	17	15	9	5

a) On the grid provided draw the cumulative frequency curve for the above information. (3 Marks)

b) Use your graph to estimate

i) The median age. (1 Mark)

ii) Quartile deviation. (3 Marks)

iii) Percentage of workers whose age is at least 37 years. (3 Marks)