

NAME:..... INDEXNO:.....

SCHOOL:..... SIGNATURE..... DATE.....

121/1

MATHEMATICS

PAPER 1

JULY/AUGUST 2012

2 ½ HRS

KISUMU NORTH AND EAST JOINT EVALUATION TEST

Kenya Certificate of Secondary Education

Mathematics

Paper 1

2 ½ hrs

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 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 electronic calculators and **KNEC** tables may be used.

For examiners use 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	

SECTION A: 50 MARKS

Attempt all the questions in this section.

1. Simplify

$$\frac{2y^2 - 3xy - 2x^2}{4y^2 - x^2}$$

(3mks)

2. Oketch sells his car to Jane and makes a profit of 17%. Jane sells the same car to Issa at Sh.300, 000, making a loss of 10%. Determine the price at which Oketch bought the car.

(3mks)

3. Given $\sin x = \frac{1}{\sqrt{5}}$ and x is an acute angle, find without using tables and calculators.

$\cos x + \tan (90-x)$, leaving your answer in the form $a + b\sqrt{c}$.

(3mks)

4. Mr. Owino spends $\frac{1}{4}$ of his salary on school fees. He spends $\frac{2}{3}$ of the remainder on food and a fifth of what is left on transport. He saves the balance. In a certain month he saved Sh.3400. What is his salary? (3mks)

5. A straight line passes through points A (-2, 6) and B (4, 2).

a) M is the midpoint of line AB. Find the co-ordinates of M.

b) Determine the equation of a straight line passing through point M and is perpendicular to AB. (3mks)

6. Without using tables or calculator evaluate $\log_2(x^2 - 9) = 3\log_2 2 + 1$ (3mks)

7. In a book store, books packed in cartons are arranged in rows such that there are 50 cartons in the first row, 48 cartons in the next row, 46 in the next and so on.

a) How many cartons will be there in the 8th row?

b) If there are 20 rows in total, find total number of cartons in the book store.

(4mks)

8. A rectangle whose area is 96m^2 is such that its length is 4m longer than its width.

Find

a) Its dimensions

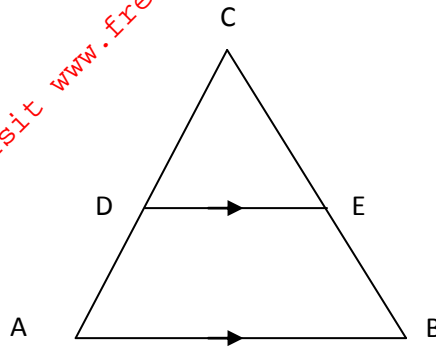
b) Its perimeter

(3mks)

9. Evaluate $\frac{-12 \div (-3) \times 4 - (-20)}{-6 \times 6 \div 3 + (-6)}$

(2mks)

10. In triangle ABC below, $AC=BC$, AB is parallel to DE , $AB=15\text{cm}$, $DE=7.5\text{cm}$ and $BE=6\text{cm}$.



Calculate

a) Length CE

b) Area of quadrilateral ABED.

(4mks)

11. A salesman gets a commission of 2.4% on sales up to sh.100, 000. He gets additional commission of 1.5% on sales above this. Calculate the commission he gets for sales worth sh.280, 000.

(3mks)

12. A bus and a car leave Nairobi at 7.30am and 9.30am respectively. If their speeds are 60km/h and 100km/h respectively, find the time when the car catches up with the bus. (3mks)

13. The table below shows the number of children per house in a certain village.

No. of children	0	1	2	3	4	5	6	7	8	9
No. of Houses	2	3	2	6	4	3	4	3	2	1

Calculate

(i) The mean number of children per house to the nearest whole number.

(ii) The median (4mks)

14. Solve the inequality below and state the integral values of your solution.

$$2(3x - 4) < x + 4 \leq 3(5 + 2x) \quad (3mks)$$

15. A measuring cylinder of radius 5cm contains water whose level reads 6cm high. A spherical object is immersed in the water and the new level reads 10cm. Calculate the radius of the spherical object. (3mks)

16. Solve the equation

$$8^{2x+1} \times \frac{1}{64} = 16 \div 4^x \quad (3\text{mks})$$

SECTION B: 50 MARKS

Answer any five questions only.

17. John is a sales agent in a company that pays him a basic salary of sh.5000. In addition he is given a commission of 5% on sales worth sh.200, 000 and 7.5% on any additional sales above sh. 200,000.

a) In January his total sale was sh. 420,000. How much did he earn in total.

b) In February, his total earnings was sh.28125. Calculate his total sales in February.

c) The following year the company changed its policy to a flat rate commission of 9% on goods sold. In the first month, John sold goods worth sh.450, 000. Find the percentage change in earning compared to the old policy. (10mks)

18. The table below shows marks scored by a class in a math test.

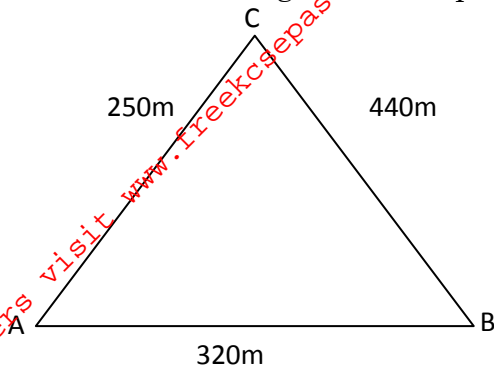
Marks	5-9	10-19	20-39	40-49
No. of students	20	120	50	40

a) Draw a histogram for the distribution above, on a graph paper. (6mks)

b) i) State the group in which the median lies. (1mk)

ii) A vertical line drawn through the median mark divides the total area of the Histogram into 2 equal parts. Using the information, estimate the median mark. (3mks)

19. Karis owns a farm that is triangular in shape as shown below.



a) Calculate the size of angle BAC.

b) Find the area of the farm in hectares.

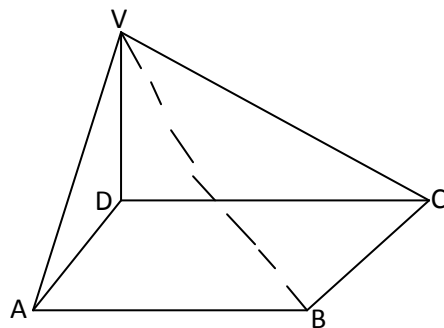
c) Karis wishes to irrigate his farm using a sprinkler machine situated in the farm such that it is equidistant from points A, B and C.

i) Calculate the distance of the sprinkler from point C.

ii) The sprinkler rotates in a circular motion so that the maximum point reached by the water jets is the vertices A, B, and C. Calculate the area outside his farm that will be irrigated. (10mks)

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20. The diagram below is a right pyramid on a rectangular base.



Given that the volume of the solid is 280m^3 and its base area is 60cm^2 and that $AB:BC=3:5$, determine

i) the height of the pyramid. (2mks)

ii) the length and width of the base. (4mks)

iii) the slant edge of the pyramid (4mks)

21. Triangle ABC has vertices A(-5,-3), B(-3,-5) and C(-3,-1).

a) Plot triangle ABC and its image $A^1B^1C^1$ under reflection in the line $y=-x$.

(3mks)

PASTE GRAPH

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- b) $A^{II}B^{II}C^{II}$ is the image of $A^I B^I C^I$ under rotation centre $(0,0)$ through a positive quarter turn. Plot $A^{II}B^{II}C^{II}$ and state its co-ordinates. (2mks)
- c) $A^3 B^3 C^3$ with coordinates $A^3(7.5, -4.5), B^3(4.5, -7.5)$ and $C^3(4.5, -1.5)$ is the image of $A^{II}B^{II}C^{II}$ under a certain transformation. Plot $A^3 B^3 C^3$ and describe this transformation. (2mks)
- d) $A^4(6, -1.5)$ is the image of A^3 under translation. State the co-ordinates of B^4 and C^4 . (2mks)

22. Maru Secondary School consumes 40 bags of maize and 25 bags of beans per term. Kadu Secondary School consumes 35 bags of maize and 18 bags of beans per term. The schools purchase the grains from the same grain store. Maru pays sh.380,000 while Kadu pays sh.301,500 for the grains.

- a) Write down two equations representing the cost of grains in the two schools.
- b) Using matrix method, calculate the cost of each bag of maize and beans.
- c) The following term the price of each bag of maize increased by 20% while that of beans decreased by 15%.
- i) How much did Maru pay for the grains?
- ii) If the school enrolment increased by 10% and the food ration also increased proportionally, how much would the school spend on the grains? (10mks)

23. A ship leaves port M and sails on a bearing of 050° heading towards Island L. Two navy destroyers sail from a naval base N to intercept the ship. Destroyer A sails such that it covers the shortest distance possible. Destroyer B sails on a bearing of 20° to L. If the bearing of N from M is 100° and distance $NM=300\text{Km}$, Using a scale of 1cm to represent 50Km, determine

i) the positions of M, N and L.

ii) the distance travelled by destroyer A.

iii) the distance travelled by destroyer B.

iv) the bearing of N from L. (10mks)

24. The table below shows values for the function

$$y = 5 + 8x - 2x^2 \text{ for } -2 \leq x \leq 6$$

x	-2	-1	0	1	2	3	4	5	6
$8x+5$	-9					29			
$-2x^2$		-2							-72
y				11				-5	

a) Complete the table above.

(2mks)

b) Draw the graph of $y=5+8x-2x^2$ for $-2 \leq x \leq 6$.

(3mks)

PASTE A GRAPH

c) Use your graph to solve the equation.

i) $5+8x-2x^2=0$

(1mk)

ii) $-2x^2+5x+3=0$

(3mks)

d) State the equation of the line of symmetry of the curve $y=5+8x-2x^2$