



Name: _____ Index No: _____

School: _____ Candidate's sign: _____

Date: _____

121/1
 MATHEMATICS
 PAPER 1
 March 2019
 2 ½ hrs

NYANZA COUNTIES' PRE-MOCK MATHEMATICS EXAMINATIONS

P. O. Box 578, RONGO- 40404. Tel. +254724214892 / +254733545455.
 Kenya Certificate of Secondary Education (K.C.S.E)

121/1
 MATHEMATICS
 PAPER 1
 March 2019
 2 ½ hrs

INSTRUCTION TO CANDIDATES

1. Write your name and index number in the spaces provided above
2. Sign and write the date of examination in the spaces provided.
3. The paper contains two sections: Section I and II.
4. Answer all questions in section I and **strictly five** questions from section II.
5. All workings and answers must be written on the question paper in the spaces provided below each question.
6. Show all the steps in your calculations, giving your answers at each stage in the spaces below each question.
7. Marks may be given for correct working even if the answer is wrong.
8. Non- programmable silent electronic calculators and KNEC mathematical tables may be used except where stated otherwise.

FOR EXAMINER'S USE ONLY

Section I

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

This paper consists of 16 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 the questions in this section in the spaces provided.

1. Without using a calculator, evaluate: $\frac{-24 \div 8 - 9 \times 3 - 2 \times 5}{-56 \div \frac{8}{3} \text{ of } 5\frac{1}{4}}$ (3 marks)
2. Given that $\frac{2x+3y}{3x+4y} = 5$, find the ratio $x:y$ (3 marks)
3. A rectangle is thrice as long as it is wide. If its dimensions are increased by 20%. Find percentage change in its area. (4 marks)

4. By prime factorizing and without using tables or a calculator solve for a and b given that:

$$3^{a-1} \times 7^{b+1} = 1323$$

(4 marks)

5. Solve for x give that

$$5^{2x+3} - 4 \times 25^{x+1} = 625$$

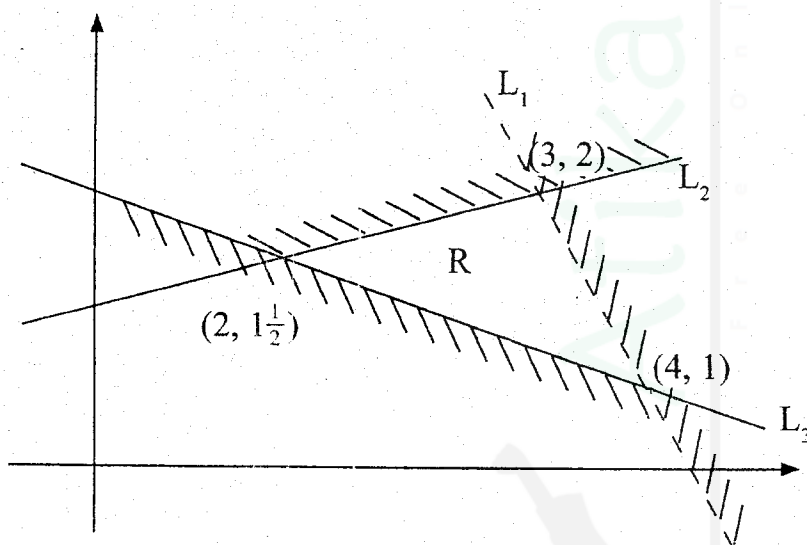
(3 marks)

6. Simplify by factorizing: $\frac{2ax - by + ay - 2bx}{20x^2 - 5y^2}$

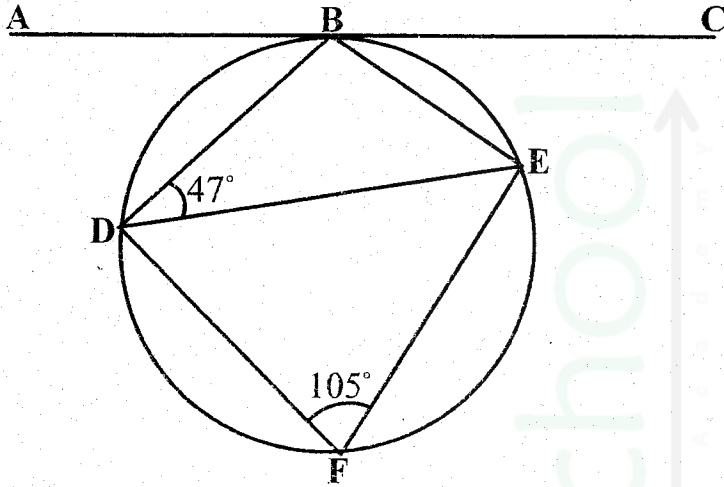
(3 marks)

7. The region **R** in the figure below is defined by the inequalities L_1 , L_2 and L_3 .
Find the three inequalities

(3 marks)



8. In the figure below, ABC is a tangent to the circle at B. Find angle ABD. (3 marks)



9. Otieno, Karanja and Shiundu are three casual workers in a tea factory. Karanja earns twice as much as Otieno and Shiundu earns sh 70 more than Karanja. If their total earning is sh 1120, express the ratio of their earnings, Otieno:Karanja:Shiundu in its simplest form. (3 marks)

10. A map is drawn to a scale of 1:50,000. Find the area in cm^2 on the map of a field with an actual area of 6 hectares. (2 marks)

11. A regular polygon has internal angle of 150° and a side of length 10 cm.

(a) Find the number of sides of the polygon

(2 marks)

(b) Find the perimeter of the polygon

(2 marks)

12. A cylindrical iron pipe is 2.1 m long and 12 cm in external diameter. The metal is 1 cm thick and its density is 7.8 g/cm^3 . Taking $\pi = 3.142$, find its mass.

(3 marks)

13. Peter paid sh 180 for a shirt after getting a discount of 10%. The shopkeeper made a profit of 20% on the sale of this shirt. What percentage profit would the shopkeeper have made if no discount was allowed? (3 marks)

14. Given that $p = 3$, $q = -2$ and $r = -1$, evaluate:

(3 marks)

$$\frac{2(p+r)^2 - (p-q)(q-r) - 2r}{3(p+q) - 2(q-r)}$$

15. Use tables of reciprocals and cubes to evaluate: $\left(\frac{4}{0.5789}\right)^3$ (3 marks)

16. Two similar solids have surface areas of 48 cm^2 and 108 cm^2 respectively. Find the volume of the smaller solid if the bigger one has a volume of 162 cm^3 . (3 marks)

SECTION II

Answer any **FIVE** questions from this section in the spaces provided.

17. (a) Find the equation of a straight line passing through the points (3, 2) and (-3, 6) giving your answer in the form $\frac{x}{a} + \frac{y}{b} = 1$, where a and b are constants. (4 marks)

- (b) State the coordinates of point A and B, at which the line in (a) above crosses the x-axis and y-axis respectively (2 marks)

- (c) Using the information in (a) and (b) above, find the area of triangle AOB, where O is the origin (2 marks)

- (d) Find the acute angle the line in (a) above makes with the axis (2 marks)

18. The distance between towns M and N is 280 km. A car and a lorry travel from M to N. The average speed of the lorry is 20 km/h less than that of the car, The lorry takes 1 hour 10 minutes more than the car to travel from M to N.

(a) If the speed of the lorry is x km/h, find x .

(6 marks)

(b) The lorry left town M at 8:15 a.m. The car left town M later and overtook the lorry at 12:15 p.m. Calculate the time the car left town M.

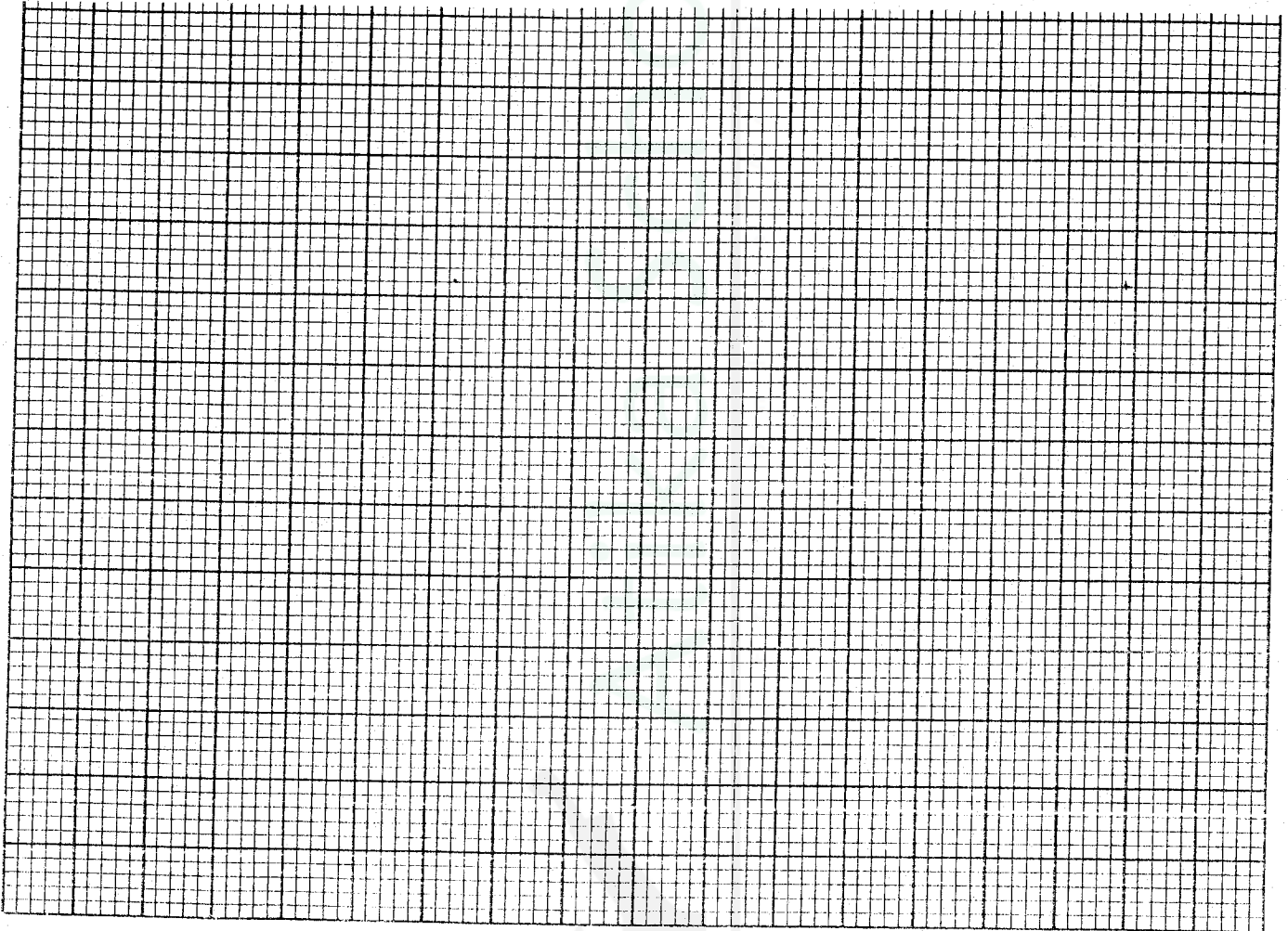
(4 marks)

19. The vertices of triangle PQR are P(1, 1), Q(4, 1) and R(5, 4). A transformation represented by

a matrix $T = \begin{pmatrix} -1 & 0 \\ 0 & 1 \end{pmatrix}$ maps PQR onto P'Q'R'. A second transformation represented by

$U = \begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix}$ maps P'Q'R' onto P''Q''R''.

(a) On the same axes, draw the three triangles PQR, P'Q'R' and P''Q''R''. (6 marks)



(b) Describe a single transformation which maps triangle PQR onto P''Q''R'' and find its matrix (4 marks)

20. In a Mathematics test, 40 students scored the following marks.

43 39 59 56 58 63 71 40 72 66 47 38 51 50 61 64 32 78 29 32
45 80 70 57 52 46 45 39 58 72 41 55 56 53 66 63 61 46 82 64

(a) Using a class interval of 5 and 25–29 as the first class, make a frequency distribution table.

(2 marks)

(b) Use the table to:

(i) Find the modal class

(1 marks)

(ii) Estimate the mean.

(4 marks)

(iii) Estimate the median

(3 marks)

21. The table below shows values of x and some values of y for the curve $y = x^3 + 3x^2 - 4x - 12$ in the range $-4 \leq x \leq 2$

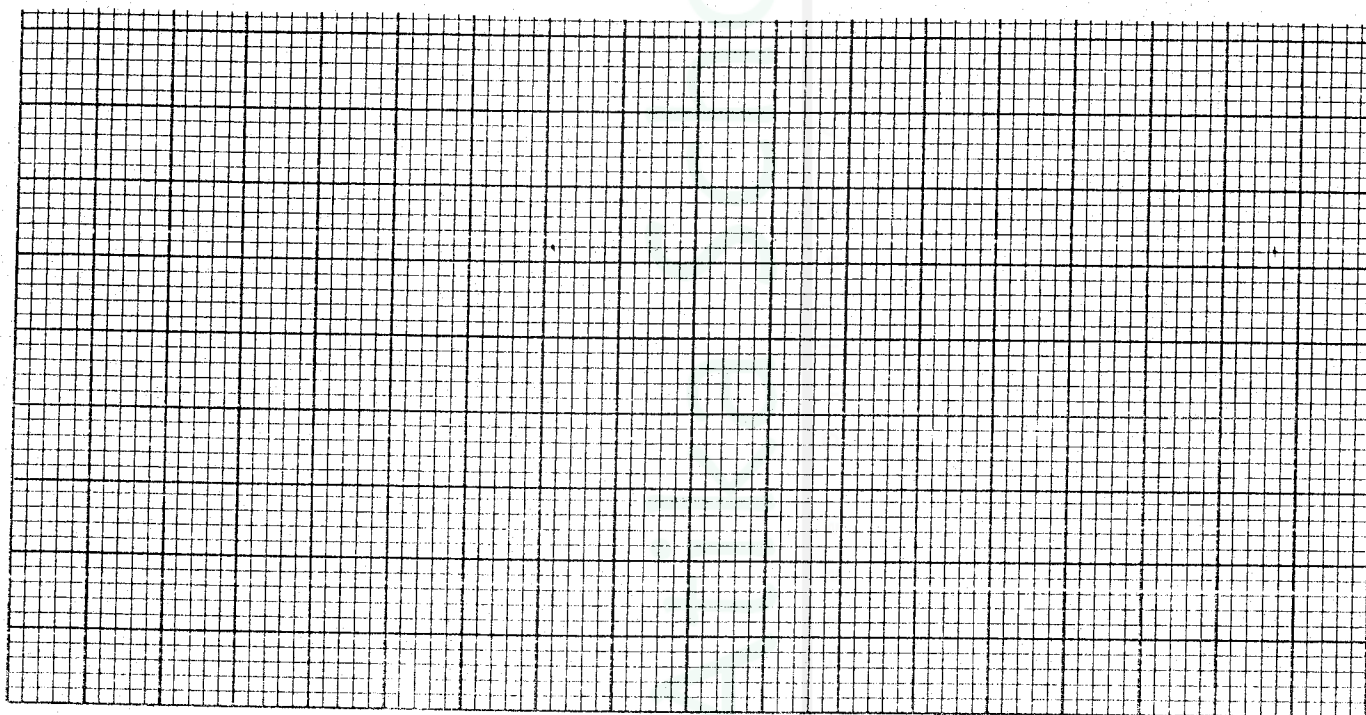
(a) Complete the table by filling in the missing values.

(2 marks)

x	-4	-3.5	-3	-2.5	-2	-1.5	-1	-0.5	0	0.5	1	1.5	2.0
y		-4.1		1.1		-2.6		-9.4		-13.1		-7.9	

(b) On the grid provided, draw the graph $y = x^3 + 3x^2 - 4x - 12$ for $-4 \leq x \leq 2$

Use the scale: Horizontal axis 2 cm for 1 unit and vertical axis 2 cm for 5 units. (3 marks)



(c) By drawing suitable straight lines, on the same grid as (b) above, solve the equations

(i) $x^3 + 3x^2 - 4x - 12 = 0$

(1 mark)

(ii) $x^3 + 3x^2 - 5x - 6 = 0$

(4 marks)

22. A sales lady earns a commission of Ksh 60 000. She gets a commission of 4% on the value of goods she sells above Ksh 250 000 but less than Ksh 400 000. On goods sold above Ksh 400 000, she gets a commission of 7.5%.

(a) In a certain month, she sold goods worth Ksh 525 000. Calculate her total earnings that month.
(4 marks)

(b) In another month, she earned a total of Ksh 94 500. Find the value of goods that she sold that month.
(6 marks)

23. A triangular plot ABC is such that $AB = 72$ m, $BC = 80$ m and $AC = 84$ m.

(a) Calculate, correct to 2 decimal places

(i) the area of the plot in square metres.

(3 marks)

(ii) the acute angle between the edges AB and BC.

(3 marks)

(ii) the perpendicular height from A to the side BC.

(2 marks)

(b) A water tap is to be installed inside the plot such that the tap is equidistant from each of the vertices A, B and C. Calculate, correct to 2 decimal places, the distance of the tap from vertex A. (2 marks)

24. Using a pair of compass and a ruler only;

- (a) Construct a triangle ABC such that $\angle ABC = 75^\circ$, line BC = 8.6 cm and line AC = 9.4 cm.
Measure the length of line AB. (6 marks)
- (b) Drop a perpendicular from A to meet line BC at M. Measure AM. (2 marks)
- (c) Use the length AM to calculate the area of the triangle. (2 marks)