



MUEO

MOI UNIVERSITY

OFFICE OF THE DEPUTY VICE CHANCELLOR (A,R&E)

UNIVERSITY EXAMINATIONS 2017/2018 ACADEMIC YEAR FIRST YEAR FIRST SEMESTER EXAMINATION

FOR THE DEGREE OF BACHELOR OF ARTS IN ECONOMICS

COURSE CODE: ECO 112

COURSE TITLE: INTRODUCTION TO MATHS I

DATE: 7TH FEBRUARY, 2018 **TIME:** 11.40 A.M – 2.40 P.M

INSTRUCTION TO CANDIDATES

SEE INSIDE

Instructions: Answer Question One any Other Three Questions

QUESTION ONE

- a) The main daily newspapers in Kenya are: The Nation, The Standard and The Star. The management of one of the dailies is concerned about the low sales volume of their paper. In a recent survey of 100 families in Nairobi, the numbers (hypothetical) that read the various newspapers were found to be as follows:

Newspaper	Number of readers
The Star	28
The star and Standard	8
The Standard	30
Star and Nation	10
The Nation	42
Standard and Nation	5
All the three papers	3

Required

- i) Determine the number of families who did not read any of the three newspapers with the help of Venn diagram (3marks)
- ii) Mrembo Beauty advertising firm in Nairobi want to know which newspaper they should advertise in so that they can reach the largest audience. Advice the company. (1mark)
- b) A manufacturer makes two products i.e product Q and product M. the cost of making 15 units of product q and 10 units of product M is sh 600. The cost of making 5 units of product Q and 8 units of product M is sh 340. The manufacturer makes a profit of 20% and 25% on each unit of product Q and product M respectively.
- i) Express the above cost of making one unit of products Q and M in form of simultaneous equations and calculate the cost of making one unit of product Q and product M (3marks)
- ii) Calculate the selling price of one unit of product Q and product M (1mark)

- c) Determine the partial derivative of the following equation (3marks)

$$z = \frac{(8x + 15y)^4}{3x + 7y}$$

$\frac{4(8x+15y)^3}{3x+7y}$

- d) Solve the following equation by clearing the denominator (2marks)

$$\frac{675}{x+3} = \frac{120}{x-6} + \frac{375}{x+3}$$

- e) Determine the limit of the following rational function (2marks)

$$\lim_{x \rightarrow 4} \frac{x^2 - 3x - 4}{x - 4}$$

- f) Solve the following equations, by the help of matrix inverse: (3marks)

$$5x + 9y = -30$$

$$6x - 2y = 28$$

$\begin{pmatrix} 5 & 9 \\ 6 & -2 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} -30 \\ 28 \end{pmatrix}$

- g) Evaluate; $\text{Log}_y\left(\frac{1}{y^3}\right)$ (2marks)

- h) Solve by completing square method; (3marks)

$$4x^2 - x - 3 = 0$$

- i) Solve by Cramer's rule

$$4x + 3y = 7$$

$$-2y + 3x = 9$$

(2marks)

QUESTION TWO

Determine the partial derivatives of;

a) $m = (4x^3 + 5y)(6x^2 - 8y^2)$ (5marks)

b) $m = \frac{5x^2 + 3y^3}{5x - 2y}$ (5marks)

c) $m = \frac{(9x + 15y)^5}{4x^2 + 7y}$ (5marks)

QUESTION THREE

- a) You are given the following two quadratic functions:

$$y^2 = 4x$$

$$y^2 = -x + 16$$

- i) Sketch the functions separately on a co-ordinate plane. (5marks)
- ii) Sketch both functions on the same Cartesian co-ordinate graph. (5marks)
- iii) Find their point of intersection in the first quadrant and show that point on the graph. (5marks)

QUESTION FOUR

a) Find $\frac{dy}{dx}$; $y = \frac{1 - \sqrt{x^2}}{\sqrt{x^2 - 1}}$ (5marks)

- b) Determine the average rate of change for the following function

$$y = x^3 + 2x^2 + 4x \quad (4marks)$$

- c) Analyse the continuity of

$$f(x) = \frac{x^2 + 8x - 20}{x - 2} \quad (3marks)$$

$$\text{at } x = 2$$

d) Solve for x ; $\frac{x+4}{16} + \frac{x-2}{4} = \frac{2}{8}$ (3marks)

QUESTION FIVE

- a) Given the following functions

i. $f = 5x + 4$ $x \in R$ (5marks)

ii. $g = \frac{1}{x+4}$ $x \neq -4$ (5marks)

iii. $h = x^2 + 2$ $x \in R$ (5marks)

Find the composite function $fgh(x)$ in its simplest form.

- b) Solve by quadratic formula method

$$y = x^2 - 7\frac{1}{2}x - 13\frac{1}{2} \quad (5marks)$$

c) Differentiate

$$y = \frac{\sqrt{(x^2 + 2)}}{(2x - 1)^2}$$

(5marks)

QUESTION SIX

Simply the following function

a) $\frac{x^2 - 1}{x^2 - 2x} \div \frac{4x + 4}{3x - 8}$

(4marks)

(3marks)

b) Factorize $2x^2 + 22x + 48 = 0$

(4marks)

c) Determine the derivative of $f(x) = \frac{6x(x^2 + 7)}{4x + 1}$

d) Solve by elimination and substitution technique

$$5x + 3y = -5$$

$$-3x + 4y = 29$$

(4marks)