ALUPE UNIVERSITY COLLEGE

...Bastion of Knowledge....

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OFFICE OF THE DEPUTY PRINCIPAL

ACADEMICS, RESEARCHAND STUDENTS AFFAIRS

UNIVERSITY EXAMINATIONS

2018 /2019 ACADEMIC YEAR

SECOND YEAR FIRST SEMESTER REGULAREXAMINATION

FOR THE DEGREE OF BACHELOR OF ECONOMICS

COURSE CODE: ECO 112

COURSE TITLE: INTRODUCTION TO MATHEMATICS ECONOMIS

DATE: 10TH DECEMBER, 2018

TIME: 2.00 pm – 5.00 PM

INSTRUCTION TO CANDIDATES

- **SEE INSIDE**

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INSTRUCTIONS TO CANDIDATES

i.   *Answer three questions. Question one is compulsory*

ii.   *Do not write on the question paper*

Question One (30 marks)

a) Find the value of the function using a graph (5mks)

$f(x) = 2x^2 - 4x + 1$

When x= 1, 0, and 2. Is f one to one?

b) If $f(x) = x^2 + 5x + 5$, evaluate each of the following (5mks)

a. $f(x + 2)$ b. $f(-x)$

c) Find the inverse function of f. Then sketch the graph of f and on the same coordinate axis. (5mks)

$$f(x) = \sqrt{9 - x^2}, \quad 0 \le x \le 3.$$

d) if $y = x^2 + 3x$, find using first principle (5mks)

$$\frac{\delta y}{\delta x}$$

e) If the function f satisfies the equation $f(x+ y) = f(x) + f(y)$ for every pair of real numbers x and y, what are the possible values of $f(0)$? (5mks)

f) Differentiate with respect to x (5mks)

$$y = x^3 + 5x^2 - 4x + 2,$$

Question Two

a) Jack's Dad invested some money and for every $12 he invested he got a total of $15 back. If Jack's Dad invested $300, how much in total did he get back? (6mks)

b) By use of quadratic equation. Two cars start out at the same spot. One car starts to drive north at 40 mph and 3 hours later the second car starts driving to the east at 60 mph. How long after the first car starts driving does it take for the two cars to be 500 miles apart? (6mks)

c) We are going to fence in a rectangular field and we know that for some reason we want the field to have an enclosed area of 75 ft². We also know that we want the width of the field to be 3 feet longer than the length of the field. What are the dimensions of the field? (8mks)

Question Three

a)

$$P = \begin{pmatrix} 2 & 1 \\ -3 & 1 \end{pmatrix}. \qquad A = P\begin{pmatrix} -2 & 0 \\ 0 & 3 \end{pmatrix}P^{-1}.$$

Let Compute P^{-1}, and show that is the identity (5mks)

b) Solve for x and y in the following matrix equation

$$\begin{bmatrix} 3 & -2 & 2 \\ 1 & 0 & -1 \end{bmatrix} + \begin{bmatrix} x-y & 3 & -2 \\ 4 & x & y \end{bmatrix} = \begin{bmatrix} 6 & 1 & 0 \\ 5 & 2x+5 & -9 \end{bmatrix}$$

(10mks)

c) Expand and simplify $-6(2x-3)-11$ (5mks)

Question Four

a) Differentiate between exponents and roots, and give two examples each. (7mks)

b) Approximate $\sqrt{71}$. (5mks)

c) Solve the following system by graphing: (8mks)
4x - 6y = 12
2x + 2y = 6

Question Five

a) Graph the following simultaneous equation problem (6mks)

$3x + 7y = 27$

$5x + 2y = 16$.

b) Complete the square: $y = 2X^2 - 28x + 100$. $a = 2$. $b = -28$ and $c = 100$ (8mks)

C) Differentiate using product rule $y = (2x^3 + 5x - 1)*(4x + 2)$ (6mks)