



ALUPE UNIVERSITY COLLEGE
Bastion of Knowledge...

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**OFFICE OF THE DEPUTY PRINCIPAL
ACADEMICS, STUDENT AFFAIRS AND RESEARCH**

UNIVERSITY EXAMINATIONS

2017/2018 ACADEMIC YEAR

FIRST YEAR FIRST SEMESTER EXAMINATION

**FOR THE DEGREE OF BACHELOR
OF ECONOMICS**

**SCHOOL: BUSINESS, ECONOMICS &
HUMAN RESOURCE DEVELOPMENT**

COURSE CODE: ECO 112

**COURSE TITLE: INTRODUCTION TO
MATHEMATICS I**

DATE: 13th December, 2017 TIME: 2.00pm-5.00pm

For examiner's Use Only

Question	I.E	E.E
CAT		
EXAM		
TOTAL		

INSTRUCTION TO CANDIDATES: SEE INSIDE

THIS PAPER CONSISTS OF 20 PRINTED PAGES

PLEASE TURN OVER

Insert the numbers of the questions you have answered in the order done

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Student Admission No.....Exam Card No.....Signature.....

INSTRUCTIONS TO CANDIDATES

1. Write your **Admission Number, Exam Card Number** and **Sign** in the spaces provided at the bottom of each page of the Examination Booklet. **DO NOT** write your name anywhere in this booklet.
2. Write on both sides of the pages.
3. All rough work must be done in the Answer sheets and crossed through.
4. If supplementary pages are used, they must be fastened all together at the end of this Booklet. Supplementary pages should be used only after all the leaves in the booklet have been exhausted.
5. It is a serious examination offence to cheat or to have unauthorized materials including **MOBILE PHONES** (whether on or off) in the examination venue.
6. In no circumstances must Answer Booklet used or unused, be removed from the examination room by a candidate.
7. The Booklet is for **Examination use only** in a designated examination room. Unauthorized possession of the Answer sheets by a student or any other person constitutes an examination irregularity calling for stiff disciplinary action.
8. Do not pluck any page from this Booklet. Any extra/unused answer sheets should be returned to the **Examination Office**.
9. Candidates who come to examination room 30 minutes late will not be allowed to sit for the exam.
10. Candidates will not be allowed to leave the exam room once the exam commences.
11. Candidates are advised that importance is attached by examiners to accuracy and clarity of expression.
12. Committing any form of irregularity is prohibited and shall attract severe disciplinary action in accordance with Alupe University College Examination Regulations.

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INSTRUCTIONS TO CANDIDATES

- Answer Question **ONE** and any other **TWO** questions
- Question **ONE** carries 30 marks
- Time allowed: 3 hours

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)

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

- 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 ft^2 . 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)

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Question Three

a)

Let $\mathbf{P} = \begin{pmatrix} 2 & 1 \\ -3 & 1 \end{pmatrix}$. Compute \mathbf{P}^{-1} , and show that $\mathbf{A} = \mathbf{P} \begin{pmatrix} -2 & 0 \\ 0 & 3 \end{pmatrix} \mathbf{P}^{-1}$ 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)