



# MACHAKOS UNIVERSITY

University Examinations for 2016/2017 Academic Year

SCHOOL OF BUSINESS AND ECONOMICS

DEPARTMENT OF ECONOMICS

FIRST YEAR SECOND SEMESTER EXAMINATION FOR DIPLOMA IN  
EDUCATION (ARTS)

EET 0104: INTRODUCTION TO MATHEMATICS FOR ECONOMICS

DATE: 6/6/2017

TIME: 2:00 – 4:00 PM

## INSTRUCTIONS.

*Answer Question One and Any Other Two Questions*

1. (a) Find the exponential function that models the following data;

|   |   |     |      |        |
|---|---|-----|------|--------|
| x | 0 | 1   | 2    | 3      |
| y | 3 | 4.5 | 6.75 | 10.125 |

(5 marks)

- b) Integrate  $3/\sqrt{x}$  (4 marks)

- c) Differentiate  $(x^2 + 3x)^6$  (3 marks)

- d) Solve the equation:  $\frac{x-3}{x} = \frac{2x}{x-1} + 1$  (4 marks)

- e) Explain the difference between an equation a function and a set. (6 marks)

- f) A salesman of double glazing can conclude a sale on a call following an inquiry with a probability of  $3/10$ . What is the probability that 4 such calls in an evening conclude at least 2 sales? (8 marks)

2. A college graduate signs a contract for an annual salary of €50,000 and can choose either option A: a fixed annual raise of €6,000 each year, or option B: a 10% raise each year. However, the graduate must stay with the same option.

- a) Write a formula that gives the annual salary during the  $n^{\text{th}}$  year for each option. (12 marks)

- b) Discuss which option is better. (8 marks)

3. A manufacturing process cost €6500 to set up for one year's use. If it costs €85 each to produce and other costs amount to  $3.5x^2$ , where  $x$  is the production in hundreds, Find the level of production that will minimize the cost per item over the year. What will the total cost amount to at this level of production? (20 marks)
4. A firm keeps accounts for 28 customers. 12 of these are defined as new customers and 14 are based locally. If just 3 new customers live locally, how many established customers do not live locally? (20 marks)
5. a) Solve the simultaneous equations:  $5x + 9y = -30$   
 $6x - 2y = 28$  using matrices. (10 marks)
- b) Explain the role of mathematics in economic analysis. (6 marks)
- c) In which areas in economics is differential calculus used? (4 marks)