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MAASAI MARA UNIVERSITY

**REGULAR UNIVERSITY EXAMINATIONS**

**2016/2017 ACADEMIC YEAR**

**FIRST YEAR FIRST SEMESTER**

**SCHOOL OF BUSINESS AND ECONOMICS**

**BACHELOR OF BUSINESS MANAGEMENT**

**COURSE CODE: BBM 105**

**COURSE TITLE: BUSINESS MATHEMATICS I**

**DATE: 25TH APRIL 2017 TIME: 8.30AM-10.30AM**

**INSTRUCTIONS TO CANDIDATES**

* **Answer question ONE (compulsory) and any other THREE**
* **Question one carries 25 marks**
* **All other questions carry 15 marks**

This paper consists of 3 printed pages. Please turn over

**QUESTION ONE**

a) Solve 8x – 3(x – 4) = 3(x – 4) + 6 **(3marks)**

b) Solve and graph 2(2x + 3) < 6(x – 2) + 10 **(3marks)**

c) A jazz concert brought in Ksh 60,000 on the sale of 8,000 tickets. If the tickets sold for Ksh 6 and Ksh 10 each, how many of each type of tickets were sold  **(4marks)**

d) What is the value of an annuity at the end of 5 years if $100 is deposited into an account earning 9% compounded monthly? How much of this value is interest  **(9marks)**

e) Given that f(x) = (2x – 9) (x2 + 6) Find;

(i) The equation of the line tangent to the graph at x = 3  **(3marks)**

(ii) The value of x where the tangent line is horizontal **(3marks)**

**QUESTION TWO**

a) An investor has Ksh12,000 to invest. If part is invested at 10% and the rest at 15%, how much should be invested at each rate to yield 12% on the total amount? **(6marks)**

b) An investor deposits Ksh1,000 in an account paying 10% compounded monthly, how much will the account have at the end of 10 years. Compute the answer to the nearest cent and show the investment graphically **(9 marks)**

**QUESTION THREE**

a) Graph the following inequalities and find the coordinates of the intersection points of the boundary of the solution rage **(8marks)**

y ≤ 20 – 2x

10x ≥ 36 - y

2x + 5y ≥ 36

b) On a graph paper draw the function f(x) = -x2 – 4x – 5. Find;

The axis of symmetry, vertex, maximum or minimum of f(x), range and the intercepts **(7marks)**

**QUESTION FOUR**

a) (i) Construct the graph of y = x3 – 2x2 – x + 2 for values of x ranging from -2 to + **(4marks)**

(ii) Use your graph to solve x3 – 2x2 – x + 2 = 0 **(2marks)**

b) Perform the following divisions (x3 + 8y3) ÷ (x + 2y) **(3marks)**

c) Find the inverse of the following matrix 3 -1 through row reduction process

-4 2 **(6 marks)**

**QUESTION FIVE**

a) An object moves along the y axis marked in feet so that its position at time x in seconds is given by f(x) = x3 – 6x2 + 9x

Find (i) the instantaneous velocity function **(2marks)**

(ii) The velocity at x = 2 and x = 5 seconds **(3marks)**

(iii) The time when the velocity is 0 **(3marks)**

b) Using past records a company estimates that it will sell N(x) units of a product after spending Ksh x thousands on advertising as given by N(x) = 2,000 – 2x3 + 60x2 – 450x

When is the rate of change of sales per unit change in advertising increasing? Decreasing? What is the maximum rate of change?  **(7marks)**