**MAASAI MARA UNIVERSITY**

**HIGHLANDS STATE COLLEGE**

**APRIL 2017 DRAFT EXAMINATIONS**

**SCHOOL OF BUSINESS AND ECONOMICS**

**BACHELOR OF COMMERCE**

 **YEAR 1 SEMESTER 1**

**UNIT CODE: BCM 1211**

**UNIT TITLE: BUSINESS MATHEMATICS II**

***INSTRUCTION TO CANDIDATES***

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

**QUESTION ONE**

a) A survey of 100 college students showed that 75 owned radio systems, 45 owned TV sets while 35 owned radio systems and TV sets, find

 i) How many students owned either a radio or a TV set?  **(3marks)**

 ii) How many students did not own either a radio or a TV set **(3 marks)**

b) Use the matrix method to solve the following pairs of simultaneous equations; **(5marks)**

 2x + 3y = 14

 3x – 2y = -5

c) A patient in a certain hospital is required to have at least 84 units of drug A and 120 units of drug B each day (assuming that an overdose of either drug is harmless). Each gram of substance M contains 10 units of drug A and 8 units of drug B while each gram of substance N contains 2 units of drug A and 4 units of drug B. how many grams of substances M and N can be mixed to meet the minimum daily requirements? **(10marks)**

(d) If y = 2x5 + 4x4 – x3 + 3x2 – 5x + 7 find the derivative of the equation and the value dy/dx when x = 2 **(4marks)**

**QUESTION TWO**

a) The total cost Cx in thousands of shillings for manufacturing x sailboats is given by

 Cx = 2 + 8x - x2 for 0 ≤ x ≤ 4

 find the marginal cost at x = 1 and x = 3 6marks

b) Given the graph y = (2x – 9)(x2 + 6)

 (i) Find the equation of the line tangent to the graph at x = 3 **(4marks)**

 (ii) Find the values of x where the tangent line is horizontal **(5marks)**

**QUESTION THREE**

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

 -4 2 **(6marks)**

 b) 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)**

**QUESTION FOUR**

a) Find the area enclosed by the curve y = 25 – x2 and the straight line y = x + 13 **(7marks)**

b) Find all the first and second partial derivatives for the following function

 **(8marks)**

 Z = 3x2 + 2xy +4y2

**QUESTION FIVE**

 The rate of change of the income produced by a vending machine in dollars is given by F(t) = 1000e0.04t where t is time in years since the installation of the machine

 (i) Find the present value of this income stream at 12% compounded continuously for 5 years **(5marks)**

 (ii) Find the amount produced by the vending machine over this 5 years period **(5marks)**

 (iii) Find the interest earned during this 5 year period **(5marks)**