MAASAI MARA UNIVERSITY

SPECIAL/RESITS UNIVERSITY EXAMINATIONS
2020/2021 ACADEMIC YEAR
FIRST YEAR FIRST SEMESTER

SCHOOL OF BUSINESS AND ECONOMICS
BACHELOR OF ARTS ECONOMICS
BACHELOR OF SCIENCE IN AGRIBUSINESS MANAGEMENT

COURSE CODE: AGB 1104
COURSE TITLE: INTODUCTION TO MATHS II

DATE: 26TH JULY, 2021   TIME: 1430 – 1630HRS

INSTRUCTIONS TO CANDIDATES
Answer Question **ONE** and any other **THREE** questions

QUESTION ONE   **(25 MKS)**

a) Define the following terms
   i.   Function
  ii.   Derivative
      a. Singular matrix

                                          (6 mks)

     b. Find out the x values of two turning points of the function:

$y = x^3 + 8x^2 + 5x + 3$ **(3 mks)**

c) Let $g(x) = x^2 + 7$
       i.   Find the range of g
      ii.   Evaluate g(-3)

                                          (4 mks)

d) The marginal profit function is $y = 200 - 4x$ where y is amount in shillings and x is the sales in units .A firm break evens on sales of 10 units. Find the fixed costs of the company   **(4 mks)**

e) Let $B = \begin{bmatrix} 2 & 4 & 5 \\ 0 & 3 & 0 \\ 1 & 0 & 1 \end{bmatrix}$.

Find B^T **(2 mks)**
          B^{-1} **(6 mks)**

SECTION B(answer any three questions**)**

QUESTION TWO   **(15 MKS)**

a) State any two types of functions   **(2 mks)**

b) Find the gradient of the following functions
     i) $y = 3x + 4$
    ii) $5x + 2y = {}^1/_3$ **(3mks)**

d).The cost C of printing books is ksh 100 fixed charges plus ksh 50 per book. Given that n is the number of books printed,

i. Find a function relating C and n **(3 mks)**
ii. Sketch a graph to represent this function **(3 mks)**
iii. Find the number of books that can be printed at a cost of ksh 650
(4 mks)

QUESTION THREE **(15 MKS)**
a)Define the following terms as used in matrix algebra.

i) Inverse matrix
ii) Transpose of a matrix **(2 mks)**

b) Solve the following system of equation using matrix algebra
i) $2x+8y =2$
$-2x-4y=6$ **(3 mks)**

ii) $4x_1+x_2-5x_3=8$

$-2x_1 +3x_2+x_3=12$

$3x_1-x_2+4x_3=5$ **(10 mks)**

QUESTION FOUR **(15 MKS)**

a)Find the equation for a quadratic function through the points $(1,7)$, $(4,5)$ and $(5,2)$.
(4 mks)
b) Solve for x
i. $\text{Log} (7x + 2) – \log(x -1) = 1$
ii. $\text{Log}_x(^8/_{27}) = 3$ (6mks)

c) Tom has ksh 5000 in a savings account that pays 5% interest annually. Write an equation that shows the amount of money he has in x years, assuming no deposits or withdrawals were made. Hence find how much money bill will in the account in ten years time **(5 mks)**
QUESTION FIVE **(15 MKS)**

a) Find out the derivatives of the following functions

   i) $y = 3x^2 + 5x$
   ii) $y = 3(2x^3 + 1)$ **(4 mks)**

b) The anticipated profits of a limited as a function of time is $P = 20 + 12t - t^2$
   (where p is the net profit and t is time in years)

What is the anticipated profit during the second and sixth year?   **(4 mks)**

c) The resale value of a certain industrial machine decreases over a 10- year period at a rate that depends on the age of the machine .When the machine is x years old , the rate at which its value is changing is $220(x-10)$ dollars per year.

      i.   Express the value of the machine as a function of its age and initial value   **(4mks)**

     ii.   If the machine was originally worth $ 12,000 , how much will it be worth when it is 10 years old   (3 **mks)**

QUESTION SIX   (15 MKS)

a) A manager has found that the marginal cost is $3q^2 - 60q + 400$ dollars per unit when q units have been produced. The total cost of producing the first 2 units is $ 900. What is the total cost of producing the first 10 units? **(5 mks)**

b) A company has analyzed their prices and costs and have developed the following functions
Revenue (ksh) $= 400Q - 8Q^2$
Cost (ksh) $= Q^2 + 10Q + 40$
Where Q is the number of units sold
Find the:
    i) quantity that the firm should produce in order to maximize profit
                                                              (5 mks)
    ii) price of each unit   (3 mks)
    iii) amount of profit   **(2 mks)**

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