KABARAK **UNIVERSITY**

UNIVERSITY EXAMINATIONS
2009/2010 ACADEMIC YEAR
FOR THE DEGREE OF BACHELOR OF COMMERCE

COURSE CODE: FNCE 120
COURSE TITLE: MANAGEMENT MATHEMATICS 1

STREAM: Y1S2

DAY: WEDNESDAY

TIME: 9:00 – 11:00 A.M

DATE: 08/12/2009

Instructions
Answer question ONE and any other TWO questions

QUESTION ONE (30 MARKS)

a) A market research survey on the reading habits of 300 persons gave the following data in respect of three leading Newspapers namely; Nation, Standard and Times.

	No. of people
Read Nation	100
Read Standard	140
Read Times	125
Read Nation and Standard	50
Read Standard and Times	30
Read Times and Nation	40
Read all three	20

Find out the following:

i)   The number of people who read just one newspaper   (3mks)

ii) The number of people who read just newspaper   (3mks)

iii) The number of people who do not read any of the newspaper   (3mks)

b) Solve $\log_2(x^2 - 6x) = 3 + \log_2(1 - x)$ (4mks)

c) Expand $(1 + x)^{16}$ upto the term in x3 hence use your expansion to evaluate $(1.02)^{16}$ and $(0.98)^{16}$ (5mks)

d) Determine the break-even quantity of XYZ manufacturing Co. given the following data: Total cost kshs. 1200; variable cost per unit Kshs. 2; total revenue for selling q units $Y_{TR} = 100\sqrt{q}$ (6mks)

e) Integrate the following function

$$\int (2x + 7)^6 \, dx$$ (6mks)

QUESTION TWO (20 MARKS)

a) Assume the following relationship for revenue and cost functions. Find out at what level of output Q, where Q is measured in tons per week is profit maximum?

$R(Q) = 1000Q - 2Q^2$

$C(Q) = Q3 - 59A2 + 1315Q + 5000$ (4mks)

b) Two points on a linear supply function are (10, 30,000) and (15, 60,000)

    i) Determine the supply function q=f (p) (3mks)

    ii) What price would results in supplier offering 50,000 units (3mks)

    iii) Determine and interpret the P intercept (3mks)

c) Differentiate the following functions

    i) $y = (5x + 7)(3x^2 + 5)$ (4mks)

    ii) $y = \dfrac{4x^2 + 2}{x^6}$ (4mks)

QUESTION THREE (20 MARKS)

a) A business conducted a survey to determine the demand function for a product. Consumers were asked questions if they would purchase the product at various price and from their responses constructed estimates of market demand at various market prices. After sample data points were plotted, it was concluded that the demand relationship was estimated best by a Quadratic function. Researchers concluded that the quadratic representative was valid for prices between 5 and 45. Three data points chosen for fitting the curve were (5,2025), (10,1600) and (20,900).

Determine the Quadratic demand function and sketch the curve. (12mks)

b) The sales revenue function of a firm is given below, where units of machine input (M) and units of the labour input (L) have been treated as independent variables.

$R = 18L + 24M + 10ML - 5M^2 - 5M^2 - 8L^2$

Determine the amount of machine and labour inputs needed to maximize the revenue.

(8mks)

QUESTION FOUR (20 MARKS)

a) The supply and demand function for a product are $q_2 = p^2 - 200$ and $q_d = p^2 - 20p + 2200$. Determine the market equilibrium price and the quantity. (6mks)

b) If a manufacturer average-cost equation is $\bar{c} = 0.0001q^2 - 0.02q + 5 + \dfrac{500}{q}$

   i)   Find the marginal–cost function (9mks)

   ii) What is the marginal cost when 50 units are produced (5mks)

QUESTION FIVE (20 MARKS)

a) Examine the following for any critical region and determine their nature

   $f(x) = -4000e^{-0.01x} - 30x + 400$ (12mks)

b) Find the limits of the following:

   i) $\lim\limits_{x \to 3} \dfrac{x^2 - 3x}{x + 7}$ (4mks)

   ii) $\lim\limits_{x \to \infty} \dfrac{5x^2 + 3}{3x^2 - 2}$ (4mks)