KABARAK **UNIVERSITY**

EXAMINATIONS

2008/2009 ACADEMIC YEAR

FOR THE DEGREE OF BACHELOR OF COMMERCE & BACHELOR OF EDUCATION SCIENCE

COURSE CODE: **MATH 100**

COURSE TITLE: **GENERAL MATHEMATICS**

STREAM: **Y1S1**

DAY: **TUESDAY**

TIME: **11.00-1.00 P.M.**

DATE: **9/12/2008**

INSTRUCTIONS:

Answer question ONE and any other TWO

PLEASE TURN OVER

QUESTION ONE (30 Marks)

a) Solve the following for x

   i) $\log_2 x = 5 - \log_2(x+4)$ (**4 marks**)

   ii) $3^{2x} - 12(3^x) + 27 = 0$ (**5marks**)

   iii) $\dfrac{1}{x+5} = \dfrac{2}{x-3} + \dfrac{2x+2}{(x+3)(x-3)}$ (**5 marks**)

b) Differentiate the following functions

   i) $y = (5x+7)(3x^2 + 5)$ (**5marks**)

   ii) $y = \dfrac{4x^2 + 2}{x^6}$ (**5marks**)

c) The monthly profits of 100 trading firms are as given as follows:

Profits('000')	Number of firms
0-50	15
50-100	17
100-150	24
150-200	21
200-250	16
250-300	7

Draw histogram and frequency polygon   (**6 marks**)

QUESTION TWO (20 MARKS)

a) In an attempt to estimate potential future demand, a national Motor Company did a study asking married couples how many cars the average energy-minded family should own in 1998. For each couple, National averaged the husbands and wife's responses to get the overall couple response. The answers were then tabulated:

Number of cars	0	0.5	1.0	1.5	2.0	2.5
Frequency	2	14	23	7	4	2

i)   Compute the mean   (**4marks**)

ii)   Calculate the standard deviation   (**4marks**)

iii)   Calculate the variance   (**3marks**)

iv)   Calculate coefficient of variation   (**3 marks**)

b) Given the lines x - 2y = 4, find the equation of the line that passes through (2,-3) and is

     i)   Parallel to the given line   (**3 marks**)

     ii)   Perpendicular to the given line   (**3 marks**)

QUESTION THREE (20 MARKS)

a) Find the limits of the following:

    i) $l\,im\limits_{x\to 3} \dfrac{x^2 - 3x}{x+7}$ (**4 marks**)

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

b) From a committee of 10 people

    i)   In how many ways can we choose a chairperson, a vice- chairperson and a secretary assuming that one person cannot hold more than one position   (**3 marks**)

    ii)   In how many ways can we choose a subcommittee of three people

                           (**3 marks**)

    iii)   Compute the following function by first principle
$$f(x) = 3x^3 + 2x - 1$$ (**6marks**)

QUESTION FOUR (20 MARKS)

a) Given $A = \begin{pmatrix} -1 & 1 & 2 \\ 2 & 3 & -2 \end{pmatrix}$ $B = \begin{pmatrix} 1 & 2 \\ 3 & -4 \\ 5 & 6 \end{pmatrix}$ Find AB   (**5 Marks**)

b) Solve $-\dfrac{1}{2} < \dfrac{3-x}{-4} \le \dfrac{1}{2}$ (**4 marks**)

c) Consider an accounts receivable auditor examining customer accounts for a client. Past records indicate that the mean of ksh 5000 and a standard deviation ksh 1000.

    i)   What is the probability that an account selected at random will have a balance of more than ksh 5000   (**2 marks**)

    ii)   What is the probability that an account selected at random will have a balance between ksh 5000 and 6500   (**3 marks**)

    iii)   What is the probability that an account selected at random will have a balance of more than ksh 7000   (**3 marks**)

    iv)   What is the probability that an account selected at random will have a balance of less than ksh 4000   (3 **marks**)

QUESTION FIVE (20 MARKS)

a) Two factories manufacture the same machine parts. Each part is classified as having 0, 1, 2 or 3 manufacturing defects. The joint probability distribution is given below;

    Number of defects

	0	1	2	3
Manufacturer A	0.1250	0.0625	0.1875	0.1250
Manufacturer B	0.0625	0.0625	0.1250	0.250

    i)   A part observed to have no defect. What is the conditional probability that it was produced by manufacturer A   (**3 marks**)

ii)   A part is known to have been produced by manufacturer A. What is the probability that the part has no defect   (**3 marks**)

iii)   A part is known to have two or more defects. What is the conditional probability that it was manufactured by A   (**3 marks**)

iv)   A part is known to have one or more defects. What is the conditional probability that it was manufactured by B   (**3 marks**)

b) Find the integrals of the following functions;

i) $\int \left(2x^3 + 3x^2 - 12x + 4\right) dx$ (**4 marks**)

ii) $\int_2^6 \left(20 + 12x - x^2\right) dx$ (**4 marks**)