KABARAK   **UNIVERSITY**

UNIVERSITY EXAMINATIONS

2008/2009 ACADEMIC YEAR

FOR THE DEGREE OF BACHELOR OF THEOLOGY

COURSE CODE: MATH 001

COURSE TITLE: INTRODUCTORY MATHEMATICS

STREAM: **Y1S2**

DAY: **THURSDAY**

TIME: **2.00 – 4.00 P.M.**

DATE: **11/12/2008**

INSTRUCTIONS TO CANDIDATES:

1. Attempt **QUESTION ONE** and ANY **OTHER TWO (2) QUESTIONS**
2. Show all your workings

PLEASE TURN OVER

QUESTION 1 (25 marks)

(a) What are natural numbers? Give examples. *(4 marks)*

(b) Solve for x in the following equations:

    i)   4x - 2 = 2x + 10   *(2 marks)*

    ii) $\dfrac{x}{2} + \dfrac{x}{3} = 5$ *(3 marks)*

    iii) $\sqrt{3x - 2} = 4$ *(3 marks)*

(c) (i) The sum of two numbers is 21. if one number is twice the other. Find the numbers.

                                                   (4 marks)

   (ii) The sun of three consecutive even numbers is 30. Find the numbers.

                                                   (4 marks)

QUESTIION 2. (20 marks)

(a) What is a sample ?   *(4 marks)*

(b) The table below shows the CAT 1 scores for 45 students in MATH 100. Use this data to complete the table below and draw a graph that best describes these scores:

8	26	23	21	18	21	16	16	27
24	21	2	22	20	20	24	10	13
7	17	20	24	3	23	17	12	11
17	21	21	20	20	21	21	13	20
26	22	19	18	17	23	17	24	24

Classes	Tally	Frequency (f)
1 – 5		
6 – 10		
11 – 15		
16 – 20		
21 – 25		
26 – 30		

                                                          (6 marks)

(c) The weights of students in the MATH 210 class were determined and recorded as below;

            51   56   62   58   57

            62   66   64   62   65

    Determine;   (i). the mean, median and mode of these weights   *(6 marks)*

                    (ii). Q1, Q3 and IQR of these weights   *(4 marks)*

QUESTION 3

(a).   (i) Calculate the Simple Interest (*SI*) in the following case;

sh 3000 at 12% pa for 4 years   *(3marks)*

(ii) Calculate the rate of interest (*R*) in the following case;

sh 10,000 earning sh 600 in 3 years   *(3 marks)*

(iii) Find the time (*T*) in which simple interest (*SI*) on sh 25,000 at 12% pa is sh 2,000.
                                                          (4 marks)

(b).   (i) Find the principal if the amount earned after 3 years at 10% pa is sh 2,600.
                                                          (4 marks)

(ii) If a customer deposits sh 30,000 in a commercial bank which pays simple interest at the rate of 12% pa. what would be the amount in 5 years?   *(5 marks)*

QUESTION 4 (20 marks)

(a) number of sweets is divided in the ratio 3:5. if the smaller share is 6 sweets, how many sweets are there?   *(6 marks)*

(b) If 30 men working 8 hrs/day can finish a job in 50 days, how many hrs/day will 20 men be required to work in order to finish the job in 40 days?   *(7 marks)*

(c) Peter, Mwangi and David are partners in a business. They share profit and loses in the ratio 3:2:4 respectively. If the profit for the year 2005 was sh 360,000, find the share of each partner?   *(7 marks)*

QUESTION 5. (20 marks)
(a) Perform the indicated matrix operations if possible.

i. $\begin{bmatrix} -1 & 4 \\ 2 & -6 \end{bmatrix} - \begin{bmatrix} 1 & -2 \\ 0 & 5 \end{bmatrix}$
ii. $\begin{bmatrix} 4 & -1 & 0 \\ 2 & 1 & 3 \\ 1 & 0 & 4 \end{bmatrix} + \begin{bmatrix} -2 & 1 & 3 \\ 5 & 6 & -8 \\ 3 & 0 & 7 \end{bmatrix}$

iii. $\begin{bmatrix} -1 & 4 \\ 2 & -6 \end{bmatrix} \times \begin{bmatrix} 1 & -2 \\ 0 & 5 \end{bmatrix}$
iv. $\begin{bmatrix} -3 & 5 \\ 2 & 0 \\ 1 & 4 \end{bmatrix} \times \begin{bmatrix} -2 & 1 & 3 \\ 5 & 6 & -8 \end{bmatrix}$

                                                          (8 marks)

(b) Find the determinants of the following matrices if they exist;

$$i. \begin{bmatrix} 11 & 4 \\ -3 & 0 \end{bmatrix} \qquad ii. \begin{bmatrix} 0 & 2 & 1 \\ 3 & -1 & 2 \\ 4 & 0 & 1 \end{bmatrix} \qquad ii.i \begin{bmatrix} 0 & 4 \\ 3 & 2 \\ -2 & 1 \end{bmatrix} \qquad \text{(6 marks)}$$

(c) Given; $\begin{bmatrix} 3x & 5 \\ -1 & 4x \end{bmatrix} + \begin{bmatrix} 2y & -3 \\ -6 & -y \end{bmatrix} = \begin{bmatrix} 7 & 2 \\ -7 & 2 \end{bmatrix}$, find x and y. $\qquad$ (3 marks)

(d) The sum of two numbers is 20. If 4 is added to the larger number, the result is 3 times the smaller number. Find the numbers. $\qquad$ (3 marks)