

**KABARAK**



**UNIVERSITY**

**UNIVERSITY EXAMINATIONS**

**2008/2009 ACADEMIC YEAR**

**FOR THE DEGREE OF BACHELOR OF THEOLOGY**

**COURSE CODE: MATH 001**

**COURSE TITLE: INTRODUCTORY MATHEMATICS**

**STREAM: Y1S1**

**DAY: TUESDAY**

**TIME: 9.00 – 11.00 A.M.**

**DATE: 01/12/2009**

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**INSTRUCTIONS:**

Attempt question ONE and any other TWO questions

**PLEASE TURN OVER**

## QUESTION ONE

- (a) Find the value of  $x$  that satisfy the equation:  $4^{(3x + 6)} = 64$  **(3 marks)**
- (b) Evaluate the following: **(8 marks)**
- (i)  $6c_6$       (ii)  $7p_4$       (iii)  $8c_2$       (iv)  $10c_{10}$
- (c) Given that the equation of a line is  $y = 4x + 6$  What is
- (i) Its gradient **(1 mark)**
- (ii) Its y intercept **(1 mark)**
- (iii) The gradient of a line perpendicular to this line. **(2 marks)**
- (d) Consider the following data on the attendance of Sunday school in a local church:  
2, 3, 4, 5, 6, 8, 10, 10.  
Calculate;
- (i) The mean attendance **(2 marks)**
- (ii) The variance **(3 marks)**
- (iii) Standard deviation **(1 mark)**
- (e) Compute the simple interest on Ksh. 8400 at 4% p.a. for 4 years. **(2 marks)**
- (f) Solve the following simultaneous equation using matrix method:
- $$\begin{aligned} 3x - 2y &= 2 \\ 5x - 3y &= 22 \end{aligned}$$
- (4 marks)**
- (g) Use the properties of logarithms to simplify:
- (i)  $\log_3 27 + \log_3 9$  **(2 marks)**
- (ii)  $\log_4 (64)^{1/3}$  **(1 mark)**

## QUESTION TWO

- (a) Pastor Ngeno borrowed a sum of money at 12% simple interest p.a. to finance a church project. After 5 years, he paid Ksh. 128,000. Calculate the sum of money borrowed. **(5 marks)**
- (b) Solve the following equation using factorization method:
- (i)  $x^2 - 6x + 9 = 0$  **(2 marks)**
- (ii)  $2x^2 - 6x - 8 = 0$  **(3 marks)**

- (c) A church plans to buy a van after 3 years from now. The van is valued at Ksh. 220,000. If the members raised Ksh 80,000 and deposited at the beginning of the first year, and raised Ksh. 40,000 and deposited in the second year, what amount must they deposit at the beginning of the third year if compound interest is paid at 10% p.a. in order to be able to buy the van? **(10 marks)**

### QUESTION THREE

- (a) Determine the preset value of the following amount if the rate of interest is 10%
- (i) Ksh. 80,000 after three years **(2 marks)**
  - (ii) Ksh. 10,000 after two years **(2 marks)**
- (b) Without drawing the lines, state which of the pairs of lines below are perpendicular and which ones are parallel giving reasons for your answers in each case:
- (i)  $y = 8x + 7$ ,  $y = -\frac{1}{8}x + 3$  **(1 mark)**
  - (ii)  $2y = 7x - 2$ ,  $7y = -2x - 4$  **(2 marks)**
  - (iii)  $3y + 4x = 8$ ,  $y = -\frac{4}{3}x + 2$  **(2 marks)**
  - (iv)  $y = 2x + 4$ ,  $y = 2x + 3$  **(1 mark)**
- (c) If  $A = \begin{pmatrix} 2 & 3 \\ 1 & 4 \end{pmatrix}$  and  $B = \begin{pmatrix} 2 & -3 \\ 4 & 4 \end{pmatrix}$   
 Compute;
- (i)  $A^{-1}$  **(2 marks)**
  - (ii)  $B^{-1}$  **(2 marks)**
  - (iii)  $BA$  **(2 marks)**
  - (iv)  $|BA|$  **(1 mark)**
- (d) Evaluate;
- (i)  $-5 + -3$  **(1 mark)**
  - (ii)  $-3 - 3$  **(1 mark)**
  - (iii)  $-42 + 21$  **(1 mark)**

### QUESTION FOUR

- (a) Four persons are to be selected for a local church council. If twelve members have been identified, how many different groups of four could be selected for the council? **(4 marks)**

(b) The Bishop of AIC Kenya would like to visit seven church councils prior to the end of the year. However, it will be possible for the Bishop to visit only three district church councils. How many different itineraries can the Bishop and his staff consider? **(4 marks)**

(c) Evaluate  $\frac{d^2 y}{dx^2}$  of the following;  $y = x^3 + 4x^2$  **(2 marks)**

(d) Simply the following;

(i)  $(x^4)^3$  **(1 mark)**

(ii)  $\frac{x^3 \cdot x^8}{x^5}$  **(2 marks)**

(iii)  $x^6 \cdot x^4 \cdot x^{-3}$  **(1 mark)**

(e)  $\frac{\log 27}{\log 9}$  **(2 marks)**

(f) Show that;

(i)  $\tan 60 = \sqrt{3}$

(ii)  $\cos 45 = \frac{1}{\sqrt{2}}$

using suitable triangles **(4 marks)**

### QUESTION FIVE

(a) Evaluate the definite integral  $\int_0^2 (x^4 + 3)dx$  **(3 marks)**

(b) Define the term statistics **(2 marks)**

(c) The Age of 40 members of a local church are shown in the table below;

Age	11 – 14	15 – 18	19 – 22	23 – 26	27 – 30	31 – 34
Number of Members	0	8	16	11	4	1

Determine;

- (i) The mean Age **(5 marks)**
- (ii) The median Age **(3 marks)**

(d) Express the following in logarithmic notations;

(i)  $4^2 = 16$

(ii)  $1728 = 12^3$

(iii)  $3^{9/2} = 27$

**(3 marks)**

(e) Show that  $2^0 = 1$

**(2 marks)**

(f) Show that  $a^{-n} = \frac{1}{a^n}$

**(2 marks)**