JARAMOGI OGINGA ODINGA UNIVERSITY

OF SCIENCE & TECHNOLOGY

UNIVERSITY EXAMINATIONS 2012/2013

1ST YEAR 1ST SEMESTER EXAMINATION FOR THE DIPLOMA IN COMMUNITY HEALTH AND DEVELOPMENT

(KISUMU LEARNING CENTRE)

COURSE CODE: SMA 2111

COURSE TITLE: MATHEMATICS I

DATE: 18/8/2013 **TIME: 2.00-3.30PM**

DURATION: 1.30 HOURS

INSTRUCTIONS

1. **This paper consists of 5 Questions.**
2. **Answer Question 1 (Compulsory) and any other 2 questions.**
3. **Write your answers on the answer booklet provided.**

QUESTION ONE **(30 Marks)**

a. Determine the inverse of the function defined as $f(x) = 2x^2 + 4$ (3 marks)

b. Copy and complete the table below

Angle θ in degrees	30^o		345^o	
Angle θ in radians		3.142^c		$2.25\pi^c$
Cosec θ				

(3 marks)

c. Solve the quadratic equation given below using the completing square method.

$x^2 + 7x - 2 = 0$

(3Marks)

d. Prove the trigonometric identity below

$(\sin^{-} + \cos^{-})^2 = 1 + 2\sin^{-}\cos^{-}$ (3 Marks)

e. Express the surd $\sqrt{243000}$ in its simplest form

(3 Marks)

f. The second term of an A.P is 11 and the fifth term is 26. Determine the last term if there are 100 terms in the series. (3 Marks)

h. Expand $(x + 2y)^8$ (3 Marks)

i. In a Mathematics Diploma class, the duration in minutes, taken by some 10 students to recall the mathematical concepts they learnt in the secondary school syllabus were measured and recorded as shown.

4, 7, 9, 12, 14, 17, 20, 22, 24, 25.

Determine the variance of these 'thinking' durations (3Marks)

j. Solve the triangle whose dimensions are provided as.

$$a = 3cm, A = 56^0, c = 5cm$$

(3 marks)

QUESTION TWO (15 MARKS)

a. Define the following terms
   i) Function
   ii) Domain of a function
   iii) Range of a function

(3 Marks)

b. A function is defined as $f(x) = 5x^2 + 6x - 10$

Evaluate i) $f(5)$ ii) $f(4+h)$ (6 Marks)

c. Given that $g(x) = 2x^2 + x + 11$ and $h(x) = 2x + 5$, Evaluate

i) $g[h(x)]$ ii) $h[g(x)]$ (6 Marks)

QUESTION THREE (15 MARKS)

a. A quadratic equation takes the general form $ax^2 + bx + c = 0$ where a, b and c are constants. Show that its general solution is given as

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$ (7 marks)

b.Using the general solution in (a) above solve the equation

$2x^2 - 7x - 15 = 0$ (3 Marks)

c.Prove the following trigonometric identity

$$\sec^{2-}\cos ec^{2-} = \sec^{2-} + \cos ec^{2-}$$

(5 marks)

QUESTION FOUR (15 MARKS)

a. In an arithmetic series the first term is 16 while the last term is 60. If the sum of all the terms in the series is 342, determine the common difference and the number of terms in the series.

(5 Marks)

b. In a Geometric Progression, the first term is ***a*** while the common ratio is ***r***. Show that the sum of the first ***n*** terms, S_n is given by

$$S_n = \frac{a(r^n - 1)}{r - 1}$$ (6 marks)

c. In a GP, the first term is 3 while the common ratio is 4, determine the sum of the first 10 terms.

(4 marks)

QUESTION FIVE (15 MARKS)

In a community health class of 40 students, a survey was carried out to determine the number of times each student had participated in any anti-syphilis campaign.
The following were the responses obtained from each student.

22 ; 46 ; 35 ; 68 ; 67 ; 49 ; 55 ; 44

44 ; 29 ; 35 ; 34 ; 42 ; 37 ; 40 ; 42

41 ; 30 ; 59 ; 62 ; 26 ; 47 ; 45 ; 37

23 ; 29 ; 56 ; 51 ; 38 ; 35 ; 43 ; 47

46 ; 45 ; 61 ; 53 ; 52 ; 55 ; 48 ; 45

i. Using classes of 20-29, 30-39,…… up to 60-69. Construct a frequency distribution table.
(5 marks)

ii. From the frequency distribution table made (i) above, determine the mean, the median, the variance and the standard deviation of the frequency of the visits.

(10 marks)