SET C

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DEPARTMENT OF MATHEMATICAL SCIENCES

2009/2010 HARMATTAN SEMESTER EXAMINATION

COURSE CODE: MAT 101

COURSE TITLE: ELEMENTARY MATHEMATICS 1 Time: 2hrs

INSTRUCTION: ANSWER ALL QUESTIONS

APRIL 2010

NAME:Matric No:

DEPARTMENT:OPTION:

1. Solve for y if $9^y - 4(3^y) + 3 = 0$

Re-write the equation to have a common base i.e $3^{y(2)} - 4(3^y) + 3 = 0$

Let $3^y = p$

$\Rightarrow p^2 - 4p + 3 = 0$

Factorise

$p^2 - 3p - p + 3 = 0$

$p(p-3) - 1(p-3) = 0$

$(p-1)(p-3) = 0$

$p = 1$ or 3

To get y

Recall $p = 3^y$

When $p = 1$, $3^0 = 3^y$

$\Rightarrow y = 0$

When $p = 3$, $3^1 = 3^y$

$\Rightarrow y = 1$

2. A sequence is defined by the rule $a_1 = 0$, $a_2 = 2$ and $a_r = a_{r-1} - a_{r-2}$ for $r \geq 2$ find the sum of the first six terms of the sequence.

$U_1 = 0$, $U_2 = 2$

$U_3 = U_2 - U_1$

$U_3 = 2 - 0 = 2$

$U_4 = U_3 - U_2$

$= 2 - 2$

$U_4 = 0$

$U_5 = U_4 - U_3$

$U_5 = 0 - 2 = -2$

$U_6 = U_5 - U_4$

$U_6 = -2 - 0 = -2$

$U_1 + U_2 + U_3 + U_4 + U_5 + U_6$

$= 0 + 2 + 2 + 0 - 2 - 2 = 0$

3. The first term of an A.P is 3 common difference is 4 and all terms is 820. Find the number of terms and last terms.

$a = 3$, $d = 4$, $S_n = 820$

$S_n = \frac{n}{2}[2a + (n-1)d]$

$820 = \frac{n}{2}[2 \times 3 + (n-1)4]$

$= n[6 + 4n - 4]$

$n[2 + 4n]$

$2n + 4n^2$

$-1640 = 0$

$n = \frac{-2 \pm \sqrt{2^2 - 4(4) \times 1640}}{2 \times 4}$

$n = \frac{-2 \pm \sqrt{26244}}{8}$

$n = \frac{-2 \pm 162}{8}$

$n = 20$ or $n = -20.5$

Last term

$L = a + (n-1)$

$L = 3 + (20-1)$

$L = 79$