

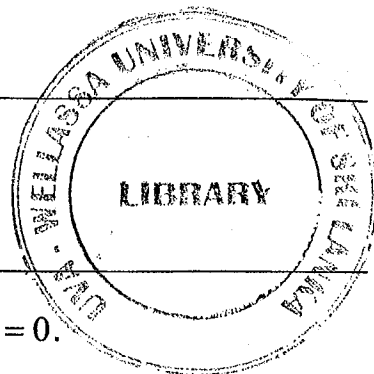
Uva Wellassa University, Sri Lanka
End Semester Examination – March 2011
SCT 104-2 Essential Mathematics
(For Re-repeaters Only)



Time: Two (02) hours

Total four (04) questions.

Answer all questions.



01. (i) Find the solutions x_1 and x_2 for the equation of $x^2 - px + q = 0$.

(ii) Using part (i) show that;

a.) $x_1 + x_2 = p$

b.) $x_1 \cdot x_2 = q$

(iii) Solve the equation $x^2 - x - 3 = x - 8$

(iv) If $Z = -2 - 3i$, then show that $Z\bar{Z} = |Z|^2$

02. (i) Find the partial fractions of $\frac{x^2 + x + 1}{x^3 + 2x^2 - x - 2}$

(ii) Find the partial fractions of $\frac{2x^2 - x + 3}{(x+1)(x^2 + 2x + 3)}$

03. (a) (i) Solve $\log_3 x - \log_3 3 = \log_3 16 - \log_3(2x + 10)$

(ii) Solve and Graph $3(x^2 + 1) \leq 4 - x - 3x^2$

(iii) Show that $\log_a b = \frac{1}{\log_b a}$; $a, b \neq 1$

(b) (i) Show that ${}^n C_3 = {}^n C_{n-3}$ for $n \geq 3$

(ii) Suppose that you have 6 people but only 4 chairs. How many arrangements of the 6 people can be seated in the 4 chairs?

04. (a) (i) Expand $\left(2x - \frac{1}{x}\right)^4$

(ii) Find the middle term of $\left(\frac{x^2}{2} - 1\right)^8$

(b) (i) Prove the identity $\cos^4 A - \sin^4 A = \cos 2A$

(ii) Using your knowledge of Sum and Double Angle formulas derive the expression for $\cos 3x$.

(Keep the answer with one parameter)