EASTERN UNIVERSITY, SRI LANKA

FIRST YEAR FIRST SEMESTER EXAMINATION IN AGRICULTURE – 2009/2010

(MAY/JUNE 2011)

AE 1102 – APPLIED MATHEMATICS FOR AGRICULTURAL SCIENCE (1:15/00)

Answer all questions
Time: One hour

01. (a) i. Find the equation of the line passing through the points $(2, 1)$, $(-3, 2)$.

    ii. Find the equation of the line, which passes through the point $(-7, 8)$ and perpendicular to the above line in (i).

    iii. What is the point of intersection of those two lines in (i) and (ii).

(b) i. Let $A = \begin{pmatrix} -3 & -2 & 1 \\ 6 & 10 & 3 \\ -4 & -3 & 11 \end{pmatrix}$, $B = \begin{pmatrix} 2 & -6 & 8 \\ -7 & 12 & 5 \\ 2 & 0 & 4 \end{pmatrix}$, and $C = \begin{pmatrix} 2 & -6 & 8 \\ -7 & 12 & 5 \\ 2 & 0 & 4 \end{pmatrix}$.

    Find the matrix $A+3B-2C$.

    ii. Multiply the following matrices X and Y, where

$$X = \begin{pmatrix} 5 & -8 & 4 \\ -3 & -7 & 6 \\ 9 & -4 & 1 \end{pmatrix} \quad Y = \begin{pmatrix} -7 & 9 \\ -2 & 0 \\ 3 & -3 \end{pmatrix}.$$

(c) Evaluate the following limits:

    i. $\lim\limits_{x \to 3} \dfrac{1}{x-3} - \dfrac{3}{x^2-3x}$;

    ii. $\lim\limits_{x \to 2} \dfrac{x^2 - 5x + 6}{x^2 - 4}$.

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2. (a) Differentiate the following functions with respect to the variable x:

    i. $y = (4x^2+3x)(2x+1)$;

    ii. $y = (x+3)/(x^2+7x+1)$;

    iii. $y = (x^2+2x)^4/(x^3+3x^2+7)^3$;

    iv. $y = e^{(5x+3x)} (6x^3+4x+5)^6$.

(b) Integrate the following with respect to x:

    i. $(2x+3)(x^2+3x+5)$;

    ii. $x^3/(x^4+6)$;

    iii. e^{11x};

    iv. $(3x^2+14x)/(x^3+7x^2+2)$.