EASTERN UNIVERSITY, SRI LANKA
FIRST YEAR FIRST SEMESTER EXAMINATION IN AGRICULTURE- 2006/2007
(July/ August 2009)
EXTERNAL DEGREE
AEN 1103 BASIC MATHEMATICS (1:15/00)

Answer all questions
Time: 1 hour

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01. A. Evaluate the following

$(i) \lim_{x \to 5} \dfrac{x^2 - 25}{x - 5}$

$(ii) \lim_{x \to \alpha} \dfrac{x^4 + x^3 + 3x^2 + 5}{7x^4 + 3x^2 + 4}$

$(iii) \lim_{x \to \alpha} \dfrac{7 - 3x^2}{4x^2 + 3x - 2}$

B. Prove the following

(i) $\dfrac{1 + \sin x}{\cos x} + \dfrac{\cos x}{1 + \sin x} = 2 \sec x$

(ii) $\dfrac{\cot x + \cos ec\ y}{\tan y + \tan x \sec y} = \cot x . \cot y$

02. A. Differentiate the following with respect to x

(i) $y = \dfrac{x^2 - 4x}{7}$

(ii) $y = \ln\left(x^2 e^x\right)$

(iii) $y = e^{\left(x^2 + 1\right)}$

(PTO)

B. Find $\dfrac{dy}{dx}$ if $x = 3z^2$ and $y = 8z^2 + 11z$

03. (i) If $y = x^3 - 3x^2 - 9x + 27$, find $\dfrac{dy}{dx}$ and hence find $\dfrac{d^2 y}{dx}$ when the gradient is zero.

(ii) Show that the curve has a stationary point when $x = -1$ and also show that it is a maximum point.

04. Find the following integrals

(i) $\displaystyle\int \left(\dfrac{x^4 + x}{\sqrt{x}} \right) dx$

(ii) $\displaystyle\int (2x - 3)^2 \, dx$

(iii) $\displaystyle\int \sqrt{(x^2 + 2x)} \, (x + 1) \, dx$

(iv) $\displaystyle\int \dfrac{x^2 + 2x}{\sqrt{(x^3 + 3x^2 + 2)}} \, dx$