

Eastern University, Sri Lanka
Faculty of Commerce and Management

First Year Second Semester Examination in Bachelor of Business Administration and
Bachelor of Commerce 2009/2010 (December 2011)
Proper/Repeat

COM 1032 Basic Calculus

Answer all questions	Time	: 2.00 Hours
Calculators are permitted	Number of questions	: 04
	Number of pages	: 03

01. (I). Find the domain of the following functions.

a. $f(y) = \frac{1}{\sqrt{9-x}}$

b. $f(x) = \frac{x-7}{x^2+x-6}$

(04 Marks)

(II). Find the limits of the following expressions:

a. $\lim_{x \rightarrow -1} \frac{x^2 - 1}{x + 1};$

c. $\lim_{x \rightarrow \infty} \frac{4x^5 + 3x^3 + 2x}{2x^5 + 6x^2};$

b. $\lim_{x \rightarrow 0} \frac{\sqrt{1-x} - 1}{x};$

d. $\lim_{x \rightarrow 1} \frac{\sqrt{5-x} - 2}{\sqrt{10-x} - 3}.$

(10 Marks)

(III). If $r(x) = x + 1$, $m(x) = 6x^2 + 2x$ and $h(x) = x^2 - 5x + 8$;

then evaluate the following:

a. $m(4)$; b. $(h(2)+r(1)) - m(7)$; c. $r(m(h(3)))$.

(06 Marks)

(IV). Find the following:

- a. degree of each polynomial,
- b. maximum number of turning points;
- c. maximum number of x intercepts;
- d. minimum number of x intercept;
- e. maximum number of y intercepts;
- f. minimum number of y intercept; for each of the following polynomial.

i). $y(x) = ax^2 + bx + c, \quad a \neq 0$

ii). $y(x) = ax^4 + bx^3 + cx^2 + dx + e, \quad a \neq 0$

iii). $y(x) = ax^5 + bx^4 + cx^3 + dx^2 + ex + f, \quad a \neq 0$

(05 Marks)

(Total: 25 Marks)

02. (I). Differentiate the following functions with respect to x ;

a.
$$y(x) = \frac{7x^5 + 6\sqrt{x^3} + 4x}{x};$$

d.
$$u(x) = 5(x^2 + 3x + 5)^7;$$

b.
$$f(x) = (2x^4 - 3x + 5)(x^2 + 5\sqrt{x});$$

e.
$$g(x) = \frac{3x^3 + x^2 + 5}{e^{x^3 + 5x}};$$

c.
$$f(x) = (x^3 - 2x)^5 \ln(2x^2 + 3)$$

(15 Marks)

(II). Find second derivative of the function.

$$y = (2x^2 + 5)^3$$

(03 Marks)

(III). Determine:

a. turning point;

b. axis of symmetry;

c. and define maximum or minimum of the following functions:

i.
$$y = 2x^2 - 12x + 10;$$

ii.
$$y = x^3 + x^2 - 5x + 10$$

(07 Marks)

(Total: 25 Marks)

03. A company manufactures and sells x television sets per month. The monthly cost and price-demand equation are:

$$c(x) = 72000 + 60x$$

$$p = 200 - \frac{x}{30} \quad 0 \leq x \leq 6000$$

where

c : cost for producing television

p : price per television

x : number of television

then;

a. find average cost function;

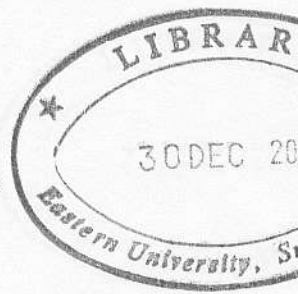
b. find revenue function $R(x)$.

c. find profit function $Pr(x)$;

d. find the output which maximise the profit function;

e. and based on the output level result in (d.), find total revenue, total cost and total profit.

(Total: 20 Marks)



04. (I). Integrate the following function.

a. $\int \frac{8x^3 + 5x^2 + x + 3}{x^3} dx$

c. $\int (3x + 4)^{10} dx$

b. $\int \left(2e^x + \frac{3}{x} \right) dx$

(09 Marks)

(II). Integrate function using partial fraction;

$$\int \frac{x+3}{(x^2-1)(x+5)} dx$$

(05 Marks)

(III). Evaluate the following definite integrals.

a. $\int_2^5 \frac{1}{\sqrt[3]{x^2}} dx$

b. $\int_1^3 \left(\sqrt{x} - \frac{1}{x^2} \right) dx$

(06 Marks)

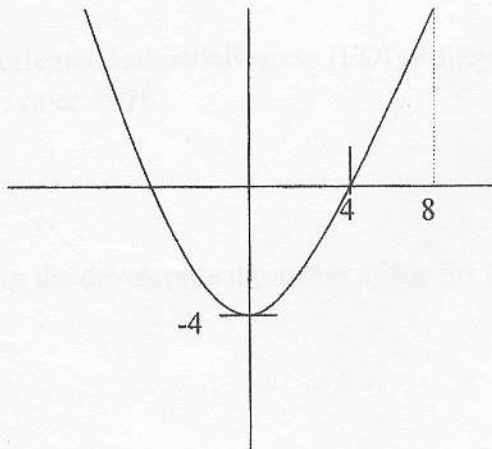
(IV). Find consumers' surplus at a price level of $p = \text{Rs. } 120$ for the price-demand function,

$$p = D(x) = 200 - 0.02x, \text{ using integration technique.}$$

(05 Marks)

(V). Find the area of the following function as shown in the figures.

$$f(x) = 0.25x^2 - 4 \text{ for } 0 \leq x \leq 8$$



(05 Marks)

(Total: 30 Marks)