



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER I
SESSION 2010/2011**

COURSE : MATHEMATICS FOR MANAGEMENT
CODE : BSM 1813
PROGRAMME : BPA / BPB / BPC
DATE : NOVEMBER/DECEMBER 2010
DURATION : 3 HOURS
INSTRUCTION : ANSWER ALL QUESTIONS

THIS EXAMINATION PAPER CONSISTS OF 5 PAGES

Q1 (a) Find $\frac{dy}{dx}$ for $y = \frac{3 - (1/x)}{x + 5}$. (5 marks)

(b) If $y = \ln\left(\frac{\sin x}{\cos x}\right)$, show that $\frac{dy}{dx} = \sec x \csc x$. Then, evaluate $\frac{dy}{dx}$ when $x = \frac{\pi}{4}$. (6 marks)

(c) Let P be the total profit (in thousand), for a Mathematics module in t (months) given by the formula

$$P(t) = \frac{110t^3}{t^3 + 55}$$

- Determine the total profit for $t = 12$ months.
- Find the rate of profit, $\frac{dP}{dt}$.
- Calculate the rate of profit for $t = 12$ months.

(9 marks)

Q2 (a) Find the following integrations.

(i) $\int_1^2 \int_0^1 (e^y + xy - 2) dx dy$.

(ii) $\int_0^2 \frac{4x}{(x^2 + 1)^2} dx$.

(11 marks)

(b) Find the area of the indicated region in **Figure Q2**.

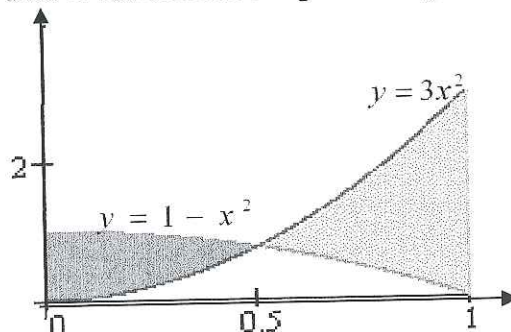


Figure Q2

(9 marks)

Q3 (a) Translate the sentences into inequalities.

- (i) The sum of 3 and a number is not more than -9 .
- (ii) A number plus 5 is not equal but less than 21.
- (iii) A number minus -4 is greater than 2.
- (iv) The sum of x and 5 less than x is not equal to -2 .
- (v) The sum of number and 2 more than the number is less than 20.

(5 marks)

(b) Solve $|4x+1| < \frac{7}{3}$.

(5 marks)

(c) Translate into symbolic form and by truth table, test the validity of this argument.

If the product has a higher price, then the product has quality.

If the product has a higher price or has quality, then the product is reliable.

The product has a higher price.

The product is reliable.

(10 marks)

Q4 (a) Evaluate the determinant of $C = \begin{pmatrix} 1 & 2 & 4 \\ -1 & 0 & 3 \\ 3 & 1 & -2 \end{pmatrix}$.

(5 marks)

(b) Given $Q = \begin{bmatrix} 1 & 1 & 1 \\ 1 & 2 & 4 \\ 1 & 3 & 9 \end{bmatrix}$, find the inverse of matrix Q by using the elementary row

operation.

(15 marks)

- Q5.** (a) Katie must place five stuffed animals: a duck, a goose, a panda, a turtle and a swan in a row in the display window of a toy store. How many different displays can she make if the duck and the goose must be either first or last?

(2 marks)

- (b) In how many arrangements can a teacher seats 3 girls and 3 boys in a row of 6 if the boys are to have the first, third, and fifth seats?

(2 marks)

- (c) A company manufactures three type of toys A, B and C. Each requires rubber, plastic and aluminum as listed in **Table Q5** below

Toy	Rubber	Plastic	Aluminum
A	2	2	4
B	1	2	2
C	1	2	4

Table Q5

The company has available 600 units of rubber, 800 units of plastic and 1400 units of aluminum. The company makes a profit of RM4, RM3 and RM2 on toys A, B and C respectively. Assume all toys manufactured can be sold. By using the simplex method, determine a production order so that the profit is maximum?

(16 marks)

FORMULAE

$$\int x^n dx = \frac{x^{n+1}}{n+1} + C, \quad n \neq -1$$

$$\int \frac{1}{x} dx = \ln |x| + C$$

$$\int \cos x dx = \sin x + C$$

$$\int \sin x dx = -\cos x + C$$

$$\int \sec^2 x dx = \tan x + C$$

$$\int \csc^2 x dx = -\cot x + C$$

$$\int \sec x \tan x dx = \sec x + C$$

$$\int \csc x \cot x dx = -\csc x + C$$

$$\int e^x dx = e^x + C$$