



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER I
SESSION 2011/2012**

COURSE NAME : MATHEMATICS FOR REAL ESTATE
MANAGEMENT

COURSE CODE : BWM 10702 / BSM 1812

PROGRAMME : 1 BPD

EXAMINATION DATE : JANUARY 2012

DURATION : 2 HOURS

INSTRUCTION : ANSWER ALL QUESTIONS IN **PART A**
AND **TWO (2)** QUESTIONS IN **PART B**

THIS EXAMINATION PAPER CONSISTS OF SIX (6) PAGES

PART A

Q1 (a) Differentiate each of the following function.

(i) $f(x) = x\sqrt{x} + \frac{2}{x} - \frac{4}{\sqrt{x}}$

(ii) $f(x) = x^2(x^2 - 2x)^4$

(iii) $f(x) = \ln 3x + \ln x^3$

(iv) $f(x) = \frac{x^3+1}{\cos 2x}$

(16 marks)

(b) Based on data from 1995 to 2007, the whole sale demand for CD may be modelled by

$$p(x) = 7.85 - \frac{138}{x}$$

ringgits per CD, where x is the number of CDs shipped by manufacturers (in millions). The financial data have been adjusted for inflation. In order for the price to be positive, x must equal at least 18 million CDs.

The cost function for CD retailers is the same as the revenue function for CD manufacturers, since retailers purchase their CD from the manufacturers.

Give your answer in **TWO** decimal places.

- (i) Find the product cost function for CDs retailers.
- (ii) Assuming that the average retail price of a CD is $p(x) = 9 - \frac{x}{200}$, find the revenue function for CD retailers.
- (iii) Find the profit function for CD retailers.
- (iv) Determine the quantity of CD, that will maximize the profit of CD retailers.

(9 marks)

Q2 (a) Evaluate the integrals below.

(i) $\int (3x - \frac{2}{x})^2 dx.$

(ii) $\int (\frac{x^2-2}{\sqrt{x}}) dx.$

(iii) $\int (e^{2x-1} + \frac{4}{1-2x}) dx.$

(12 marks)

(b) By using the substitution method, integrate

(i) $\int (3x^2 + 2)\sqrt{x^3 + 2x} dx$

(ii) $\int x e^{1-x^2} dx$

(8 marks)

(c) **Figure Q2** shows the curve $y = 3\sqrt{x}$ and the line $y = x$ intersecting at O and P . Give your answer in **ONE** decimal places.

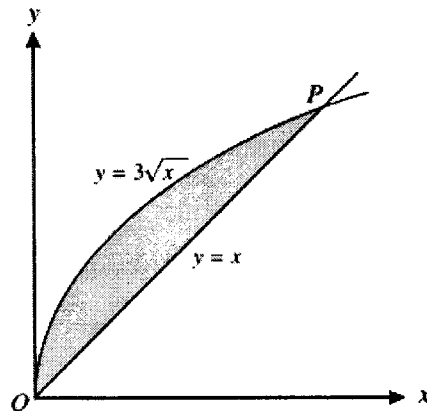


Figure Q2

Find

- (i) The coordinate of P .
 (ii) The area of the shaded region.

(5 marks)

PART B

Q3 (a) Find the set of values of x satisfying the inequality $|8 - 3x| < 2$.
(3 marks)

(b) Given that a is a positive constant, solve the inequality $|x - 3a| > |x - a|$.
(4 marks)

(c) Determine, using truth table, whether or not the following proposition is tautology or contradiction.

$$[(p \wedge q) \vee p] \Leftrightarrow (\sim q \Rightarrow p)$$

(8 marks)

(d) By using algebraic approach, solve the linear programming problem below.

Minimise
subject to

$$K = 4a + 3b + 2c$$

$$-3a - 2b + c \geq -2$$

$$a + b + c \geq 2$$

$$a + 2c \geq 3$$

$$a, b, c \geq 0.$$

(10 marks)

Q4 (a) Let p be “Anuska is a student” and q be “Anuska is hardworking” and r be “Anuska obtains good result”. Give a simple sentence which describes each of the following statement.

(i) $\sim q$

(ii) $p \vee q$

(iv) $(p \wedge q) \Rightarrow r$

(5 marks)

- (b) A box is dragged along the floor by a rope that applies a force of 100N at an angle 30° with the floor. Determine the work that is done in moving the box 5m.

(4 marks)

- (c) Rent-A-Car has three different types of vehicles, P, Q and R, for renting. These cars are located at yard A and B on either side of a city. Some cars are being rented. In total they have 150 cars. At yard A they have 20% of P, 40% of Q and 30% of R which are 46 cars in total. At yard B they have 40% of P, 20% of Q and 50% of R which are 54 cars in total. How many cars for each type do they have? Solve this problem by using Gauss Elimination Method.

(16 marks)

- Q5** (a) In how many ways can a team members consist of 3 boys and 2 girls be formed if 10 boys and 15 girls are eligible to serve on the team members?

(3 marks)

- (b) The judges in a 'Beautiful Baby' competition have to arrange 10 babies in order of merit. In how many different ways could this be done? Two babies are to be selected to be photographed. In how many ways can this selection be made?

(5 marks)

- (c) (i) Given matrix $A = \begin{bmatrix} k & 1 & 3 \\ 2k + 1 & -3 & 2 \\ 0 & k & 2 \end{bmatrix}$. Determine the values of k if $|A| = 0$.

(ii) With values k from c (i), form two matrices A.

(8 marks)

- (d) Two aeroplanes are flying in the direction given by the vectors $300i + 400j + 2k$ and $-100i + 500j - k$. A person from the flight control centre is plotting their paths on a map. Find the angle between their paths on the map. Give your answer in **TWO** decimal places.

(9 marks)

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Formulae**Differentiation And Integration Formula**

Differentiation	Integration
$\frac{d}{dx} x^n = nx^{n-1}$	$\int x^n dx = \frac{x^{n+1}}{n+1} + C, \quad n \neq -1$
$\frac{d}{dx} \ln x = \frac{1}{x}$	$\int \frac{1}{x} dx = \ln x + C$
$\frac{d}{dx} \log_b x = \frac{1}{x \ln b}$	$\int \frac{1}{x \ln b} dx = \log_b x + C$
$\frac{d}{dx} e^x = e^x$	$\int e^x dx = e^x + C$
$\frac{d}{dx} b^x = b^x \ln b$	$\int b^x \ln b dx = b^x + C$
$\frac{d}{dx} \sin x = \cos x$	$\int \cos x dx = \sin x + C$
$\frac{d}{dx} \cos x = -\sin x$	$\int \sin x dx = -\cos x + C$
$\frac{d}{dx} \tan x = \sec^2 x$	$\int \sec^2 x dx = \tan x + C$
$\frac{d}{dx} \cot x = -\csc^2 x$	$\int \csc^2 x dx = -\cot x + C$
$\frac{d}{dx} \sec x = \sec x \tan x$	$\int \sec x \tan x dx = \sec x + C$
$\frac{d}{dx} \csc x = -\csc x \cot x$	$\int \csc x \cot x dx = -\csc x + C$