



**INTI**  
**International College Penang**

FINAL  
Examination Paper

(COVER PAGE)

Session : AUGUST 2018

Programme : FOUNDATION IN BUSINESS INFORMATION TECHNOLOGY  
(CFPI)

Course : **MAT1215 : FUNDAMENTALS OF MATHEMATICS**

Date of Examination : 13 December 2018, Thursday

Time : 11:00AM – 1:00PM Reading Time : Nil

Duration : 2 Hours

Special Instructions :

This paper consists of **SIX (6)** questions. Answer any **FIVE (5)** questions in the answer booklet provided. ALL questions carry equal marks

Materials permitted :  
Non-Programmable Scientific Calculator

Materials provided :  
Formulae Booklet 1 & Graph Paper

Examiner(s) : **Dr. Ch'ng Pei Cheng**

Moderator : **Dr. CH'NG Pei Eng**

*This paper consists of 7 printed pages, including the cover page.*

INTI INTERNATIONAL COLLEGE PENANG

FOUNDATION IN BUSINESS INFORMATION TECHNOLOGY (CFPI)  
 MAT 1215: FUNDAMENTALS OF MATHEMATICS  
 FINAL EXAMINATION: AUGUST 2018 SESSION

Instructions: This paper consists of **SIX (6)** questions. Answer any **FIVE (5)** questions in the answer booklet provided. All questions carry equal marks. **Show complete working.**

**Question 1**

(a) List the element in the set  $\{ -7, -0.5, 0, \frac{3}{4}, 8, \sqrt{5}, 20.34 \}$  satisfy the given equation.

(i) Whole numbers

(ii) Irrational numbers

(iii) Integers

(3 marks)

(b) Simplify each expression by removing parentheses:

(i)  $(2x^3 - 3x^2 + 6x + 9) - 2(x^3 - x^2 + 7x)$

(3 marks)

(ii)  $(x + 5y)(2x - 3)$

(2 marks)

(c) Factorise each function completely.

(i)  $4x^2 - 25y^2$

(2 marks)

(ii)  $rs + 3r + 2s + 6$

(2 marks)

(iii)  $8x^2 + 18x - 5$

(2 marks)

(d) Simplify  $\frac{(x^6 y^3)^5}{(x^2 y)^2}$  and write your answer without any negative exponents.

(3 marks)

- (e) Rationalize the denominator of  $\frac{3}{2-\sqrt{3}}$ . (3 marks)

**Question 2**

- (a) Given point A (3,7) and B (2, -5).
- (i) Find the slope of the line AB. (2 marks)
- (ii) Find the equation of the line AB. (2 marks)
- (iii) Find the equation of the line goes through point A but perpendicular to line AB. (3 marks)
- (b) An electronic firm manufactures portable DVD players, receiving RM 120 for each unit it makes. The income received is determined by the revenue function  $R(x) = 120x$ . The manufacturer has fixed cost of RM12,000 per month and variable costs of RM 57.50 for each unit manufactured. Suppose  $x$  represents the number of units produced.
- (i) Find the cost and profit functions. (4 marks)
- (ii) How many DVD players must the company sold to break even. (3 marks)
- (iii) Determine the Marginal Profit function. Interpret the value. (3 marks)
- (iv) If 200 units of DVD players sold out, how much is the profit of the firms. (3 marks)

**Question 3**

- (a) Given  $f(x) = \frac{13-5x}{4}$  and  $g(x) = 8x-1$ . Find
- (i)  $g^{-1}(3)$ . (2 marks)
- (ii)  $(g \circ f)(x)$ . (3 marks)
- (b) (i) Find the 10<sup>th</sup> term of an arithmetic sequence whose 1<sup>st</sup> term is 5 and whose 5<sup>th</sup> term is 17. (3 marks)

- (ii) Find the sum of the geometric series  $40 + 80 + 160 + \dots + 20,480$ .  
(3 marks)
- (c) (i) How much should you invest now at 5% interest compounded quarterly to have RM20,000 toward the purchase of a car in 5 years?  
(3 marks)
- (ii) What is the present value of an annuity that pays RM300 per month for 5 years if money is worth 3% compounded monthly?  
(3 marks)
- (iii) An investment of RM 10,000 is increased to RM 20,000 in 15 years. If the interest was compounded continuously, find the interest rate.  
(3 marks)

**Question 4**

- (a) Given  $f(x) = 2x^2 + 3x - 5$ .
- (i) Find the vertex. (2 marks)
- (ii) Find the  $x$  and  $y$  intercepts. (2 marks)
- (iii) Hence, sketch the graph of  $f(x)$ . (3 marks)
- (b) Let  $A = \begin{bmatrix} 3 & 0 & -1 \\ 0 & 4 & 2 \\ 5 & -3 & 1 \end{bmatrix}$ ,  $B = \begin{bmatrix} 1 & -5 & 0 \\ 4 & 1 & -2 \\ 0 & -1 & 3 \end{bmatrix}$ . Find,
- (i)  $2A - 3B$ . (2 marks)
- (ii)  $AB$ . (3 marks)
- (c) Given matrix  $A = \begin{bmatrix} 1 & -1 & 1 \\ 0 & 2 & -1 \\ 2 & 3 & 0 \end{bmatrix}$ .
- (i) Find  $A^{-1}$ . (6 marks)

- (ii) Use the result from the above to solve the following system of linear equations:

$$\begin{aligned} x - y + z &= 4 \\ 2y - z &= 1 \\ 2x + 3y &= 9 \end{aligned}$$

(2 marks)

**Question 5**

- (a) A furniture manufacturing company manufactures dining- room tables and chairs. The relevant manufacturing data are given in the table below.

Department	Table	Chair	Maximum labor-hours available per Day
Assembly	8	2	400
Finishing	2	1	120
Profit per unit	RM90	RM25	

- (i) Write down all inequalities other than  $x \geq 0$  and  $y \geq 0$  which satisfy the above conditions.  
(3 marks)
- (ii) Draw the graph for all the inequalities. Hence, shade the region  $R$  which satisfies the above conditions.  
(3 marks)
- (iii) How many tables and chairs should be manufactured each day to realized a maximum profit? What is the maximum profit?  
(4 marks)
- (b) The price ( $p$ ) and the quantity ( $x$ ) of a certain product obey the demand equation  

$$p = -\frac{1}{6}x + 100, \quad 0 \leq x \leq 600.$$
- (i) Find the revenue function.  
(2 marks)
- (ii) What is the revenue if 200 units was sold?  
(2 marks)
- (iii) What quantity of  $x$  maximize the revenue? What is the maximum revenue?  
(3 marks)
- (iv) What price should the company charge to maximize revenue?  
(3 marks)

**Question 6**

- (a) Find the number of ways a family consisting of father, mother and 3 children can arrange themselves in a line for a group photo.
- (i) All in the photo in any sequence? (2 marks)
- (ii) All children must be together? (3 marks)
- (b) A company has 10 seniors and 5 junior officers. An ad hoc legislative committee is to be formed. In how many ways can a 4-officer committee be formed so that it is composed of
- (i) 3 seniors and 1 junior officer? (2 marks)
- (ii) At least 2 senior officers? (3 marks)
- (c) A city has two daily newspapers, the Sun and the Star. The following information was obtained from survey of 100 residents of the city: 35 people subscribe to the Sun, 60 subscribe to the Star, and 20 subscribe to both newspapers.
- (i) Draw the Venn diagram to represent the above data. (2 marks)
- (ii) How many people subscribe to the Sun but not to the Star. (2 marks)

(d) Copy Figure 1 and shade the following:

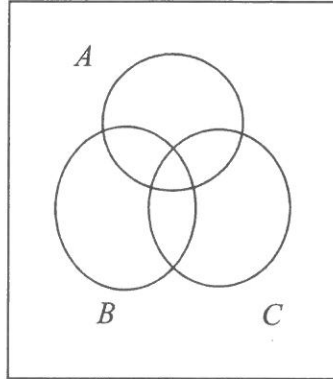


Figure 1

(i)  $A \cup (B \cap C)$

(3 marks)

(ii)  $(A \cap B') \cup C$

(3 marks)

