INTI
International College Subang
LAUREATE INTERNATIONAL UNIVERSITIES

FINAL
Examination Paper

(COVER PAGE)

Session	:	**April 2014**		
Programme	:	Diploma In Business (DIB)		
Course	:	**MAT1103 : Fundamentals Of Mathematics**		
Date of Examination	:	July 22, 2014		
Time	:	8:00am – 10:00am	Reading Time:	Nil
Duration	:	2 Hours		
Special Instructions	:			

Answer any **FOUR (4)** structured-type questions.

Materials permitted : Non-Programmable Calculator

Materials provided : Formula sheet

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Moderator : Dr. Ch'ng Pei Eng

This paper consists of 5 printed pages, including the cover page.

INTI INTERNATIONAL COLLEGE SUBANG

DIPLOMA IN BUSINESS PROGRAMME (DIB)
MAT1103: FUNDAMENTALS OF MATHEMATICS
FINAL EXAMINATION: APRIL 2014 SESSION

Instruction : Answer any **FOUR (4)** out of **SIX (6)** structured-type questions.

Question 1

(a) Simplify the expressions.

(i) $\left(\frac{x^2}{x-3}+\frac{9}{3-x}\right)^3$ (4 marks)

(ii) $\frac{x-2}{x^2-3x}+\frac{2x-1}{x^2+3x}-\frac{2}{x^2-9}$ (5 marks)

(b) Perform the division by using ***synthetic division*** method, write the answer in $Quotient + \frac{remainder}{divisor}$ form.

$$\frac{-3x^2+2x^3-2x+1}{x-3}$$

(4 marks)

(c) Simplify the expression, giving your answer in positive exponents only.

$$\left(\frac{9x^{-2}y^{\frac{1}{3}}}{4x^{\frac{1}{2}}y^{-\frac{3}{4}}}\right)^{\frac{3}{2}}$$

(5 marks)

(d) Factor completely: x^6-64 (3 marks)

(e) Simplify: $\sqrt{\frac{1}{2}}+\sqrt{\frac{1}{8}}$ (4 marks)

Question 2

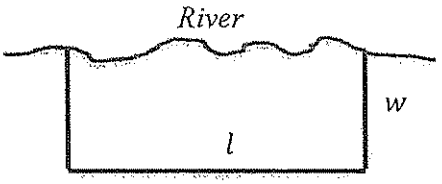
(a) Solve for the following equations for x.

(i) $x + \frac{2}{3} = \frac{2x-12}{3x-9}$ (5 marks)

(ii) $\frac{x}{x+2} = 1 - \frac{3x+2}{x^2+4x+4}$ (4 marks)

(b) Solve for x: $2 + \sqrt{x} = \sqrt{2x+7}$ (5 marks)

(c) A farmer has 624 feet of fencing to enclose the pasture shown below. Fencing will be needed on only three sides since river runs along one side. Find the dimensions of the pasture if its length is double the width.



(4 marks)

(d) Solve for x : $2\left|\frac{8x+2}{5}\right| - 1 \leq 0$ (5 marks)

(e) Expand : $\left(\sqrt{5x} - \sqrt{3}\right)^2$ (2 marks)

Question 3

(a) Solve the simultaneous equations.

$$x + 2y = 1$$
$$x^2 + 4y^2 = 13$$

(6 marks)

(b) Find the equation of the line which is perpendicular to the straight line $x + 2y - 6 = 0$ and passes through the point $(3, -4)$. (5 marks)

(c) Determine the length and midpoint of the line segment between $P(-5, -2)$ and $Q(7, 3)$. (3 marks)

(d) A family paid RM 52.50 for water in January when they used 15,000 gallons of water and RM 77.50 in May when they used 25,000 gallons.

(i) Find the equation that gives the amount of the water bill in terms of the number of gallons of water used. (5 marks)

(ii) How much does the family had to pay if they used 27,500 gallons of water? (2 marks)

(e) Solve for x : $3x^2 - 2x = 3$ (4 marks)

Question 4

(a) By using the Factor Theorem, show that $(x - 2)$ is a factor of $f(x) = 4x^3 - 6x^2 - 5x + 2$ (3 marks)

(b) Solve the following inequality.

$$\left|\frac{1}{5}x - \frac{5}{2}\right| - 2 \geq 2$$

(5 marks)

(c) Given $f(x) = \frac{x-1}{x+1}$ and $g(x) = \frac{2x+1}{x}$, find

(i) $f - g(x)$ (4 marks)

(ii) $f \circ g(x)$ (3 marks)

(iii) Solve for x, $(f \circ g)(x) = \frac{1}{2}$ (3 marks)

(d) Sketch the graphical solution for the following system of inequalities.

$$\begin{cases} x + y > 2 \\ 2x - y > 1 \\ 2 \leq x \leq 4 \end{cases}$$

(7 marks)

Question 5

(a) Graph the quadratic function $f(x) = x^2 - 4x - 12$, by showing the vertex, x-intercepts and y-intercepts clearly. (7 marks)

(b) Solve the systems of equations.

$$x - y + z = -4$$
$$2x + y + 2z = -5$$
$$3x - y - z = -6$$

(6 marks)

(c) Solve the following equations and give your answers to four significant figures if necessary.

(i) $\log_3 4x - \log_3(5x - 1) = 1$ (4 marks)

(ii) $3^{2x} = 5^{x+1}$ (5 marks)

(d) Given that $log_x 3 = p$ and $log_x 5 = q$, express $log_x \left(\frac{5x^2}{27}\right)$ in terms of p and q. (3 marks)

Question 6

(a) Find the sum of the positive even integers up to and including 250. (6 marks)

(b) The common ratio of a geometric sequence is 2 and the sum of the first 5 terms is -93. Find the first term and the third term. (5 marks)

(c) Find the inverse function for $f(x) = \frac{4+\sqrt[3]{4x}}{2}$ (4 marks)

(d) Expand $(x - 2y)^5$, in descending powers of x (6 marks)

(e) Find the 3rd term in the expansion of $\left(\frac{x}{2} + \frac{y}{3}\right)^5$ in descending powers of x. (4 marks)

-THE END-