INTI
International College Subang
LAUREATE INTERNATIONAL UNIVERSITIES

FINAL
Examination Paper

(COVER PAGE)

Session	:	**April 2015**
Programme	:	Diploma In Information And Communication Technology (DICTN)
Course	:	**MAT1103 : Fundamentals Of Mathematics**
Date of Examination	:	August 7, 2015
Time	:	11:00am – 1:00pm Reading Time:
Duration	:	2 Hours
Special Instructions	:	

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

Materials permitted : Non-Programmable Calculator

Materials provided : Nil

Examiner (s) : **Ms. Fang Yen Yen,** S.M. Elizabethrani.

Moderator : Dr. Ng Set Foong

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

INTI INTERNATIONAL COLLEGE SUBANG

DIPLOMA IN INFORMATION AND COMMUNICATION TECHNOLOGY (DICTN)
MAT1103: FUNDAMENTALS OF MATHEMATICS
FINAL EXAMINATION: APRIL 2015 SESSION

Instructions: This paper consists of **SIX (6)** questions. Answer any **FOUR (4)** questions in the answer booklet provided. All questions carry equal marks.

Question 1

(a) Simplify the expressions below to the simplest form and rewrite using only positive exponents.

(i) $\dfrac{xx^{-\frac{1}{3}}}{2x^5}$ (3 marks)

(ii) $\sqrt{32}+\sqrt{200}-\sqrt{27}$ (3 marks)

(iii) $\left(\dfrac{p^{-1}q^{-1}r^{-3}}{p^{-7}q^{-5}r}\right)^{\frac{1}{2}}$ (5 marks)

(iv) $\dfrac{\sqrt{2}}{\sqrt{2}-3}$ (4 marks)

(v) $\dfrac{x^2-4xy+4y^2}{3xy-6y^2}$ (3 marks)

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

(c) Solve $-2(x-4)=-6(x+2)+3x$ (2 marks)

Question 2

(a) Solve the inequalities:

(i) $-4 < 5-3x \leq 17$ (3 marks)

(ii) $|x-2| = -1$ (2 marks)

(iii) $|4x+5| > 3$ (4 marks)

(b) Given a polynomial $P(x) = 2x^4 - 10x^3 + 17x^2 - 14x - 3$.

(i) Show that $(x-3)$ a factor of $P(x)$. (2 marks)

(ii) Find the results if $P(x)$ is divided by $(x+3)$ (5 marks)

(iii) Find the gradient and intercepts for the equation, $x = -\frac{3}{4}y + 5$ (4 marks)

(c) Find the 5th term in the expansion for $\left(x^2 + \frac{1}{x}\right)^9$ (3 marks)

(d) Solve $x(x-9) = 0$. (2 marks)

Question 3

(a) Solve each equation. Check for extraneous solutions.

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

(ii) $2x = 1-\sqrt{2-x}$ (5 marks)

(b) Let $f(x)=\frac{1}{x}$ and $g(x)=2-x$, Find

(i) $(f+g)(x)$ (1 mark)

(ii) $(f \cdot g)(x)$ (2 marks)

(iii) $(g \circ f)(2)$ (3 marks)

(c) The sum of 3 consecutive integers is 456. What are the integers? (3 marks)

(d) Solve the system of equations. (6 marks)

$$2x-y-2z=-3$$
$$x+3y+z=-1$$
$$5x-4y+3z=10$$

Question 4

(a) Solve the systems of inequalities graphically. (6 marks)

$$\frac{3}{2}x - 3y \geq 6$$
$$2x + 2y \geq 14$$
$$x \geq 0$$
$$y \geq 0$$

(b) Given $f(x) = -2x^2 + 12x + 13$.

(i) Find the y-intercept and x-intercepts. (3 marks)

(ii) Find the vertex point. (2 marks)

(iii) Sketch the graph f (x). (3 marks)

(c) Solve $x = xe^{x+1}$. (4 marks)

(d) The sum of two numbers is 7 and the sum of their squares is 29. Find the two numbers. (5 marks)

(e) Find the midpoint between the points (–2, 4) and (–3, 2). (2 marks)

Question 5

(a) The lengths of the sides of a triangle are y^2, $y + 1$, and 7 meters. If the perimeter is 20 meters, what is the value of y?

(4 marks)

(b) Expand of $(2a+b)^5$ (3 marks)

(c) Given $k-3$, $k+1$ and $4k$ - 2 are first 3 terms of a geometric sequence.

(i) Find the possible values of k. (5 marks)

(ii) Find the first term and common ratio for each value of k (4 marks)

(d) Simplify each of the following logarithms.

(i) $\ln x^3 y^4 z^5$ (2 marks)

(ii) $\log_3\left(\frac{9x^4}{\sqrt{y}}\right)$ (4 marks)

(e) Simplify $5\sqrt{24}-3\sqrt{96}+9\sqrt{6}$.

(3 marks)

Question 6

(a) Find the sum of all the even numbers from 50 to 150, inclusive. (5 marks)

(b) Solve the following:

(i) $4\log(1-5x)=2$ (4 marks)

(ii) $\log x+\log(x-3)=1$ (4 marks)

(d) Sketch the graph of $y=-\frac{2}{5}x+3$ by showing its y-intercept and x-intercept points. And thus, find the distance of the y-intercept and x-intercept points. (5 marks)

(e) Find the inverse function of $f(x)=\sqrt{3-x}$. (3 marks)

(f) Find the 16^{th} term of a geometric progression whose first term is -2 and whose fourth term is -54. (4 marks)

~ The End ~

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