

**FINAL
ALTERNATIVE ASSESSMENT**

(COVER PAGE)

Session : January 2022

Programme : Diploma in Information Technology (DITN)
Diploma in Computer Science (DCS)

Course : **MAT1103: Fundamentals of Mathematics**

Date of Examination : 8 March 2022 (Tuesday)

Time : 8.00am – 10.30am Reading Time : Nil

Duration : 2 Hours 30 Minutes

Special Instructions :

This paper consists of **TWO (2)** sections. Answer **ALL** questions. All questions carry equal marks.

Material permitted : Non-Programmable Scientific Calculator

Materials provided : Nil

Examiner(s) : **Teng Mei Tuan, Mohd Hafis Zakaria**

Chief Moderator : S.M.Elizabethrani

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

DIPLOMA IN INFORMATION TECHNOLOGY PROGRAMME (DITN)
DIPLOMA IN COMPUTER SCIENCE PROGRAMME (DCS)
MAT1103: FUNDAMENTALS OF MATHEMATICS
FINAL ALTERNATIVE ASSESSMENT: JANUARY 2022 SESSION

Instruction: This paper consists of **TWO (2)** sections. Answer **ALL** questions. All questions carry equal marks.

Section A: (50 marks)

Question 1

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

(i) $\left(\frac{14x^3y^{-5}z^7}{-2xy^{10}}\right)^{-1}$ (3 marks)

(ii) $\sqrt{27} + \sqrt{48} - \sqrt{12}$ (3 marks)

(iii) $\frac{5\sqrt{x}}{1-2\sqrt{x}}$ (3 marks)

(iv) $(\sqrt{2} + 3)(\sqrt{2} - 5\sqrt{18})$ (3 marks)

(b) Solve the following inequalities.

(i) $-5 < 1 - 2x \leq 9$ (4 marks)

(ii) $\frac{1}{3}|6 + 2x| > 9$ (4 marks)

(c) Find the equation of the line that is perpendicular to the line $3x = 9y + 2$ and passes through the point $(1, 5)$.

(5 marks)

(Total: 25 marks)

Question 2

- (a) Find the gradient, x and y intercepts for the equation, $x = -\frac{2}{5}y + 2$. (3 marks)
- (b) Let $f(x) = 5 - 2x$ and $g(x) = \frac{ax-3}{x}$. Find
- (i) a if $g(-3) = 3$. (2 marks)
- (ii) $(f \circ g)(2)$. (2 marks)
- (iii) $g^{-1}(x)$. (3 marks)
- (c) Use completing the square method to find the vertex of the function $y = 4x^2 - 8x - 5$ and sketch the graph with the x -intercept, y -intercept and vertex shown clearly. (7 marks)
- (d) Solve the following equations for x . (Correct to 4 decimal places)
- (i) $\frac{2}{3}e^{x-1} = 4$ (4 marks)
- (ii) $\log_5 x - \log_5 2 = \log_5(x - 2) + \log_5(x + 2)$ (4 marks)
- (Total: 25 marks)**

SECTION B: (50 marks)**Question 3**

- (a) Given that $\log_a 2 = 0.3869$, $\log_a 3 = 0.6131$ and $\log_a 5 = 0.8982$. Solve the following logarithmic function: $\log_{24} 25$.

(7 marks)

- (b) Solve the simultaneous equation of the following system.

$$\begin{aligned}3x + 2y - z &= -8 \\2x - y + 7z &= 10 \\2x + 2y - 3z &= -10\end{aligned}$$

(6 marks)

- (c) Sketch the graphical solution of the following system of inequalities.

$$\begin{aligned}4x - y + 4 &\geq 0 \\x - y &\leq 2 \\4x &< 3(1 - y)\end{aligned}$$

(5 marks)

- (d) The length of a rectangle is 8cm more than its width. Find the dimension of the rectangle if its area is 84cm^2 .

(4 marks)

- (e) Solve the equation $\sum_{n=1}^3 \left(\frac{1}{n}\right)^2$.

(3 marks)

(Total: 25 marks)

Question 4

- (a) The first 3 terms of an arithmetic progression are x , $5x$, $7x - 4$. Find
- (i) the value of x , (2 marks)
 - (ii) the sum of the first 7 terms. (3 marks)
- (b) The n^{th} term of a geometric progression is given by $T_n = \left(-\frac{1}{5}\right)^n$. Find the sum of first four terms. (5 marks)
- (c) Solve $\frac{dy}{dx}$ for each of the following.
- (i) $\sqrt{x} + \sqrt{y} = 4$ (5 marks)
 - (ii) $y = \frac{x}{2x^2+1}$ (3 marks)
- (d) Solve integration for each of the following.
- (i) $\int \frac{3x}{(x^2+1)^7} dx$ (4 marks)
 - (ii) $\int_1^2 (4 + 3x - x^2) dx$ (3 marks)
- (Total: 25 marks)**

~THE END~