FINAL
ALTERNATIVE ASSESSMENT

(COVER PAGE)

Session	:	**April 2020**
Programme	:	Diploma in Information Technology (DITN) Diploma in Computer Science (DCS)
Course	:	**MAT1103: Fundamentals of Mathematics**
Date of Examination	:	August 3, 2020 (Monday)
Time	:	4:00pm – 6:30pm Reading Time : Nil
Duration	:	2 Hours : 30 Minutes

Special Instructions :

This **ALL FOUR (4)** questions. All questions carry equal marks.

Materials permitted :

Non programmable calculator

Materials provided :

Nil

Examiner(s)	:	**Mohd Hafis Bin Zakaria**, Mr Bark Chee Beng and Dr. Narinderjit Singh a/l Sawaran Singh
Moderator	:	S.M. Elizabethrani Allappan

*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: APRIL 2020 SESSION

Instructions: This paper consists of **FOUR (4)** questions. Answer **ALL** questions. All questions carry equal marks.

Question 1

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

(i) $\sqrt[3]{\frac{216y^6}{x^{-9}}}$

(3 marks)

(ii) $3\sqrt{72}+\sqrt{18}-\sqrt{98}$

(3 marks)

(iii) $\frac{\sqrt{5}+\sqrt{3}}{\sqrt{5}-\sqrt{3}}$

(3 marks)

(iv) $\frac{2x^2+32}{8} \times \frac{2}{x^2+16}$

(4 marks)

(b) Solve the following inequalities:

(i) $-5x-2>-3(x+2)+17$

(3 marks)

(ii) $\left|\frac{2x-4}{5}\right|>6$

(4 marks)

(c) Find the equation of the line passing through $(3,5)$ and perpendicular to the line $2y-3x=10$.

(5 marks)
(Total: 25 marks)

Question 2

(a) Determine midpoint and distance between the points $(\sqrt{3}, 9)$ and $(2, -5)$.

(3 marks)

(b) Let $f(x) = \frac{3}{x^3}$ and $g(x) = 6^x$. Find the following:

(i) $(f + g)(2)$

(3 marks)

(ii) $(f \circ g)\left(\frac{1}{3}\right)$

(3 marks)

(c) Sketch the graph of the function $y = x^2 - 6x + 9$ with the x-intercept, y-intercept and vertex shown clearly.

(6 marks)

(d) Solve the following equations for x.

(i) $7^{1-x} = 3^x$ (Correct to 4 decimal places)

(4 marks)

(ii) $\log_{10}(x + 2) - \log_{10}(x - 3) = 1$

(6 marks)

(Total: 25 marks)

Question 3

(a) Expand the following logarithmic functions.

$$\log\left(\frac{y^2\sqrt{z}}{x}\right)$$

(5 marks)

(b) Find the simultaneous solution of the following system.

$$\begin{aligned} 2x - y + z &= 1 \\ x + 3y - 2z &= -3 \\ x - 4y + z &= 5 \end{aligned}$$

(6 marks)

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

$$\begin{aligned} y &\geq 1 \\ 3x - 2y &\leq 6 \\ x + 3y &\leq 9 \end{aligned}$$

(6 marks)

(d) Find the number of terms for the arithmetic progression, the 10^{th} term and the sum of all the terms in the arithmetic progression:

$$-9, -2, 5, 12, \ldots, 75$$

(8 marks)

(Total: 25 marks)

Question 4

(a) The 1st term and 5th term of a geometric sequence with positive common ratio are 3 and 324 respectively. Find

(i) the 9th term,

(5 marks)

(ii) the sum of the first 8 terms.

(2 marks)

(b) Find the derivative of the following equation.

(i) $x^2 + 4xy + 2y^2 = 7$

(6 marks)

(ii) $y = x^2(\sqrt{1 - x^3})$

(6 marks)

(c) Find the following integral using substitution method.

$$\int_1^2 t^2 \sqrt[3]{4t^3 - 3}\, dt$$

(6 marks)

(Total: 25 marks)

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