

FINAL
Examination Paper

(COVER PAGE)

Session : April 2016

Programme : Certificate In Business Studies (CBSI)

Course : **MAT 1001: Mathematics**

Date of Examination : 29 July 2016, Friday

Time : 8.00am – 10.00am

Duration : 2 Hours Reading Time : Nil

Special Instructions :

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

IMPORTANT NOTE : THIS PAPER SHOULD NOT BE TAKEN OUT OF THE EXAMINATION HALL

Materials Permitted : Non-Programmable Calculator

Materials Provided : Nil

Examiner(s) : **Mr. Foong Jin Yuan**

Moderator : Ch'ng Pei Eng

This paper consists of 6 printed pages, including the cover page.

INTI INTERNATIONAL COLLEGE

CERTIFICATE IN BUSINESS STUDIES (CBSI)

MAT1001: MATHEMATICS

FINAL EXAMINATION: APRIL 2016 SESSION

Instructions: This paper consists of **FIVE (5)** questions. Answer any **FOUR (4)** questions in the answer booklet provided. All questions carry equal marks.

Question 1

(a) Let $a = 1$, $b = -3$, $c = 4$ and $d = 3$, evaluate the value for:

(i) $\frac{cd-ab}{ab+cd}$ (2 marks)

(ii) $3b(7d - 4a) + dc$ (2 marks)

(iii) $(b - a) - (c + d)$ (2 marks)

(b) Solve each equation.

(i) $4x + 2(x + 3) = 14$ (2 marks)

(ii) $5p + 6\left(\frac{p-2}{3}\right) = 4p$ (2 marks)

(c) Determine which numbers in the set $\{-3, 2, 4, 5, \frac{1}{12}, \sqrt{2}, \pi\}$ are in each category listed below?

(i) Natural numbers (2 marks)

(ii) Whole numbers (2 marks)

(iii) Prime numbers (2 marks)

(iv) Irrational numbers (2 marks)

(d) The sum of three consecutive integers is 915. Find the integers. (4 marks)

(e) Find the midpoint of AB where A(-1, 5) and B(9, 11). (3 marks)

Question 2

- (a) Simplify the expression below. Assume all variables are not zero and write your answer without negative exponents.

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

(4 marks)

- (b) Solve the system by using substitution method.

$$2x - 4y = 5$$

$$3x + 3y = 7$$

(5 marks)

- (c) For each function, find $f(2)$ and $f(-2)$.

(i) $f(x) = 8 + 5x$

(2 marks)

(ii) $f(x) = -3 - 4x$

(2 marks)

- (d) Solve

$$\frac{3x}{x-1} - \frac{5}{x+3} = 3$$

(6 marks)

- (e) Find the gradient of the line passing through $P(2, 3)$ and $Q(-3, -8)$. (3 marks)

- (f) Sketch the graph of $y = 3x - 2$. (3 marks)

Question 3

(a) Given:

Line A : $y = -3x - 3$

Line B : $x = 3y - 2$

Determine whether the lines A and B are parallel, perpendicular or neither. (3 marks)

(b) Simplify the expression below. Assume that the variable is a positive number and write your answer without negative exponents.

$$\frac{c^3 c^5}{(c^3)^2}$$

(2 marks)

(c) Write each of the following in scientific notation.

(i) 45600000

(1 mark)

(ii) 0.0000678

(1 mark)

(d) Solve the system of equations below.

(i) $3x - 5y = 4$

$x = 9y - 7$

(4 marks)

(ii) $2x + 3y = 2$

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

(5 marks)

(e) Factor each polynomial.

(i) $x^6 + 8x^3 + 15$

(3 marks)

(ii) $3x^4 - 5x^2 - 2$

(3 marks)

(f) Factorize $36x^2 - 81y^2$ completely.

(3 marks)

Question 4

(a) The sum of three consecutive odd integers is 99. Find the integers. (4 marks)

(b) Evaluate the expression below when $x = 2$ and $y = -3$:

$$\frac{x^2 - 3y^3}{4x - 3}$$

(2 marks)

(c) Find an equation of the line that has gradient $-\frac{1}{2}$ and passes through $(2, 4)$. (2 marks)

(d) Solve the following inequality:

(i) $\frac{2}{3}(x - 1) + \frac{1}{2}(x - 2) \geq x - 1$ (3 marks)

(ii) $\left| \frac{2x-5}{3} \right| > 6$ (3 marks)

(iii) $3(3 - w) > -2(w + 2)$ (2 marks)

(iv) $-2 \leq \frac{5-2x}{2} \leq 2$ (3 marks)

(e) Solve $|3x - 2| = |2x + 3|$. (3 marks)

(f) Factorize $3x^4 - 22x^3 + 7x^2$ completely. (3 marks)

Question 5

(a) Simplify $(-3xy^2 + 2x^2y) - (-3yx^2 - 2y^2x)$. (3 marks)

(b) Expand $(x - y)(3x^2 - 4xy + y^2)$. (3 marks)

(c) Let $f(x) = 3x$ and $g(x) = x - 3$, find

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

(ii) $(f \circ g)(-1)$ (3 marks)

(d) Solve $2x^2 - 2x - 40 = 0$ by using factorization method. (3 marks)

(e) Solve the equation $3x^2 - 10x - 4 = 0$ by using quadratic formula below and round off your answer into 3 significant figures.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

(3 marks)

(f) Simplify $-3(3a^2 + 4b^2 - 4) - 2(3b^2 - 2 - 2a^2)$. (3 marks)

(g) Given $P(-7, 2)$ and $Q(1, -4)$.

(i) Find the midpoint of PQ . (2 marks)

(ii) Find the gradient of PQ . (2 marks)

~ The End ~
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