FINAL
Alternative Assessment

(COVER PAGE)

Session	:	**April 2021**
Programme	:	Foundation in Business Information Technology (CFPI)
Course	:	**MAT 1215: Fundamentals of Mathematics**
Date of Examination	:	28 July 2021 (Wednesday)
Time	:	9:00am – 11:30am Reading Time : Nil
Duration	:	2 hours + 30 minutes (uploading time)
Special Instructions	:	

This paper consists of **FIVE (5)** questions. Answer **ALL** questions. All questions carry equal marks.

Materials permitted :

Non-programmable calculator

Materials provided :

Formula Sheet

Examiner(s)	:	**Ms. Chong Mee Teng**
Chief Moderator	:	Ms. Teng Mei Tuan

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

FOUNDATION IN BUSINESS INFORMATION TECHNOLOGY PROGRAMME (CFPI)
MAT 1215: FUNDAMENTALS OF MATHEMATICS
FINAL ALTERNATIVE ASSESSMENT: APRIL 2021 SESSION

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Question 1

(a) Let set A = $\{-7, -\frac{3}{4}, 0, 0.\overline{6}, \sqrt{5}, \pi, 7.3, \sqrt{81}\}$. List the elements from set A that belong to the following:

(i) Natural numbers

(1 mark)

(ii) Integers

(3 marks)

(iii) Irrational numbers

(2 marks)

(b) Simplify each expression by removing parentheses:

(i) $(3x^2 + 4x + 9) - (2x^2 - 2x + 7)$

(2 marks)

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

(2 marks)

(c) Rationalize the denominator of $\frac{2}{\sqrt{3} - 4}$.

(3 marks)

(d) Simplify $\left(\frac{-3x^4y^2}{-9x^5y^{-2}}\right)^{-2}$ and express your answer in positive exponents only.

(3 marks)

(e) (i) Change -0.000025 to scientific notation.

(2 marks)

(ii) Change 3.7×10^5 to decimal notation.

(2 marks)

Question 2

(a) Given matrix $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 2 \\ 4 & 5 \end{bmatrix}$. Find:

(i) $2B - A$,

(3 marks)

(ii) $3(BA)$,

(4 marks)

(iii) B^{-1}

(3 marks)

(b) Pharmer Phil needs to treat a field with potash and nitrogen. He can use Grow Rice brand and Great Green brand. Grow Rice has 3 pounds of potash and 5 pounds of nitrogen per bag. Great Green has 1 pound of potash and 2 pounds of nitrogen per bag. By using matrix method, determine the number of bags of each brand that he should use on his field if he needs exactly 1320 pounds of potash and 2240 pounds of nitrogen.

(10 marks)

Question 3

(a) Use Cramer's rule to solve the system:

$$\begin{cases} 3x - 2y + z = 16 \\ 2x + 3y - z = -9 \\ x + 4y + 3z = 2 \end{cases}$$

(11 marks)

(b) Factorize completely for the following expression:

(i) $z^2 - 58 + 42$

(3 marks)

(ii) $a^3 - 125$

(3 marks)

(iii) $a^2 - 4b + ab - 4a$

(3 marks)

Question 4

(a) Graph the solution set of the following system of inequalities.

$$\begin{cases} 3x + 2y \leq 4 \\ x - 5y \geq 10 \\ y + 3 > 0 \\ x - 1 \geq 0 \end{cases}$$

(5 marks)

(b) Solve the following linear programming problem graphically, using the corner point method.

Minimize: $P = y - x$
Subject to: $x + y \leq 8$
$x + y \geq 4$
$x \geq 1$
$y \geq 2$

(6 marks)

(c) Ginny knits two different capes. The "Ginny" model requires 3 hours of knitting and 7 hours to embellish the cape. The "Helen" model requires 5 hours to knit and 5 hours to embellish the cape. Ginny has at most 60 hours a month to knit the capes and the most 100 hours to embellish the capes. By using the linear programming method, determine the number of capes of each type she should make to maximize her profit if she makes a profit of RM 80 on each "Ginny" cape and a profit of RM 100 on each "Helen".

(9 marks)

Question 5

(a) A survey was done by the local humane society at a shopping mall. The survey asked 200 shoppers if they owned a dog or a cat. The survey found that 80 people owned a cat, 55 people owned a dog, and 23 people owned both a cat and a dog.

(i) Use a Venn diagram to represent the sets.

(3 marks)

(ii) How many people in the survey owned neither a dog nor a cat?

(2 marks)

(iii) How many people owned a dog but not a cat?

(2 marks)

(b) Given the word '***MASSESS***'.

(i) How many permutations can be made of the letters, taken all together?

(2 marks)

(ii) How many ways will the fours '***S***'s be together?

(3 marks)

(iii) How many will end in '***SS***'?

(2 marks)

(c) A bag contains 20 chocolates, 15 coffees and 12 peppermints. If three sweets are chosen at random, what is the number of combinations that they are:

(i) all different?

(2 marks)

(ii) all the same?

(2 marks)

(iii) all not chocolates?

(2 marks)

--THE END—

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