

MATHEMATICS 3A03

Day Class

Dr. D.J.D. Earn

Duration of Final Examination: 2.5 hours

McMaster University Final Examination

April 2025

Write your signature here: _____.

THIS EXAMINATION HAS **18** PAGES AND INCLUDES **10** QUESTIONS. YOU ARE RESPONSIBLE FOR ENSURING THAT YOUR COPY OF THE PAPER IS COMPLETE. BRING ANY DISCREPANCY TO THE ATTENTION OF THE INVIGILATOR.

- No calculators, notes, scrap paper, or aids of any kind are permitted.
- All questions are to be answered on this test paper. Some pages (including the last four) are blank to provide extra space if needed.
- Always write clearly. An answer that cannot be deciphered cannot be marked.
- The marking scheme is indicated in the margin. The maximum total mark is **100**.

GOOD LUCK and ENJOY!

MARKS

[12] **QUESTION 1.** (*Circle the correct answer.*) Determine whether each of the following statements is **TRUE** or **FALSE**. Do not justify your answers.

(a)

TRUE FALSE

(b)

TRUE FALSE

(c)

TRUE FALSE

(d)

TRUE FALSE

(e)

TRUE FALSE

(f)

TRUE FALSE

In the following three questions, select the boxes associated with true statements. You can select using ☒, or ☐, or by filling in the box: ☐.

[2] **QUESTION 2.** Which of the following statements are true? *Do not justify your answers.*

☐☐☐☐

[3] **QUESTION 3.** Which of the following statements are true for
Do not justify your answers.

☐☐☐☐☐☐

[4] **QUESTION 4.** Which of the following statements are true for
Do not justify your answers.

☐☐☐☐☐☐☐☐

[9] **QUESTION 5.** For each of the following statements, circle whether the proposition is **TRUE** or **FALSE**, and *support your claim* with either a (short) proof or a counterexample.

[3] (a) Consider

TRUE FALSE

[3] (b) If

TRUE FALSE

[3] (c) The

TRUE FALSE

[14] **QUESTION 6.** Suppose that

[4] (a) Show that

[4] (b) Show that

[6] (c) Show that

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[15] **QUESTION 7.**

[6] (a) *Complete the following statements and conclude by defining*

Suppose

[9] (b) Suppose

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[12] **QUESTION 8.**

[2] (a) Let

Define

[6] (b) Prove

Part (c) on next page...

[4] (c) Prove or disprove:

[15] **QUESTION 9.** Let

[4] (a) Give

[4] (b) Give

[7] (c) Prove that

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[14] **QUESTION 10.** Consider

(♡)

Prove that (a) and (b)

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