

MATH 122 (A02)

Date: Mar. 20, 2025

Quiz 4

Time Limit: 25 minutes

This quiz contains 4 pages (including this one, and a scrap page) and 6 questions.

Before starting your quiz, enter your name and student ID (clearly) on this page.

You may not open the quiz until instructed to do so. In the meantime, please read the following instructions:

- This quiz is closed-book. You are permitted a Sharp EL-510R series calculator (which you potentially may find useful).
- Please organize your work reasonably neatly in the space provided. Work that is scattered and difficult to follow, without clear ordering, will receive little credit.
- Unless otherwise specified, in order to receive full credit for a correct solution you must show your work. Unsupported answers will not receive full credit, even if they are correct.

Question:	1	2	3	4	5	6	Total
Points:	2	2	3	2	4	2	15

- [2] 1. Check the appropriate circle to indicate whether each statement is true or false. You do not need to provide any reasoning. Let $a, b, c \in \mathbb{Z}$.

True False

- (a) ☐ ☐ For all $x \in \mathbb{R}$, $\lfloor x \rfloor < \lceil x \rceil$.
- (b) ☐ ☐ If $a \mid (b + c)$, then $a \mid b$ or $a \mid c$.
- (c) ☐ ☐ If $b \in \mathbb{Z}$ is an odd prime, then $b + 5$ is composite.
- (d) ☐ ☐ If a and b are relatively prime, then $\text{lcm}(a, b) = ab$.

- [2] 2. Find the base 8 representation of 2025.

- [3] 3. Let $a, b \in \mathbb{Z}$. Prove that if $10 \mid a$ and $14 \mid b$, then $35 \mid ab$.

- [2] 4. Let $n = 2^{60} \cdot 5^{42}$. Using the Fundamental Theorem of Arithmetic, explain why there exists no integer k such that $n = 18k$.

- [4] 5. Use the Euclidean algorithm to compute $\gcd(629, 272)$. Then use the Euclidean algorithm backwards to find $x, y \in \mathbb{Z}$ such that $\gcd(629, 272) = 629x + 272y$.

- [2] 6. Suppose $n \equiv -13 \pmod{9}$. What is the remainder when $n^2 + 82n$ is divided by 9?

This page is for rough work only, and will not be graded.
If you have work on this page you want marked,
please indicate this next to the original question.