

# MATH 108—WRITING ASSIGNMENT 10

Due: ~~Saturday April 28—3:00PM~~ Wednesday May 3—3:00PM

Get the template for this assignment. Here's how to do it:

- **Team Member 1:** Go to <https://www.sharelatex.com>, and make sure you are logged in.
- **Team Member 1:** In a new window, go here:

<https://www.sharelatex.com/project/58ff6fca4ebb05ab65c8a1e6>

- **Team Member 1:** Click on the menu icon (upper-left corner - 3 horizontal lines); select “Copy Project”
- **Team Member 1:** When prompted for a name, choose something like “Math 108 - Assignment 10” and click “Copy”
- **Team Member 1:** When this completes you will be back in your own workspace (instead of mine).
- **Team Member 1:** Click on the share icon (upper-right - 5 headed beast). Enter your team member's email address, make sure they “can edit” it, and “Share.”
- **Team Member 1 and 2:** After solving the problems (possibly by yourself), work together to make a beautiful write up.
- **Team Member 1 or 2:** Email me (or print and turn in) *one* copy of your final draft.

**The problems are below.**

1. Prove that the function  $f : \mathbb{R} \rightarrow \mathbb{R}$  defined by  $f(x) = x^3 - 4x$  is not an injection.
2. Prove that the function  $f : \mathbb{R} \rightarrow \mathbb{R}$  defined by  $f(x) = 1 - e^x$  is not a surjection.
3. Prove that the function  $f : \mathbb{Z}_6 \rightarrow \mathbb{Z}_6$  defined by  $f(\bar{x}) = \overline{x+2}$  is one-to-one *and* onto  $\mathbb{Z}_6$ .
4. Let  $p$  be a prime, and let  $m \in \mathbb{Z}$  with  $1 \leq m \leq p-1$ . Prove that the function  $f : \mathbb{Z}_p \rightarrow \mathbb{Z}_p$  defined by  $f(\bar{x}) = \overline{mx}$  is one-to-one.

*Hint: Theorem 3.4.5 is helpful.*