MATH 108—WRITING ASSIGNMENT 03

Due: Friday February 10—2:00PM

Get the template I made for this assignment. (I even started some proofs for you.) 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/58951a4d6aeda68d262e1736

- **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 02" 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 one copy of your final draft.

The problems are below.

1. Prove that if a, b, and c are nonzero integers and ab divides c, then a divides c.

2. Prove that if n is a natural number, then $n^2 + n + 4$ is even.

3. If x and y are nonnegative real numbers, then $\sqrt{xy} \leq \frac{x+y}{2}$.

   This one is a bit more challenging then the rest. Here is a hint, but feel free to do it your own way.

   (a) *First prove that $0 \leq (x + y)^2 - 4xy$.*
   (b) *Now show why $0 \leq (x + y)^2 - 4xy$ implies that $\sqrt{xy} \leq \frac{x+y}{2}$.*