Math 108—Writing Assignment 06

Due: ~~*Friday March 03—3:00*PM~~ *Saturday March 04—3:00*PM

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/58b4d5314a0c67ed155f87f9

- **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 06" 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 or disprove:** for all sets A, B, and C, $(A \cup B) \cap C \subseteq A \cup (B \cap C)$.
2. **Prove or disprove:** for all sets A and B, $(A \times B) \cup (B \times A) = (A \cup B) \times (A \cup B)$
3. **Prove** that for all sets A, B, C and D, if $C \subseteq A$ and $D \subseteq B$, then $D - A \subseteq B - C$.
4. For $a \in \mathbb{Z}$, define $a + 5\mathbb{Z} = \{x \in \mathbb{Z} : \exists m \in \mathbb{Z}(x = a + 5m)\}$.
   Prove that if $a, b \in \mathbb{Z}$, then $b \in a + 5\mathbb{Z}$ if and only if $b + 5\mathbb{Z} = a + 5\mathbb{Z}$.
   Hint: make sure to review how to prove an "if and only if" statement.