Math 108—Writing Assignment 08

*Due: Saturday April 8—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/58df319821e27de52795ae7f

- **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 08" 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. Let A be a set. Prove that if R_1 and R_2 are equivalence relations on A, then the relation S defined by $S = R_1 \cap R_2$ is also an equivalence relation.

   Try a direct proof. Assume that R_1 and R_2 are equivalence relations, so both R_1 and R_2 are reflexive, symmetric, and transitive. You now need to prove three things: that S is reflexive, symmetric, and transitive.

2. Let A be a set. Prove, by giving an example, that if R_1 and R_2 are equivalence relations on A, then the relation S defined by $S = R_1 \cup R_2$ might not be an equivalence relation.

   For your example, you can choose your set A, and I recommend choosing something simple like $A = \{1, 2, 3\}$. But you still need to come up with R_1 and R_2 and prove that R_1 and R_2 are equivalence relations while $S = R_1 \cup R_2$ is not.