Math 108—Outline for Exam 1

Up through Theorem 3.19

Definitions

One thing that I hope you all take away from this course is a fluency in the language of logic and set theory. To that end, **you are expected to be able to recite the definitions for the following terms**.

- a (mathematical) *proposition*
- the *converse* and *contrapositive* of an implication $P \implies Q$
- what it means to say that a set A is a *subset* of a set B
- the *complement* of a set A
- the *union*, *intersection*, and *difference* of two sets

Problems to Practice

1. Translating to and from symbolic logic
2. Proving two propositional forms are equivalent with a truth table
3. Using set-builder notation
4. "True or False" problems (with explanations)
   - **(a)** Determining truth values of propositions (especially involving quantifiers)
   - **(b)** Determining if an element is contained in a given set
   - **(c)** Determining if a set is contained in a given set
5. Being able to provide examples of elements and/or sets meeting certain set-theoretic criteria

Proofs

1. Make sure you can reprove all proofs from the notes class
2. Practice choosing which proof technique to use (e.g. contraposition or cases, like in Theorem 2.80)
3. Practice "prove or disprove" problems (these are easy to make up on your own)
4. Practice how to prove that a set is contained in another set and how to prove that two sets are equal