Math 321 Review for Exam #2

Exam Information. The in-class part of the exam will be on Tuesday, April 7. There will be a take-home portion, which you will receive in class, and which will be due on Thursday, April 9 at the beginning of class.

Induction. Review proofs by mathematical induction. This is chapter 3 in the book. Try any problems you’re not sure how to do.

Logic. Be able to state the definitions of and give examples of important concepts like

- tautology
- absurdity (or contradiction)
- sentential variable
- predicate

Also be sure you know the difference between a definition and an example.

You should know how to use truth tables to decide if something is a tautology, absurdity, or neither.

Practice proofs with any old homework problems (especially make sure you have done the problems that were not collected). You can practice with additional problems from chapter 1.

Set Theory. Be able to state the definitions of and give examples of important concepts like

- subset
- power set
- union
- intersection
- relative complement (set difference)
- absolute complement

You should understand the importance of Russell’s Paradox in Set Theory, and be able to state Russell’s paradox clearly.

Practice proofs with any old homework problems (especially make sure you have done the problems that were not collected). You can practice with additional problems from chapter 2.

Proof Techniques. Besides induction, you should know the following proof techniques:

- Make sure you know how to construct proofs for statements of the form “For all $x...$,” “There exists an $x...$,” and “There exists a unique $x...$” Review the homework problems.
- Make sure you know different ways to prove “if / then” statements (direct proof, proving the contrapositive, proof by contradiction). If direct proof seems not to be working, try one of the other approaches.
- Review how to prove statements of the form “The following are equivalent.” Remember that these are also “if / then” statements, so different approaches might be applicable here as well.