

## MATH 310.01 - METHODS OF PROOF

Your second in-class exam will take place on Friday, November 6th, 2009, and will cover material from sections 3.3, 3.4, 4.1 - 4.6, 5.1, 5.2, 5.4, 5.5, 6.1, 6.2, 6.4, 7.2 and 7.3. Make sure that you have done all the homework problems that were assigned (not just the ones that were handed in), as these are the types of questions that you can expect to see on the test.

For this exam you need to:

- Be able to prove a result by proving the contrapositive.
- Be able to prove a result using cases.
- Know the definition of divisibility and be able to prove results involving divisibility.
- Know the definition of congruence modulo  $n$  and be able to prove results involving congruence.
- Be able to prove results involving real numbers.
- Be able to prove that one set is a subset of another.
- Be able to show set equality by proving each set is a subset of the other.
- Be able to show set equality using the set relationships.
- Be able to disprove a statement using a counterexample.
- Be able to prove a result using contradiction.
- Be able to prove an existence result.
- Be able to disprove an existence result.
- Be able to prove a result using the Principle of Mathematical Induction.
- Be able to prove a result using the Strong Principle of Mathematical Induction.
- Be able to prove a result involving a recursively defined sequence.
- Be able to prove or disprove statements involving multiple quantifiers. (Know when you need a proof and when you need an example or counterexample.)

Note that you are expected to know any definitions and concepts on which you have already been tested, such as the definitions of odd and even integers and the concept of a direct proof.