## Math F215: Midterm Exam Study Ideas

This list is intended as the start of a study guide. There is no guarantee that because a topic is listed here that it will be on the midterm, or that this is a comprehensive list of topics to appear. The material covered will be Chapters 4, 5, 6, and a little bit of Chapter 9 (a single induction problem of the style of Problem 9.4).

Some specific things you might want to study:

- Be able to construct direct proofs, proofs by contrapositive, and proofs by contradiction.
- Given a statement, be able to prove it using more than one proof technique.
- Know what a characterization is.
- Know what a counterexample is.
- Be able to prove a statement is false either by producing a counterexample, or by proving the negation of the statement is true.
- Given a proof with a flaw, discover the flaw.
- Be able to negate a statment involving quantifiers.
- Know the definition of a rational number. Be able to work with irrational numbers.
- Be able to construct proofs involving sets (Section 4.4).
- Given a false, but "nearly" true statement, find a correction to the statement and prove that the corrected statement is true (e.g. Problem 6.40)
- Know the definition of the statement  $a \mid b$ .
- Know the definition of the statement  $a \equiv b \pmod{n}$ .

Good luck!