Exam 3 will be on Friday 3 April during our regular class time. It will include Chapters 9, 10, 11, and Section 12.1. You will have one hour to complete the exam. You may bring a single 3 in by 5 in notecard with writing on both sides.

Definitions

For all of the terms below, you must be able to formally state and use the definition from your textbook.

1. odd, even, same parity, opposite parity
2. divides, multiple, divisor
3. prime
4. greatest common divisor, least common multiple
5. congruent modulo n
6. rational number, irrational number
7. subsets, set equality
8. **relation on A, reflexive, symmetric, transitive relations, a relation from A to B, an equivalence relation, an equivalence class, a partition of a set**
9. **a function from A to B, domain, codomain, range of f**

Proof Techniques

1. direct proof
2. using cases
3. by contrapositive
4. by contradiction
5. if-and-only-if proofs
6. existence statements
7. **proofs involving sets (that is, statements including $A \subseteq B$ or $A = B$)**
8. **methods of disproving statements**
9. **proof by induction (both strong and weak)**

Things to Keep in Mind

1. If a proof technique is not prescribed, you must state the method you are using.
2. You should put in the "boiler-plate" language even if you cannot figure out the whole proof.
3. You should expect to **use** all of the hypotheses.
4. I will **not** ask you to prove something that is false.

What the Midterm Will Look Like

1. Problem 1 (a) What is the standard way to show $X \subseteq Y$ for sets X and Y? Your answer should be " Pick an arbitrary element of the set X and prove that it is in the set Y.
2. Problem 1 (b) Prove the proposition below using the standard method described above. Proposition: If P, then $X \subseteq Y$. (Clearly, P, X, and Y are specific.)
3. Problems 2 and Problems 3: Proofs by Induction.
4. Problem 4 about disproof.
5. Problem 5 about equivalence relations.