Math 260
Fall 2008
H. Jordon

Study Guide for Exam 1

In what follows is a **brief** synopsis of what we have covered in Sections 2.1, 2.2, 2.4, 2.5, 3.1, 3.2. Use this list a guide to help you make up your own study guide.

On the exam, you can expect several proofs, TRUE/FALSE questions, and give-an-example-of type questions. The problems that have been assigned in class (but not necessarily collected) or very similar problems could appear on the exam; therefore it is **highly** recommended that you make every effort to complete those problems.

Exam 1 Topics:

1. Sets: showing two sets are equal, showing one set is a subset of another, set notation, set-builder notation, finding the power set of a given set, the sets $\mathbb{N}$, $\mathbb{Z}$, $\mathbb{Q}$, $\mathbb{R}$.
2. Set operations: union, intersection, set difference, complement, symmetric difference, cartesian product. Given various sets, applying these operations.
3. De Morgan's Laws and Set Properties – proving various set properties are true or finding a counter-example to show a statement is false.
4. Binary relations, reflexive, symmetric, transitive: showing that a given relation is reflexive, symmetric, or transitive or finding a counter-example to show that the relation does not satisfy any one of these properties.
5. Equivalence relations: determining whether a given relation is an equivalence relation, finding the equivalence classes.
6. The relationship between equivalence relations and partitions.
7. Definition of a function.
8. Surjections, injections, and bijections: showing that a function is one-to-one or onto.
9. Composition of functions: what is it, how is it defined.
10. The Division Algorithm, finding the "q" and the "r".
11. Definition of divides and properties of divides; proving a given property is true or finding a counter-example to show the statement is false.
12. Definition of gcd and using the Euclidean Algorithm to find gcd; writing the gcd as a linear combination.
13. Definition of Congruence modulo n where $n \geq 2$; congruence classes.

14. Properties of congruence, simplifying arithmetic and solving equations with congruence.
15. Using Mathematical Induction to prove a statement is true.