Math 1281 Midterm
Info Sheet

The purpose of this handout is to help you study by listing the concepts, definitions, and results you will need to know for the mid-term.

Midterm Information. The midterm will be on Oct. 29, 2004 at 2:30. The midterm will take place in our regular class room. You will *not* be allowed to bring in any notes, use the text book, or use a calculator. Please bring your **Student Card.**

Material Covered. All the material discussed in class may appear on the midterm. The material that we covered was Chapter 1 and Chapter 2 (except Section 2.7) of the text. I have given below a breakdown of what you will need to know from each section.

1. **Section 1.1** Know the definition of a proposition, the logical operators ($\neg, \rightarrow, \wedge, \vee, \oplus$), how to construct truth tables, and how to turn propositions into English sentences, and back.

2. **Section 1.2** Know the definition of a tautology, contradiction, and the table of logical equivalences in Table 5, e.g., De Morgan's Laws (page 24).

3. **Section 1.3** Know what a propositional function is, and know how to use the universal and existential quantifiers ($\exists, \forall$). Also know how to turn expressions using quantifiers into English sentences.

4. **Section 1.4** Know how to translate statements involving nested quantifiers. As well, know how negation affects nested quantifiers, and how the order of the quantifiers can affect the truth value of a statement.

5. **Section 1.5** Memorize all the rules of inference (including the rules of inference for quantifiers), and be able to identify the rule of inference being used in an argument. Know how to construct arguments like we did in class and in the homework, i.e., you should be able to do problems like Examples 6, 7, 12, and 13 in the text. Be able to identify fallacies. As well, there will be one question on the test that will ask you to prove a simple statement using a direct proof.

6. **Section 1.6** Know the definitions of a set, a subset, the cardinality of a set. Also know how to form the power set of a set, and how to make the Cartesian product of two or more sets.

7. **Section 1.7** Know how to use the the various set operations ($A \cup B, A \cap B, A - B, \overline{A}$). Also know how to prove set identities using a membership table.

8. **Section 1.8** Know the following terms related to functions: co-domain, domain, range, image. Know what a one-to-one function and an onto function are. Also know how to construct a one-to-one and/or onto function. Know what the inverse of a function is. You should also be able to use the floor and ceiling function.

9. **Section 2.1** Know how to write simple algorithms like the ones we did in class. You should also be able to write down the various steps of an algorithm, like some of the homework problems. As well, given an algorithm, you should be able to determine its output.

10. **Section 2.2** Know the definition of "big-O" notation, and be able to apply Theorem 1 (page 136). You do not need to know the material from page 138-142.

11. **Section 2.3** Know how we measure the time complexity of an algorithm, and be able to measure the time complexity of some simple algorithms.

12. **Section 2.4** You will need to know the definitions of the following terms: a divides b, factor, multiple, prime, gcd, lcm, a **mod** m, a congruent modulo m. You will also need to be able to compute the gcd and lcm of two numbers. As well, you should be able to calculate a **mod** m.

13. **Section 2.5** You will only need to know the material on the Euclidean Algorithm and how to use it.

14. **Section 2.6** You will only need to know the material up to the bottom of page 185. So, you will need to know how to find linear congruences. You should be able to do problems of the types that we discussed in class.