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 Wednesday Oct. 18, 2006 at 9:30AM. 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 and Sections 2.1-2.3 of Chapter 2 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 6, e.g., De Morgan's Laws (page 24). Know how to determine if two propositions are logically equivalent using a truth table.
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, and vice versa. You should also know how negation affects quantifiers, e.g. see Table 2 on page 41.
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. Again, you will need to know how to translate statements involving nested quantifiers.
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.
6. **Section 1.6** Know the terms: theorem, proof, axioms, lemma, corollary, and conjecture. Know the different types of proofs (direct proof, proof by contraposition, proof by contradiction) and know the differences between the various types of proofs. Be able to do simple proofs like those in the exercises of Section 1.6. Also be aware of the possible mistakes one can make in proofs.
7. **Section 1.7** Know what is meant by proof by cases and exhaustive proofs. Know the difference between a constructive and non-constructive existence proof. Know what is meant by the phrase "forward and backward reasoning". (You don't need to know the material on tilings in this section.)
8. **Section 2.1** 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.
9. **Section 2.2** 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.
10. **Section 2.3** 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.

Please note that I will out of town from Oct 14-19. I will have limited email access while I am gone, so you can still send me questions. There will be no class or lab on Monday October 16. Another Professor will be supervising the exam. Good luck!