Math 1281 Midterm II Information 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 second midterm.

Midterm Information. The midterm will take place on

Friday, November 16, 2007, 1:30-2:20PM, RB 2047.

You *must* **bring your student ID**. You will *not* be allowed to bring in any notes, use the text book, or use a calculator. You may leave your answers in an unexpanded form. For example, you may simply write 2^{10}.

Material Covered. All the material discussed in class on Chapter 2 and 3 may appear on the exam. I have given a breakdown of what you will need to know from Chapters 2 and 3.

(1) 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.

(2) 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.

(3) 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.

(4) Section 2.4. Know the difference between a sequence and a summation. Also, know the difference between an arithmetic and geometric progression. Know how to find a formula for a sequence, and how to do a summation over a set. You do not need to know the material on cardinality (pg. 158-160).

(5) Section 3.1. 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.

(6) Section 3.2. Know the definition of "big-O" notation, and be able to apply Theorem 1 (page 184). You should be able to do problems like in the homework. You do not need to know the material from page 186-190.

(7) Section 3.3. Know how we measure the time complexity of an algorithm, and be able to measure the time complexity of some simple algorithms.

(8) Section 3.4. You will need to know the definitions of the following terms: a divides b, factor, multiple, a mod m, a congruent modulo m. As well, you should be able to calculate a mod m, and know the Division Algorithm (Theorem 2). Also, know some applications of congruence.

(9) Section 3.5. Know what a prime and composite number are. Know the Fundamental Theorem of Arithmetic. Also, know the definition of the gcd and lcm of two numbers, and how to use the prime factorization to find both.

(10) Section 3.6. You will only need to know the material on the Euclidean Algorithm and how to use it.

(11) Section 3.7. Know the material up to page 235. That is, know Theorem 1, and the subsection on solving linear congruence. As well, know Fermat's Little Theorem (Theorem 5). You do not need to know the material on public-key systems.

Midterm Format. The exam is out of 45 points. You will have 50 minutes. The first question is a matching question. The last question will ask you to pick 2 of three problems.

Good Luck! – Dr. Adam VT