

Math 1281 Midterm III 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 third Midterm.

Midterm Information. The third midterm will be on **Friday Jan. 25, 2008** at 1:30. The midterm will take place in our regular classroom. 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 of Chapters 4 through 6 discussed in class may appear on the exam. I have given below a breakdown of what you will need to know from Chapters 4, 5, and 6.

- (1) **Section 4.1.** You will have to do one or two proofs that involve induction. You do not need to know the material of pages 275-277.
- (2) **Section 4.2.** Know the definition of Strong Induction (page 284) and be able to do examples like those done in class. Omit the material from page 288 to 291.
- (3) **Section 4.3.** Know the definition of a recursive definition. Be able to evaluate a function that is defined recursively. As well, you should be able to give a recursive definition for a sequence and for a set. You do not need to know the material on Recursively Defined Sets and Structures (pg. 299-308).
- (4) **Section 4.4.** From this section you will only need to know the definition of a recursive algorithm and some examples of a recursive algorithm.
- (5) **Section 5.1.** Know the Sum Rule and the Product Rule. You should be able to do problems using these two rules like those given in class and in the homework assignments. As well, know the principle of inclusion-exclusion, and the definition of a tree.
- (6) **Section 5.2.** Know both the Pigeonhole Principle and the Generalized Pigeonhole Principle. I expect you to be able to use these principles in problems similar to ones we did in class and in the homework.
- (7) **Section 5.3.** Make sure you understand the difference between a permutation and combination. I expect you to remember Theorem 1 and Theorem 2, and how to use them. You will be expected to do problems like those discussed in class and the homework.
- (8) **Section 5.4.** Know how to use the Binomial Theorem. As well, memorize Pascal's Identity. You should be able to show, via algebraic manipulation, identities involving binomial coefficients (similar to Question 20 of the homework.)
- (9) **Section 5.5.** Know how to count the number of permutations when repetition is allowed. Also, know how to count the number of combinations when repetition is allowed. I will expect you to be able to answer problems like Example 5. Also, know how to apply Theorem 3. The material on pages 376-379 can be omitted.
- (10) **Section 5.6.** Know how to put permutations in order according to the lexicographical ordering. As well, you should be able to find the next biggest permutation (see Example 2). You can skip the material on combinations.
- (11) **Section 6.1** Know the definition of an experiment, sample space, event, and probability. You should also be able to calculate some probabilities, like questions involving poker hands. As well, you should know Theorems 1 and 2 about the probability of combinations of events.
- (12) **Section 6.2** Be able to assign probabilities, like Example 1. Know Definition 2, and how to use it to compute the probability of an event. Also, know how to compute the conditional probability of an event, and know what it means for two events to be independent. You can ignore the material on Bernoulli trials, random variables and the material after this subsection.
- (13) **Section 6.3** Know Bayes's Theorem (Theorem 1) and how to use it. Be able to do problems like Examples 1 and 2.