Math 1281 Christmas Exam 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 Christmas Exam.

Exam Information. The exam will take place on *Dec. 13, 2002* at 9:00AM in the Fieldhouse. 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 unexpaned form. For example, you may simply write $C(23, 4)$.

Material Covered. All the material discussed in class may appear on the exam. However, the majority of the questions will focus on the material discussed since the last test. For a description of the material that we covered in Chapter 1 and Chapter 2, see the handout for the last test (copies of this handout can be found on the web). I have given below a breakdown of what you will need to know from Chapters 3 and 4.

1. **Section 3.1.** Know the definitions of a theorem, proof, rule of inference, fallacy, direct proof, indirect proof, proof by contradiction, proof by cases, existence proof, and counterexample. Also, know all the rules of inference (Table 1 and Table 2). You should be able to identify what rule of inference is being used in an argument. As well, I expect you to be able to do problems like Problems 8df and 10cd that were part of the homework.
2. **Section 3.2.** You will have to do one or two proofs that involve induction.
3. **Section 3.3.** 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.
4. **Section 3.4.** From this section you will only need to know the definition of a recursive algorithm and some examples of a recursive algorithm.
5. **Section 4.1.** 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 4.2.** 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 4.3.** Make sure you understand the difference between a permutation and combination. I expect you to remember Theorem 1, Theorem 2, and Theorem 3, and how to use them. You will be expected to do problems like those discussed in class and the homework. As well, you should know the Binomial Theorem and how to use it to calculate coefficients.
8. **Section 4.4.** Know the definition of an experiment, sample space, event, and probability. You should also be able to calculate some probabilities.
9. **Section 4.5.** Be able to assign probabilities, like Example 1. Know Definition 1, 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 a two events to be independent.
10. **Section 4.6.** 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 6. Also, know how to apply Theorem 3.