

**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 exam.

Midterm Information. The exam will be on December 5, 2001 at 9:00 AM in the Fieldhouse.

You will *not* be allowed to bring in any notes, use the text book, or use a calculator. If a question involves a calculation you may leave it in an unexpanded form, e.g., you can write 5^4 instead of 625, or $C(6, 3)$ instead of 20.

Material Covered. The exam will cover all the material discussed in class about Chapters 3 and 4, and the material on matrices. The exam will not explicitly test you about the material covered in the last exam. However, I will assume that you are familiar with this material.

I have given below a breakdown of what you will need to know from each section.

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 8a and 10a 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 2.6** Know the definition of a matrix. As well, you should be able to add two matrices together, and multiply two matrices together. Also know the definitions of a transpose of a matrix, and a symmetric matrix.

Office Hours. I will be in my office from 9:30 - 12:30 and 1:30 - 5:30 on Tuesday, December 4, (the day before the exam) if you have any questions and/or problems. Or send me your question by email: avantuy1@sleet.lakeheadu.ca. I will also put the solutions to all the homework assignments on reserve in the library.

Good Luck!