Math 175, Spring 2008
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Study Guide for Exam 1

In what follows is a **brief** synopsis of what we have covered in Chapter 1, Sections 1–4, 6. Use this list a guide to help you make up your own study guide.

On the exam, you can expect several proofs, TRUE/FALSE questions, and give-an-example-of type questions. The problems that have been assigned in class (but not necessarily collected) or very similar problems could appear on the exam; therefore it is **highly** recommended that you make every effort to complete those problems. In addition, you might try the problems in the Chapter 1 Review Section listed on the course website. Please note that these problems are mostly computational in nature and are therefore not representative of a proof that might appear on the exam.

To prepare for this test, you should make sure that you have done each of the following:

- **Rewritten your class notes.** Anything that I asked you to finish, make sure you know how to finish it. You should understand all of the proofs and be able to apply the techniques used in class to similar problems.
- **Tried all of the homework problems.** Just because a problem did not appear on a homework quiz does NOT mean that it is unimportant. Similar questions could appear on the exam.

Exam 1 Topics:

1. Matrices, and matrix operations: transpose, sum, scalar multiple, subtraction.
2. Vectors, vector addition and scalar multiplication, geometry of vectors, parallelogram law.
3. Properties of matrix addition and scalar multiplication (Theorem 1.1). Properties of transpose (Theorem 1.2)
4. Linear combinations, standard vectors of $\mathbb{R}^n$, identity matrix.
5. Matrix-vector products and properties of matrix-vector products (Theorem 1.3).
6. Rotation matrices.
7. Systems of linear equations, consistent systems and inconsistent systems, basic variables, free variables.
8. Elementary row operations.
9. Row echelon form and reduced row echelon form, Gaussian Elimination.
10. Rank and nullity of a matrix.

11. Span of a set of vectors, spanning set.

12. Span of the columns of a matrix A and relationship to rank A, rref(A), number of solutions to $Ax = b$ (Theorem 1.6).

13. Properties of spanning sets (Theorem 1.7).