Math 2255 Midterm II 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 midterm.

Midterm Information. The midterm will be on Wednesday, Nov. 9, 2005. You will **not** be allowed to bring in any notes, use the text book, or use a calculator. **Bring your STUDENT ID**.

Material Covered. The exam will cover all the material discussed in class about Chapters 2 and 3 of the textbook.

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

Section 2.1. Know the basic operations (addition, multiplication) for matrices. Know Theorems 1 and 2, and pay attention to the Warning on page 114. Also know what a transpose is, and some of its properties (Theorem 3).

Section 2.2. Know what the the inverse of a matrix is. You should know the formula for finding A^{-1} when A is a 2×2 matrix (see Theorem 4). As well, you need to know how to compute the inverse of a $n \times n$ matrix. For example, you should be able to do problems like Example 7 of the section. Know also the properties of inverses (Theorem 6). You can skip the material on elementary matrices.

Section 2.3. Know how to use Theorem 8 (Invertible Matrix Theorem) to decide if a matrix is invertible. Also understand the relation between an invertible matrix and an invertible linear transformation (Theorem 9).

Section 2.4. Know what a partitioned matrix is. Know how to do operations involving partitioned matrices.

Section 2.5. Given a matrix A, you should be able to find its LU-factorization. As well, you should be able to use the LU-factorization to solve the system $A\mathbf{x} = \mathbf{b}$ (see Example 1). Skip the application in electrical engineering.

Section 2.7. Know only the material on 2D computer graphics (up to Example 6). Know how to compute a translation using homogeneous coordinates, as discussed in class.

Section 3.1. Know the definition of a determinant, and how to use Theorem 1 to compute the determinant of a matrix using the cofactor expansion down a row or column. Also know Theorem 2. Also know the trick for computing the determinant of 3×3 matrix (see page 191 before exercise 15).

Section 3.2. Know how a row operation changes the determinant of a matrix. Also know Theorems 4, 5, and 6.

Section 3.3. Know what Cramer's rule is, and how to use it to solve simple systems of linear equations. Know how to use this rule to find the inverse of a matrix. Also know Theorem 9, and know how it describes how area and volume change in a linear transformation.