

Math 2275 Midterm I 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 Thursday, Feb. 9, 2012 during our regular class time. 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 Chapter 5 of the textbook.

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

Section 5.1. Know the following terms: eigenvector, eigenvalue, eigenspace. Know Theorem 1 and Theorem 2. Know how to find eigenvalues, eigenvectors, and eigenspaces, and a basis for the eigenspace.

Section 5.2. Know the terms: characteristic equation, the multiplicity of an eigenvalue, A is similar to B . Know how to use the characteristic equation to find eigenvalues. Know what it means if an eigenvalue is 0. Know Theorem 4.

Section 5.3. Know the terms: diagonalizable. Know Theorem 5, and know how to use it determine if a matrix is diagonalizable, and if it is, be able to find the diagonalization. Know how to do problems like Example 3. Also know Theorem 7, and how the dimensions of the eigenspace tell us whether a matrix is diagonalizable or not.

Section 5.4. Know the terms: matrix for T relative to the bases \mathcal{B} and \mathcal{C} ; matrix for T relative to \mathcal{B} . The shaded boxes on Page 289 are important, especially formula (4). Also know how to use Theorem 8.

Section 5.5. Know the terms: complex eigenvalue, complex eigenvector, real and imaginary parts of a vector, conjugate. Know how to find complex eigenvalues and complex eigenvectors. Know how to use Theorem 9, e.g., be able to do problems like Exercises 13-20. Also, understand Example 6.

Section 5.6 Know the terms: eigenvector decomposition, trajectory, attractor, repeller, saddle point. Know how to find the solution to a discrete dynamical system (like the example given in class). Know how to use this solution to determine if the origin is an attractor, repeller, or saddle point. Also know how to find the directions of greatest attraction and repulsion.

Section 5.7. We did not cover this section.

Section 5.8. Know the terms: strictly dominant eigenvalue. Know how to use the power method. For example, if I were to give you a table like Table 1, know how to use this information to estimate the dominant eigenvalue and associated eigenvector.