MATH 1B03 MIDTERM 2 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 November 7, 2017 at 7:30PM**. The midterm will be 75 minutes long. Note that we will be in two different classrooms. Please see below for your room assignment. You will *not* be allowed to bring in any notes, use the text book, or use a calculator.

Please bring your **STUDENT CARD** and **HB PENCILS**. The midterm is a multiple-choice test, and you require an HB pencil in order to fill out the multiple-choice exam sheet (so that the scanner can read your solutions).

CONFLICTS. It is expected that you attend the scheduled midterm. Students who have legitimate conflicts (e.g., an evening class at the scheduled time) will write on Wednesday, Nov. 7, 2017 at 2:30PM in KTH 109. Please submit your request to write at an earlier date through the assignment portal. (There is an option on the main page entitled *Request an Alternate Write.*)

MATERIAL COVERED. This midterm will focus on the material of Sections 2.1–2.3, 5.1–5.4, and Chapter 10 (of the 9th edition) that was discussed in class and the homework. Below, I have given a breakdown of what you will need to know from each section. Note that when you are learning terms, it is good to think of an example that satisfies that term, and one that does not satisfy that term.

(Section 2.1) Know how to compute a determinant using the cofactor expansion. Know what is meant by a minor entry and a cofactor entry. Know how to compute the determinant of a triangular matrix. It is also useful to know the techniques for computing 2×2 and 3×3 matrices described on page 110.

(Section 2.2) Know Theorems 2.2.1 and 2.2.2. Know how row operations change the value of the determinant.

(Section 2.3) Know the properties of determinants described in this section (e.g., Theorems 2.3.3, 2.3.4, 2.3.5). Know how to compute the adjoint of a matrix and know the formula of Theorem 2.3.6. Know how to use Cramer's Rule to solve a system of equations.

(Section 5.1) Know the definition of eigenvalues and eigenvectors. Know how to find eigenvalues from the characteristic equation, and how to find eigenvectors. Know Theorems 5.1.2 and 5.1.3. Also, know Theorem 5.1.4.

(Section 5.2) Know what is meant by similar matrices, and what it means for a matrix to be diagonalizable. Know when a matrix is diagonalizable (e.g., Theorems 5.2.1 and 5.2.2). Know how to use a diagonalization to compute powers of a matrix. Know what we mean by algebraic multiplicity and geometric multiplicity (see Theorem 5.2.4).

(Section 5.3) Some of this material is also covered in Sections 10.1-10.3 of the ninth edition. See below for more. Know what we mean by the complex conjugate of a vector, and some of its properties. (e.g. Theorems 5.3.1 and 5.3.2). Know the complex Euclidean inner product of two complex vectors, and its properties (see Theorem 5.3.3). Know Theorem 5.3.4. Know how to find complex eigenvalues and eigenvectors of 2×2 matrices. In particular, know Theorems 5.3.7 and 5.3.8. You don't need to know Theorem 5.3.5, or the material on the geometric interpretation.

(Section 5.4) Know what we mean by a differential equation and a first-order linear system of differential equaitons. Know what is meant by an initial condition and an initial-vaule problem. Be able to use the procedure described on pg 328 to solve a first-order linear system. In particular, be able to do a problem like Example 2.

(Section 10.1) Know what we mean by a complex number, and its real and imaginary parts. Know how to add, subtract, and multiply complex numbers.

(Section 10.2) Know how to form the complex conjugate of a complex number. Know what we mean by the modulus of a complex number and how to compute it. Know how to divide two complex numbers, and be able to solve a linear system with complex coefficients. Know also the properties of the conjugate (Theorem 10.2.3).
(Section 10.3) Know what we mean by the polar form of a complex number. Know how to multiply and divide complex numbers in polar form. You don't need to know about DeMoivre's formula or complex exponents.
(Matlab) There will also be a question relating to the syntax of Matlab.

If you have questions, please feel free to email me. There will also be a special review session; I will post details on the class website.

ROOM ASSIGNMENT. The midterm will be spread across the following two rooms. Please go to the room indicated by your last name. Your room may be different than the last midterm!!

Last Name (between the following letters)	Room
A - SPENCE	MDCL 1305
STAVNITZKY - Z	T13 123

Here is the KEY for the above abbreviations:

MDCL = Michael G. DeGroote Centre for Learning and Discovery
T13 = Temporary Building 13