MATH 2010: STUDY SHEET FOR TEST 1

The purpose of this handout is to help you study by listing the concepts, definitions, and results you will need to know for the first test.

Test Information. The first test will be on Thursday, October 9, 2002 at 5:30 - 7:00 in **UC 2011** (the Upper Lecture Theater). 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 $\sqrt{10}$ instead of 3.1....

Test Procedure. Please show up on time on the day of the test so that we may start on time. Please, **bring you Student ID card**. Before the test starts, I will ask you to move your bags, coats, and other belongings to the front of the room. You may pick them up at the end of the test. During the first 30 minutes, nobody will be able to leave the exam room.

Material Covered. The test will cover all the material discussed in class about Chapters 1, 2, and Sections 3.1 - 3.7 of Chapter 3. I have provided a breakdown of what you will need to know below.

1. **Chapter 1** In class and in the labs I covered Sections 1.1, the first two parts of Section 1.2, Section 1.3, 1.6, and 1.7/ You will not be explicitly tested on this material since this material is review of high school topics. However, I will assume that you know this material. For example, you should know how to find the equation of a line.

2. **Section 2.1** Know what a limit is, that is, make sure you understand the informal definition of a limit. Know how to calculate limits of the type done in this section. Know how to calculate left and right limits.

3. **Section 2.2** Given a function $f(x)$ with a vertical asymptote, be able to determine if $f(x)$ goes to infinity or minus infinity as x approaches the vertical asymptote.

4. **Section 2.3** Be able to calculate limits of $f(x)$ as $x \to \infty$ or $x \to -\infty$.

5. **Section 2.4** Know Definition 2.1, and know what it means for a curve to be continuous, i.e., it can be drawn without lifting your pen. Be able to determine when a graph is discontinuous. Also know how to apply the Heaviside function, and be able to do a question using Heaviside functions as in the homework.

6. **Section 2.5** You will not be tested on this material. Just be aware that there is formal definition of a limit.

7. **Section 3.1** Know Definition 3.1, the definition of the derivative, and know the geometric interpretation of the derivative (i.e., the slope of the tangent line). You should know how to use the formal definition of the derivative to find the derivative, as in Examples 3.1, 3.2, and 3.3.

8. **Section 3.2** Be able to calculate derivatives using Theorems 3.3, 3.4, and 3.5.

9. **Section 3.3** Know what it it means for a function to be differentiable at a point $x = a$. Know the difference between a continuous function and a differentiable function. Also know how to compute right- and left-hand derivatives.

10. **Section 3.4** Be able to apply Theorems 3.7 and 3.8 to calculate derivatives of functions. Make sure you memorize the product and quotient rules. For practice, try the even problems between 2 and 16, and compare with the back of the book.

11. **Section 3.5** Know how to calculate higher-order derivatives.

12. **Section 3.6** Know the relationships between the displacement function, velocity function, and acceleration function. Know the difference between speed and velocity.

13. **Section 3.7** Know how to use Theorem 3.9 (the Chain rule) to calculate derivatives. For practice try the even problems between 10 and 36, and compare with the back of the book.

Note: On Wednesday, Oct. 8, 2003, during the lab, I will be available to answer questions.