Study Guide for Test 1

The test will be Wednesday, September 16, and will cover sections 2.2, 2.3, 2.4, 2.5 and 3.1 as detailed below. (2.1 will not be tested.) The test will consist of problems similar to assigned homework problems, both problems from the book and the problems you have handed in. There will be about a dozen problems, two or three per section. Each problem will be worth the same. The test will be 12.5% of your course grade.

Please see me if you have any questions or if you would like some help.

2.2. Be able to evaluate infinite limits.

Be able to find one-sided limits for functions whose definition involves more than one formula, such as $f(x) = \begin{cases} x^2 & \text{if } x \leq 1 \\ x+2 & \text{if } x > 1 \end{cases}$. (For this example, $\lim_{x\to 1^-} f(x) = 1$ while $\lim_{x\to 1^+} f(x) = 3$.)

Be able to sketch the graph of a function given certain values or limits. Be able to determine limits of a function given its graph.

2.3. Be able to evaluate limits algebraically, including limits of polynomial fractions or limits involving square roots.

2.4. Be able to state the definition of a limit. I might ask you for the definition of a limit such as $\lim_{t\to c} g(t) = M$. You would need to state the definition for this particular limit: For $\epsilon > 0$ there is $\delta > 0$ such that if $0 < |t - c| < \delta$ then $|g(t) - M| < \epsilon$.

Be able to solve problems such as the following: Consider $\lim_{x\to 3}(5 - 4x) = -7$. How close must x be to 3 for $5 - 4x$ to be within 0.01 units of -7?

Be able to prove a limit. I will only give you problems with limits of linear expressions, such as $\lim_{x\to 3}(5 - 4x) = -7$.

2.5. Be able to state the definition that a function f is continuous at a point $x = a$. (This is just: $\lim_{x\to a} f(x) = f(a)$.) Also be able to state the definition that a function is continuous on an open interval (a, b) or a closed interval $[a, b]$.

Be able to indicate why a given function is discontinuous at a given point. (I will give you problems where the function has an infinite discontinuity, a jump discontinuity, or a removable discontinuity.)

I might give a problem similar to (2.5)41 in the book, or homework problem 3 on my homework assignment 2, where you have to find the number c that makes the function continuous.

Be able to use the Intermediate Value Theorem to show that an equation has a solution in a given interval.

3.1. Be able to set up and find the limit to find the slope of a curve at a given point. Be able to find the velocity of a moving object, given its position at each time t, by setting up and finding the appropriate limit. By the way, these are the same problems as in section 2.1, but of course, now we can do the problems using limits. (This is why I am not testing 2.1 on the test.)