

## MATH 104/184: Week 2 Learning Goals

September 14, 2013

### Learning Goals

This week we introduce continuity and the derivative. This is the material in section 2.6 and 3.1 of Briggs Cochran. Please note that we have skipped sections 2.4 (infinite limits) and 2.5 (limits at infinity) and will return to these section when we do curve sketching.

Questions suggested from the text related to a learning goal are included as [section: question #s]. In some cases, a single question uses skills from several learning goals.

The specific learning goals for this week are that by the end of the week and review homework, you should be able to:

1. explain what it means for a function to be continuous at a point. you should be able to correctly analyze whether a given function is continuous at a given point. [2.6: 16,21]
2. identify points of discontinuity for a given function. [2.6:10]
3. know the way continuous functions behave under basic algebraic operations, and use these results to correctly identify whether or not a given function is continuous at a point. (See Theorem 2.9.) [2.6: 35–48]
4. know the way continuous functions behave when they are composed. (See Theorem 2.11.) [2.6: 35 – 48]
5. identify whether or not a given function is continuous on a given interval. This includes identifying when a function is left- or right-continuous at the endpoints of a closed interval. [2.6: 33,55]
6. state the Intermediate Value Theorem and to apply it to simple situations such as determining whether or not a function has a zero in some interval. [2.6: 8, 50, 55]
7. compute the average rate of change of a function on an interval. [3.1: 2, 58]
8. explain the notion of instantaneous rate of change at a given point and its role as the slope of the tangent line at that point. [3.1: 1, 58]
9. state the definition of the derivative and use it to compute the derivative of a given function in simple cases (such as those given in the exercises). [3.1: 11– 16,12, 21]
10. sketch the graph of  $f'$  given the graph of  $f$ . [3.1: 41,44]
11. explain using sketches of appropriate functions the relationship between continuity and differentiability. [3.1: 71]

### Suggested Problems and Assignments

**Suggested Problems:** Each week, I will post suggested problems on the main Math 104/184 website. Our general promise to students is that 75% of the problems on the exams will be similar to these.

This week, all suggested problems will be from the text:

Chapter 2.6: 8, 10, 16, 21,33, 50,55,74.

Chapter 3.1: 2, 12,21,41,44,55,58,71.

**Webwork Homework:**

The due date for this week's Webwork homework is 8 a.m. on Wednesday.