

## MATH 104/184: Week 1 Learning Goals

August 16, 2012

### Learning Goals

This week we introduce some concepts from business: revenue, costs, and profit, and introduce the students to their first optimization problem. This problem motivates the need for the derivative. Before formally introducing the derivative (week 2), we cover the material of Chapter 2.1, 2.2, and part of 2.3 to get an intuitive introduction to limits.

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 revenue, costs, and profit for the case of linear demand. You should be able to set up and solve a simple problem involving maximizing revenue, for example, in this context. Note there are some posted notes on this material on the main Math 104/184 website..
2. give an intuitive explanation of the process of taking a *limit*. You should be able to compute the limits of functions in simple cases, as presented in section 2.2 and the beginning of 2.3 (up to and including the limits of polynomials and rational functions – end of page 67).
3. compute the average rate of change of a function. You should be able to draw a diagram that illustrates this quantity.
4. draw a diagram to illustrate the process of computing an instantaneous rate of change of a function.
5. explain the relationship between finding average and instantaneous rates of change of a function and appropriate secant and tangent lines on graphs of this function.
6. explain *one-sided limits* and their relationship to two-sided limits. You should be able to examine these limits graphically and numerically.

### Suggested Problems and Assignments

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

Chapter 2.1: 3,4,5,6, 8, 16, 21.

Chapter 2.2: 2,5, 10, 12, 18, 23,35.

Chapter 2.3: 5, 10, 24,27, 32,38,44,64.