Summary for Midterm One - Math 120C - Autumn 2009

Here are some thoughts I was having while considering what to put on the first midterm. The core of your studying should be the assigned homework problems: make sure you really understand those well before moving on to other things (like the old midterms on the test archive).

- Chapter 1 - Warm Up
  - One of the most important ideas of this chapter is that of *multiplying by one* as a means of unit conversion. This idea makes all unit conversions have a common method, and helps one's notekeeping.
- Chapter 2 - Imposing Coordinates
  - This chapter introduced the use of the *coordinate system* and the *distance formula*.
  - A classic problem from this chapter is one in which two objects are moving and we need to describe the distance between them, like problems 2.3, and 2.10.
- Chapter 3 - Three Simple Curves
  - This chapter introduces circles and horizontal and vertical lines. You should be sure you are comfortable finding the equation of a circle from a variety of descriptions.
  - You should be able to find the intersection of a circle with a vertical or horizontal line.
- Chapter 4 - Linear Modeling
  - In this chapter, we get the general line definition. Be sure you are able to find the intersection of a given circle with a general line.
  - We also have the idea of perpendicular lines, and the method for finding the shortest distance between a line and a point not on that line. We also considered tangent lines to circles.
  - Uniform linear motion is introduced. See problems 4.14 and 4.15.
  - Especially good problems are 4.7, 4.9, 4.11, 4.12.
- Chapter 5 - Functions and Graphs
  - Here the *function* is introduced.
  - Every function has a domain, range and graph. Be sure to know what each is, and how to determine it for a given function. As we said, finding the range and graph can be hard; rest assured, if asked to find the range or graph of a given function, it will be doable.

- You should be comfortable with *multipart* functions (what are they, how to evaluate one, how to solve equations involving them, etc.) What's an example of a multipart function?
- I like problem 5.7 particularly.

- Chapter 6 - Graphical Analysis
  - Chapter 6 talks about a variety of function-related topics.
  - You should be able to create multipart functions from a geometric description (e.g., "pizza" problems).
  - You should be able to solve equations involving multipart functions.
  - You should understand how to graph a multipart function, where each part is linear.
  - Especially good problems are 6.5, 6.6, 6.8, and 6.9.

- Chapter 7 - Quadratic Modeling
  - The *quadratic* function is introduced. You should know the significance of the *vertex* and how to find it. You should be able to sketch the graph of a given quadratic function.
  - You should be able to determine the maximum and minimum value of a quadratic function on a specified interval, as in problem 7.2.
  - You do not need to be able to solve problems that involve maximizing area, revenue, or other quantities. You will see many examples of these problems in the test archive. These sorts of problems are part of the latter half of chapter 7, and we'll study them after the midterm exam.