Summary for Midterm One - Math 120

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 should be able find the maximum or minimum possible value of a quantity by expressing it as a quadratic function of some other quantity (e.g., area of a rectangular enclosure as a function of the width of the enclosure, etc.). Problem 7.9-7.13 all involve this idea.