

## Summary for Midterm One - Math 120 A, B - Winter 2012

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.
  - Introduction of variables for unknown quantities is a crucial idea illustrated in this chapter.
- 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.
- 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 complete the square on a circle equation in order to find the circle's center and radius.
  - 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 got the general line definition.
  - Be sure you are able to find the intersection of a given circle with a general line.
  - We used the idea of perpendicular lines, and have a method for finding the shortest distance between a line and a point not on that line.
  - We considered tangent lines to circles.
  - Uniform linear motion was introduced. You should be able to model the motion of anything moving at a constant speed along a line with a pair of **parametric equations**.
- 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 you are asked to find the range or graph of a given function, it will be doable.
  - Given a function  $f(x)$ , you should be able to simplify expressions like
$$\frac{f(x + 2h) - f(x - 2h)}{h}.$$
  - 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?
- Chapter 6 - Graphical Analysis

- Chapter 6 talks about a variety of function-related topics.
  - You should understand how to graph a multipart function, where each part is linear.
  - You should be able to create multipart functions from geometric descriptions (e.g., "pizza" problems, "baseball diamond" problems, "trough" problems).
  - You should be able to solve equations involving multipart functions.
  - You should understand the effect of applying absolute value to a function. How does the graph of  $f(x)$  compare with the graph of  $|f(x)|$ ?
- 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 a quadratic function given three points on its graph.
    - You should be able to determine the maximum and minimum value of a quadratic function on a specified interval.