This outcomes list summarizes what skills and knowledge you should have reviewed and/or acquired so far this quarter, and what sort of problems to expect on Exam 1. The problems here are representative, although we do not guarantee that the problems on the exam will look exactly like the ones here. Most are from homework problems assigned so far and some are extra problems from the book. You should, of course, also review the problems assigned on the syllabus.

Exam 1 will cover sections 0.1, 0.2, 0.4, Appendix B, 0.5, 1.1, 1.2

Chapter 0: Pre-calculus fundamentals. In this chapter we quickly review the knowledge we expect students to have as we approach the rest of the course.

0.1 Define functions and determine when a relation among quantities constitutes a function, i.e., by the vertical line test. Given a function, determine its domain and range. Understand how algebraic operations affect domains and range.

In addition to the homework problems assigned for this section, look at (all references to Section 0.1):

Examples 6, 7; Problems 24, 27, 36

0.2 Define operations on functions, such as addition of functions, multiplication, and composition. Be able to find the domain of a composition.

In addition to the homework problems assigned for this section, look at (all references to Section 0.2):

Examples 7, 8; Problems 52, 54, 68

0.4 Given a function, determine whether it has an inverse and, if so, what this inverse is. Apply be able to discuss the range and domain of the function and its inverse. Relate the graph of a function and its inverse.

In addition to the homework problems assigned for this section, look at (all references to Section 0.4):

Example 6; Problems 25, 28.
**0.5 Describe** what is meant by exponential growth or decay, and relate these to exponential functions $b^x$ and $b^{-x}$. Relate exponentiation to logarithms, especially the natural log. State and use the basic properties of exponents and logs that are useful for calculation.

In addition to the homework problems assigned for this section, look at (all references to Section 0.5):

Example 4; Problems 26, 28

**Appendix B. You** should know the definition of the auxiliary functions sec, cosec, tan, and cotan, in terms of sin and cos. You should know, and be able to use, the basic trig identity $\sin^2(x) + \cos^2(x) = 1$, as well as the sin and cos addition formulas. You should know the sin and cos of the standard angles $\frac{\pi}{6}, \frac{\pi}{4}, \frac{\pi}{3}, \frac{\pi}{2}$, as well as related angles in the different quadrants.

In addition to the homework problems assigned for this section, look at (all references to Appendix B):

Example 6; Problems 7, 13, 34.

**Chapter 1: The Limit. The limit is the basic object defining calculus. In this chapter we define the limit and develop techniques for finding limits of various functions.**

**1.1 Calculate** the limit of a function $f$ of a variable $x$, as $x$ approaches some finite value $c$. Determine when such a limit does not exist, as a one-sided or two-sided limit. In either case, describe the behavior of $f$ in the vicinity of such a point. Include an understanding of what is meant by increase or decrease without bound in the vicinity of such a point, or a vertical asymptote.

In addition to the homework problems assigned for this section, look at (all references to Section 1.1):

Problem 8

**1.2 Discuss** how the limit interacts with basic arithmetic operations such as addition, multiplication, and division. Take limits of functions involving especially quotients or radicals; define some indeterminate forms.

In addition to the homework problems assigned for this section, look at (all references to Section 1.2):

Examples 9, 10; Problems 38, 40