Unit 3

In this unit you will study the basic properties of the graphs of the sine and cosine functions, with variations. These functions can be used to study harmonic motion.

- Review of graphing: x-intercepts, y-intercepts, domain, range, axes, increasing and decreasing intervals, asymptotes. (1.2 and 2.5)
- Graphs of the sine and cosine functions. (6.4 and 6.6)
  - Period, amplitude, and phase shift
- Simple harmonic motion (8.5)

Study Guidelines for the 8th edition of Sullivan's Precalculus

These reading and problem assignments are designed to help you learn the course material.

The only way to learn mathematics is to do mathematics.

Sections 1.2 and 2.5 (review): Graphing

- **Reading**: sections 1.2 and 2.5
  - Concepts you should know:
    - x-intercepts, y-intercepts, axes
    - domain, range
    - increasing and decreasing intervals
    - vertical translation
    - horizontal translation
    - reflection
    - vertical compression and stretching
    - horizontal compression and stretching

Section 6.4: Graphs of the Sine and Cosine Functions

- **Reading**: section 6.4
  - Read and work through examples 1-9 and their matched problems.
  - You can [view an animation](#) which illustrates how the sine curve is created.
  - **Practice Problems**: 6.4 #1, 2, 9-41 odds, 45, 47, 51, 53, 59, 65, 67-83, 91, 93, 95

Section 6.6: Phase Shift; Sinusoidal Curve Fitting

- **Reading**: section 6.6
  - Read and work through examples 1-2 and their matched problems.
  - You will not be required to find sinusoidal functions from data points, as in examples 3-5. However, it is a useful calculator skill, so I recommend that you read examples 3-5 and try problem 29 and 35.
  - Try out a java applet that illustrates the various aspects of harmonic motion: amplitude, period, and phaseshift.
  - **Practice Problems**: 6.6 #3-25 odds, 29, 35

Section 8.5: Simple Harmonic Motion; Damped Motion; Combining Waves

- **Reading**: section 8.5
  - Read and work through examples 1-2 and their matched problems.
  - You will only be required to answer questions about simple harmonic motion, as in problems 5-20. Nevertheless, you should also read the section on Damped Motion (including example 3) and try problems 21 and 23.
- You can view an animation which illustrates how the motion of a spring generates a cosine curve.
- Practice Problems: 8.5 #1, 5-23 odds
  - Additional spring problems #1-4 (solutions are included)