

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)
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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)