

Unit 4

In this unit, you will study the graphs of tangent, cotangent, secant, and cosecant, with variations. You will also study the inverse trigonometric functions. The textbook is quite brief in these three sections, so I've include some supplementary material and exercises, as indicated below in the **Study Guidelines**.

- Graphs of variations of tangent, cotangent, secant, and cosecant (6.5)
 - Period and phase shift
- Inverse trigonometric functions: arcsin, arccos, arctan (7.1-2)
 - Computations
 - Graphs

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

The only way to learn mathematics is to do mathematics.

Pages 186-187 (review): Asymptotes

- **Reading:** pages 186-187 on vertical and horizontal asymptotes
- **Section 6.5:** Graphs of the Tangent, Cotangent, Cosecant, and Secant Functions
 - **Reading:** section 6.5
Read and work through examples 1-3 and their matched problems.
 - The textbook neglects any mention of period and phase shift for these four functions. But, just as in section 6.6 for sin and cos, you should be able to determine period and phase shift for variations of these functions. See the [supplementary material on period and phase shift](#) for definitions and exercises.
 - You can also try out a java applet that illustrates period, phase shift, and vertical stretching of the [graphs of tangent, secant, cotangent, and cosecant](#).
 - You may of course use your graphing calculator to help graph these functions, but it is also a good idea to be able to do at least a rough sketch by hand. Be sure to take period and phase shift into account when graphing or recognizing graphs of these functions.
 - **Practice Problems:** 6.5 #1, 2, 7-39 odds, 41, 45, 49, 51
 - [Additional exercises on period and phase shift](#)
- **Section 5.2 (review):** Inverse functions
 - **Reading:** section 5.2
 - For a quick review, see the [module on inverse functions](#). This module includes discussion of the concept, examples, and several animations and applets.
 - **Problems:** Work through a representative sampling of the problems in this section until you feel comfortable with the material.
- **Section 7.1:** The Inverse Sine, Cosine, and Tangent Functions
 - **Reading:** section 7.1
Read and work through examples 1-11 and their matched problems.
 - This particular book unfortunately uses the $\sin^{-1}x$ notation for the inverse trig functions. As noted on page 429, this notation can cause confusion because the -1 exponent is not really an exponent, it's just notation. Therefore, I encourage you to use the more standard notations: arcsin x , arccos x , and arctan x , and I have also used these in the exams. You really should be familiar with both notations.
 - Pay close attention to the definition of the inverse trig functions, particularly the range of these functions:
 - The range of arcsin x is the interval $[-\pi/2, \pi/2]$.

- The range of $\arccos x$ is the interval $[0, \pi]$.
 - The range of $\arctan x$ is the interval $(-\pi/2, \pi/2)$.
 - You can also try out a java applet to further explore the definitions of the [inverse trig functions](#).
 - The textbook does not ask any questions involving graphs of the inverse trig functions. Thus, I've installed a practice assignment (on the MapleTA testing system) called **Practice: Graphs of Inverse Trig Functions** to give you some exercises in this area.
 - **Practice Problems:** 7.1 #1-6, 13-69 odd, 75
 - **Additional practice exercises on graphs of inverse trig functions:**
 - At the testing web site for [Math 141](#) or [Math 142](#), choose **Practice: Graphs of Inverse Trig Functions**. You may take this as many times as you like - you will see different questions each time.
- **Section 7.2: The Inverse Trigonometric Functions (continued)**
 - **Reading:** section 7.2
Read and work through examples 1-6 and their matched problems.
 - The arccot and arccsc functions are almost never used. However, arcsec is useful in calculus. Although I have assigned a few exercises involving arcsec, you will not be asked any questions on the exam about these three functions.
 - **Practice Problems:** 7.2 #1-3, 9-35 odd, 41, 45, 57, 67, 79