

**Section 6.3 Learning Objectives:**

- Video 1: The Inverse Trigonometric Functions (13:12)
  - State the domains and ranges of the inverse trigonometric functions.
  - Understand the relationship between the sine, cosine, and tangent functions and their inverses.
- Video 2: Evaluating Inverse Trigonometric Functions (5:11)
  - Determine the exact values of the inverse trigonometric functions for the common angles of the unit circle.
  - Determine the approximate values of the inverse trigonometric functions using a calculator in both degrees and radians.
- Video 3: Compositions of Trigonometric Functions and Inverse Trigonometric Functions (8:19)
  - Determine the value of the composition of an inverse trigonometric function and a trigonometric function evaluated at the common angles of the unit circle.
  - Determine the value of the composition of a trigonometric function and an inverse trigonometric function using algebra.
  - Determine the value of the composition of a trigonometric function and an inverse trigonometric function using geometry.

**Individual Learning Objective Binder Check:** Before class, you should have completed the Learning Objective Worksheet for each of the learning objectives in the video. These should have been placed in a binder in an organized manner so that it can be quickly checked by the instructor. If you have specific questions, this is a good time to ask the professor about them. While you are waiting for the professor to make their way around the room, you can work on the rest of the activities.

**Group Practice Problems:** In a group of no more than 3 students, work on the following problems. While everyone in the group should work together, each student should write out their work for themselves. This work can prove to be helpful when working on the homework assignment. If questions arise as you're working on these problems, feel free to seek help from the instructor or other groups of students.

*Group Practice Problems #1 - Chart of Values:* Complete the following chart of values, except only complete the portions of the chart that correspond to the appropriate inverse trigonometric function. (For example, the sine function should only have values on the interval  $[-\frac{\pi}{2}, \frac{\pi}{2}]$ .)

$\theta$	$-\frac{\pi}{2}$	$-\frac{\pi}{3}$	$-\frac{\pi}{4}$	$-\frac{\pi}{6}$	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\frac{2\pi}{3}$	$\frac{3\pi}{4}$	$\frac{5\pi}{6}$	$\pi$
$\sin(\theta)$										—	—	—	—
$\cos(\theta)$	—	—	—	—									
$\tan(\theta)$										—	—	—	—

*Group Practice Problems #2 - Evaluating Inverse Trigonometric Functions:* Determine the values of the following expressions. For each problem, draw a unit circle diagram and use it to identify the quadrant of the angle. Then state the corresponding reference angle.

- $\sin^{-1}\left(\frac{\sqrt{3}}{2}\right)$
- $\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right)$
- $\tan^{-1}(\sqrt{3})$

- $\sin^{-1}\left(-\frac{1}{2}\right)$
- $\cos^{-1}\left(\frac{\sqrt{2}}{2}\right)$
- $\tan^{-1}\left(-\frac{1}{\sqrt{3}}\right)$
- $\sin^{-1}(-1)$
- $\cos^{-1}(1)$
- $\tan^{-1}(-1)$

*Group Practice Problems #3 - Approximating Inverse Trigonometric Functions:* Use a calculator to determine the values of the following expressions. For each problem, draw a unit circle diagram and use it to identify the quadrant of the angle. Then calculate the corresponding reference angle. All of your calculations should be done in degrees.

- $\sin^{-1}(0.2)$
- $\cos^{-1}(-0.7)$
- $\tan^{-1}(0.6)$

*Group Practice Problems #4 - Approximating Inverse Trigonometric Functions:* Use a calculator to determine the values of the following expressions. For each problem, draw a unit circle diagram and use it to identify the quadrant of the angle. Then calculate the corresponding reference angle. All of your calculations should be done in radians.

- $\sin^{-1}(-0.9)$
- $\cos^{-1}(0.1)$
- $\tan^{-1}(-4)$

*Group Practice Problems #5 - Compositions of inverse trigonometric functions with trigonometric functions:* Determine the exact values of the following expressions.

- $\sin^{-1}\left(\cos\left(\frac{\pi}{3}\right)\right)$
- $\cos^{-1}\left(\sin\left(-\frac{\pi}{6}\right)\right)$
- $\sin^{-1}\left(\sin\left(\frac{7\pi}{4}\right)\right)$
- $\cos^{-1}(\cos(-9\pi))$

*Group Practice Problems #6 - Compositions of trigonometric functions with inverse trigonometric functions using Algebraic Methods:* Use an algebraic method to determine the exact values of the following expressions.

- $\sin\left(\cos^{-1}\left(\frac{2}{9}\right)\right)$
- $\cot\left(\sec^{-1}\left(\frac{11}{5}\right)\right)$

*Group Practice Problems #7 - Compositions of trigonometric functions with inverse trigonometric functions using Geometric Methods:* Use an algebraic method to determine the exact values of the following expressions.

- $\sec(\sin^{-1}(\frac{5}{6}))$
- $\cos(\tan^{-1}(-\frac{4}{3}))$

**Group Work Check:** Present your work for the practice problems to the instructor for approval. The work will not be graded deeply, but simply graded on whether it appears that you have put in a good faith effort to do the work. If you are not confident about particular problems, this is a good time to ask about them.

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**Section 6.3 Homework:**

- 6.3 (General Problems): #1, 5, 9, 13, 17, 19, 23
- 6.3 (Write-Up): #27, 28