# Class Discussion: Inverse Trig Functions

The word **invert** means *put upside down; put in opposite position or order*. It's understandable that this word is associated with "flipping a fraction."

Also, the "multiplicative inverse of a number that's represented as a fraction" can be found by "flipping the fraction."
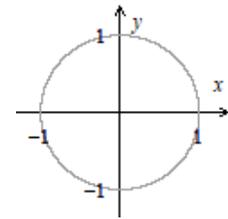
But "multiplicative inverse" and "flipping a fraction" have nothing to do with **inverse of a function**. [A "flipped fraction" is better referred to as a _____ not an "inverse."]

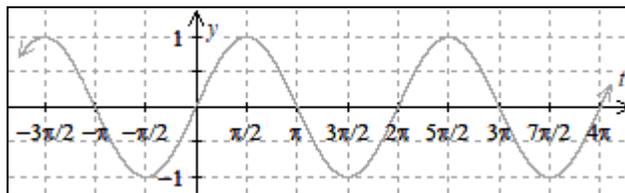When we use the word **invert** (or **inverse**) with functions, we're referring to…

To construct the inverse cosine function, we need to create a one-to-one function that utilizes the entire range of cosine:
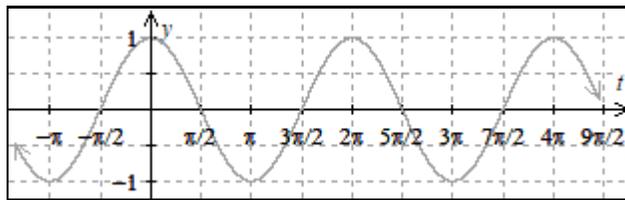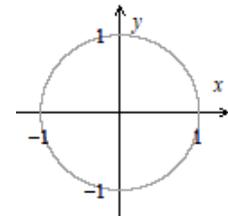

A graph of $y = \cos(t)$.

To construct the inverse sine function, we need to create a one-to-one function that utilizes the entire range of sine:
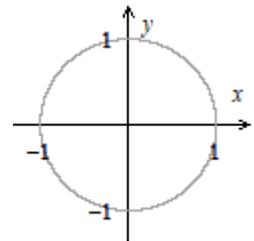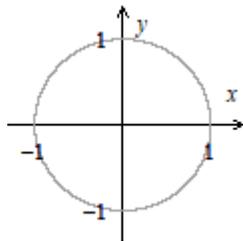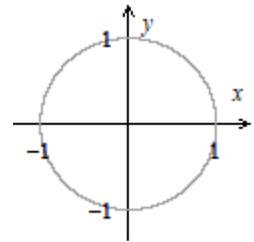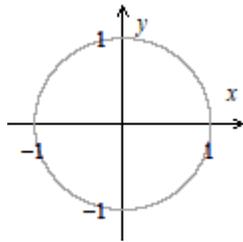

A graph of $y = \sin(t)$.

EXAMPLES: Evaluate the following expressions.

a. $\cos^{-1}\left(\frac{\sqrt{2}}{2}\right).$

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

c. $\cos^{-1}\left(\cos\left(\frac{5\pi}{3}\right)\right).$

d. $\sin^{-1}\left(\sin\left(\frac{5\pi}{4}\right)\right).$

e. $\cos^{-1}\left(\cos\left(\frac{11\pi}{10}\right)\right).$