Inverse Trig Derivatives

Goal: • Can use implicit differentiation to find inverse function derivatives • Can quickly determine the derivatives of inverse trig functions.
Terminology: • Inverse Functions
Reminder: • Quiz on Implicit and Logarithmic Differentiation next Wednesday • Test in 2 weeks

Review: Determine the slope, dy/dx, of the curve below at $(0,0)$

$$\tan(y^2) = y + x$$

If the the volume of a sphere is given by

$$V = \frac{4}{3}\pi r^3$$

Determine an expression that relates the rate the volume and radius are changing **with respect to time.**

If $\sin\theta = y$ then what is $\cos^{-1} y$?

We want to expand our knowledge of trig derivatives to include their inverse functions.

Function	Derivative	Inverse	Inverse Derivative
$\sin x$			
$\cos x$			
$\tan x$			
$\csc x$			
$\sec x$			
$\cot x$			

How can we differentiate

$$y = \arcsin x = \sin^{-1} x$$

Practice Problems: 3.8: # 1-18 (every other), 19, 20, 27, 30, 32

 # 21, 22

Look Ahead: If you wanted to construct a function $y = f(x)$ such that $y' = y$ what would you do?

In Class Evidence

1. Show that the five other inverse trig functions indeed have the correct derivative.

17. Find dy/dx if $y = x \sin^{-1} x + \sqrt{1 - x^2}$

21. $f(x) = \cos x + 3x$. Show that f has a differentiable inverse. Find $f(0), f^{-1}(0), f^{-1}(1)$, and $(f^{-1})'(1)$