

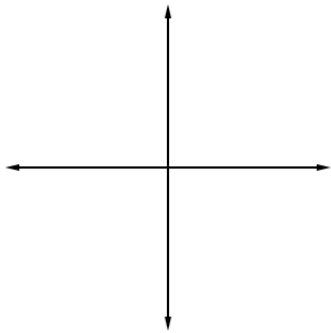
### Lesson 3.3: Derivatives of Inverse Trig Functions

Definition of the Inverse Trig Functions:

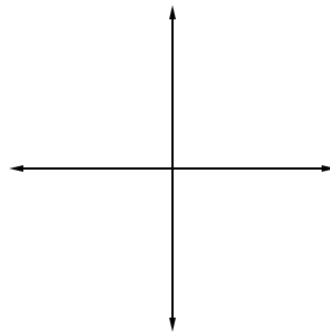
Function	Domain (x-values)	Range (y-values)

Examples:

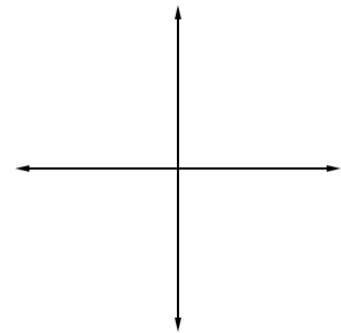
- Graph the indicated inverse trig functions in the coordinate planes below:



$$y = \arcsin(x)$$

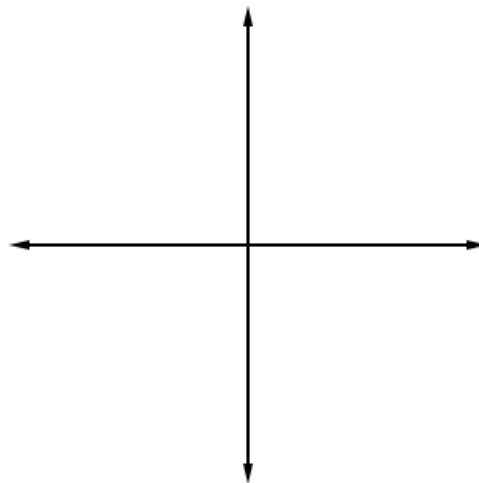


$$y = \arccos(x)$$



$$y = \arctan(x)$$

Below is a geometric representation of the range values for each inverse trig function:



- Evaluate without a

calculator.

- a.  $\arctan(1)$       b.  $\cos^{-1}(-1)$       c.  $\sin^{-1}\left(-\frac{\sqrt{3}}{2}\right)$       d.  $\arcsin(2)$

3. Solve for  $x$ .

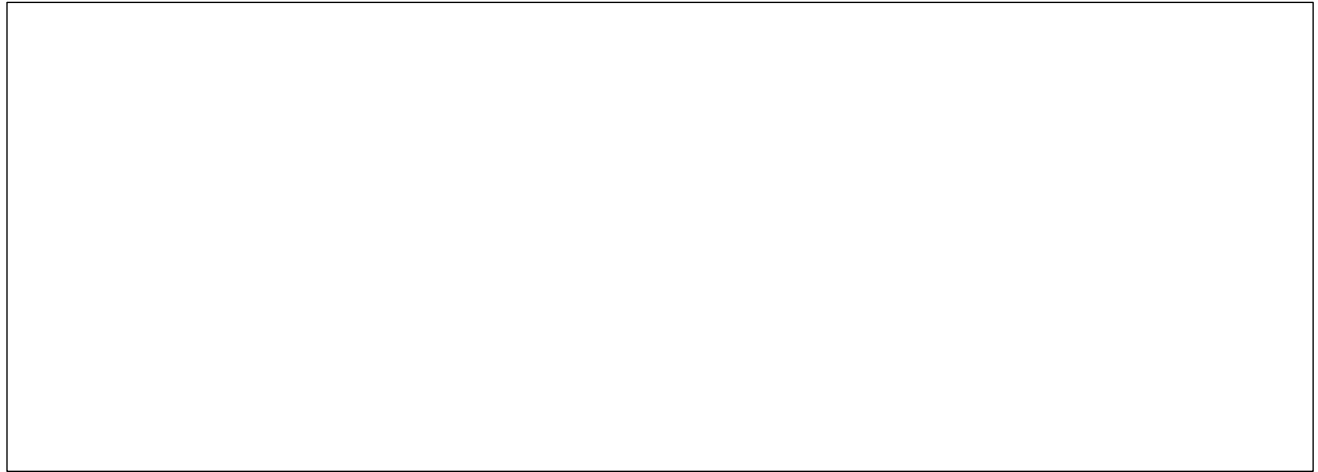
$$\arcsin(x^2 - 3) = \frac{\pi}{2}$$

4. Sketch a right triangle and evaluate without a calculator.

a. Find  $\tan(x)$ , given that  $x = \arccos\left(\frac{2}{\sqrt{5}}\right)$ .

b. Find  $\cos(y)$ , given that  $y = \arcsin(x)$ .

5. Use your answer from Example 5b to find  $\frac{d}{dx} \arcsin(x)$ .



Examples: Differentiate.

1.  $g(y) = \arctan(2y - 1)$

2.  $f(x) = \arcsin(\sqrt{x})$

3.  $h(t) = \arccos(\ln(t))$

4.  $y = \arcsin\left(\frac{x}{2}\right)$