

## Inverse Trig Functions

An inverse trig function is a function that reverses the trig function. For example, if the  $\sin x = y$ , then the inverse sine ( $\sin^{-1}$ ) can be written as  $\sin^{-1} y = x$ . Another way to write  $\sin^{-1}$  is  $\arcsin$ . The same holds for the other trig functions.

Here are some examples of inverse sin functions.

$$\sin^{-1}(1) = 90^\circ \text{ or } \frac{\pi}{2}$$

$$\arctan\left(\frac{\sqrt{3}}{3}\right) = 30^\circ \text{ or } \frac{\pi}{6}$$

Note that for inverse sine and cosine functions, the domain is  $-1 \leq x \leq 1$ .

For inverse sine, the range is  $[-\frac{\pi}{2}, \frac{\pi}{2}]$

For inverse cosine, the range is  $[0, \pi]$

The domain of inverse tangent is  $(-\infty, \infty)$  and the range is  $(-\frac{\pi}{2}, \frac{\pi}{2})$ .

The domain of inverse cotangent is  $(-\infty, \infty)$  and its range is  $(0, \pi)$ .

The domain of inverse cosecant is  $(-\infty, -1] \cup [1, \infty)$  and its range is  $[-\frac{\pi}{2}, 0) \cup (0, \frac{\pi}{2}]$ ,

The domain of inverse secant is  $(-\infty, -1] \cup [1, \infty)$  and its range is  $[0, \frac{\pi}{2}) \cup (\frac{\pi}{2}, \pi]$ .