Entry #: _____

Lesson 5.5: Inverse Trigonometric Functions & Their Graphs

Inverse Trigonometric Functions

The input of trigonometric functions is an _____ and the output of trigonometric functions is a ratio of _____ of a triangle.

Therefore, the inverse of trigonometric functions have an input of the ratio of _____ of a triangle and an output of an _____ .

Domain & Range of Inverse Trigonometric Functions

Function	Domain	Range
$y = \sin^{-1}(x)$		
$y = \cos^{-1}(x)$		
$y = \tan^{-1}(x)$		

***Note:** We restrict the domain of the sine, cosine & tangent functions before taking the inverse, so the resulting inverse is a function.

Evaluating Inverse Trigonometric Functions

To evaluate an inverse trig function, you find the angle on the _____ that corresponds to the ratio of side lengths of a triangle given (the input).

You must check the restricted range of the function before completing your evaluation, to make sure your answer is within the range.

Examples:

1. $\sin^{-1}\left(\frac{1}{2}\right) =$
2. $\sin^{-1}\left(-\frac{1}{2}\right) =$
3. $\sin^{-1}\left(\frac{\sqrt{2}}{2}\right) =$
4. $\cos^{-1}\left(\frac{\sqrt{3}}{2}\right) =$
5. $\cos^{-1}(2) =$
6. $\cos^{-1}(-1) =$
7. $\tan^{-1}(1) =$
8. $\tan^{-1}\left(\sqrt{3}\right) =$
9. $\tan^{-1}(0) =$

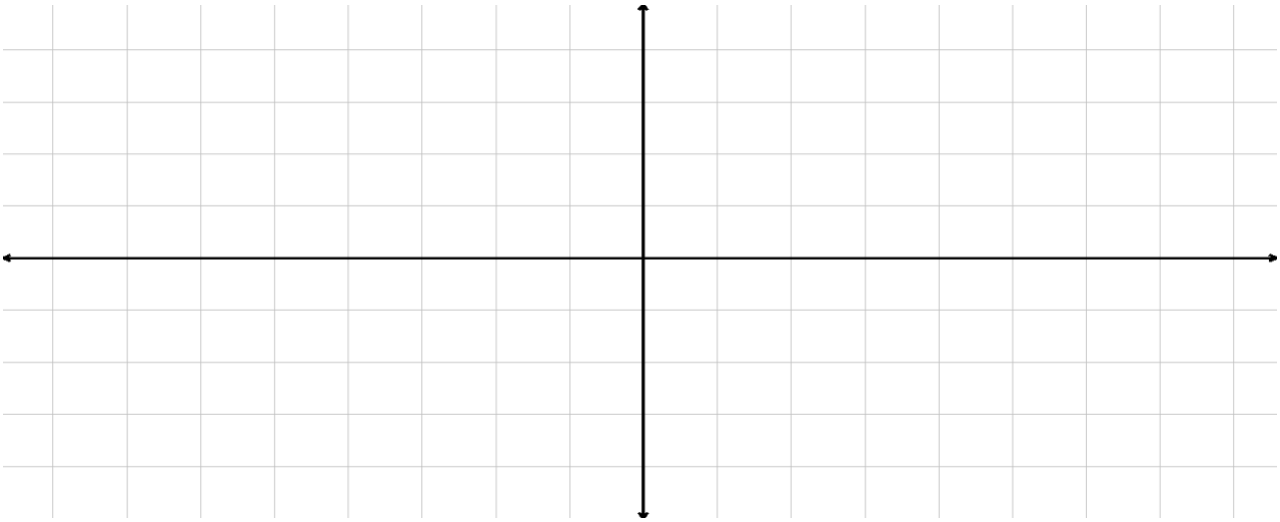
Evaluating Compositions of Trigonometric Functions

Examples:

1. $\sin^{-1}\left(\sin\left(\frac{\pi}{3}\right)\right) =$
2. $\sin^{-1}\left(\sin\left(\frac{2\pi}{3}\right)\right) =$
3. $\cos^{-1}\left(\cos\left(\frac{2\pi}{3}\right)\right) =$
4. $\cos^{-1}\left(\cos\left(\frac{5\pi}{3}\right)\right) =$
5. $\tan^{-1}\left(\tan\left(\frac{\pi}{2}\right)\right) =$
6. $\tan^{-1}\left(\tan\left(-\frac{\pi}{4}\right)\right) =$
7. $\sin\left(\sin^{-1}\left(\frac{\sqrt{3}}{2}\right)\right) =$
8. $\cos\left(\cos^{-1}\left(-\frac{1}{2}\right)\right) =$
9. $\tan(\tan^{-1}(-1)) =$
10. $\cos(\sin^{-1}(0)) =$
11. $\tan\left(\sin^{-1}\left(\frac{1}{2}\right)\right) =$
12. $\sin\left(\tan^{-1}\left(-\sqrt{3}\right)\right) =$

Graphing Inverse Trig Functions

On the axes below, graph $y = \sin(\theta)$, $y = \cos(\theta)$, & $y = \tan(\theta)$.



On the graphs above, highlight $y = \sin(\theta)$ on $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$, $y = \cos(\theta)$ on $[0, \pi]$, and $y = \tan(\theta)$ on $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$.

Use the highlighted portions of the graphs above to graph $y = \sin^{-1}(\theta)$, $y = \cos^{-1}(\theta)$, and $y = \tan^{-1}(\theta)$ on the axes below.