

8.1 Variable Compositions

EQ:

$$\sin(\cos^{-1} x)$$

$$\cos(\tan^{-1} x)$$

$$\sec(\tan^{-1} 3x)$$

$$\tan\left(\cos^{-1}\left(\frac{x}{3}\right)\right)$$

Unit 8

Inverse Trig Functions

8.1 Inverse Values on the Unit Circle

Guiding Questions:

How do I find an inverse value?

EQ:

$$\sin 30^\circ = \frac{1}{2}$$

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

2. $\arcsin\left(-\frac{1}{\sqrt{2}}\right)$

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

Will there always be two locations for an inverse?

Quadrantal Inverses

4. $\cos^{-1}(0)$

5. $\sin^{-1}(-1)$

6. $\tan^{-1} 1$

Will 0's and 1's always be quadrantal or can you draw a triangle for some?

8.6 Trig Compositions

EQ:

How do I solve compositions when the inverse is INSIDE the parenthesis?

1. $\sec\left(\sin^{-1}\left(\frac{5}{7}\right)\right)$

TRY This! $\cot\left(\text{arcsec}\left(-\frac{3}{2}\right)\right)$

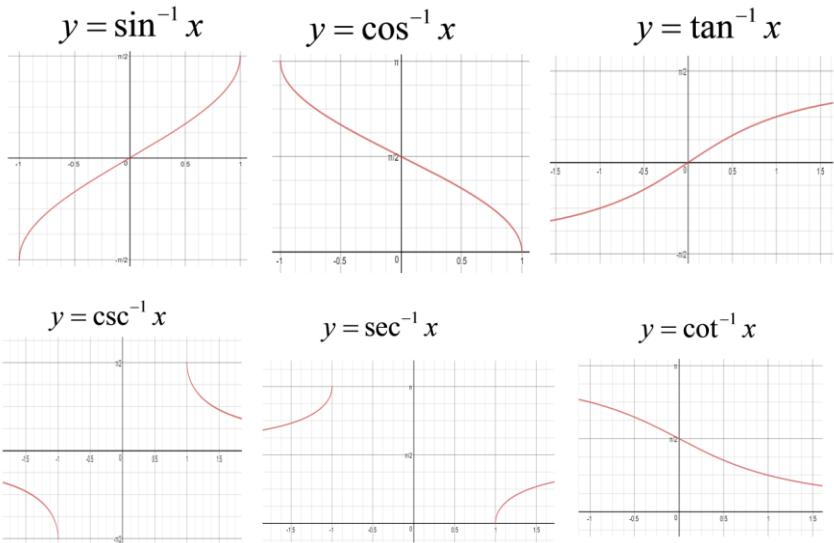
How do I solve compositions when the inverse is OUTSIDE the parenthesis?

2. $\cos^{-1}\left(\sin\frac{4\pi}{3}\right)$

TRY This! $\sin^{-1}\left(\cos\frac{3\pi}{4}\right)$

8.5 Principal Inverse Values

EQ:



Which quadrants fall in the restricted ranges?

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

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

$$3. \csc^{-1}\left(\sqrt{2}\right)$$

$$4. \cos^{-1}(0)$$

8.2 General Solutions

EQ:

Problem

General Solution First 3 positive values

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

$$2. x = \sin^{-1}\left(-\frac{1}{2}\right)$$

$$3. \cos x = -\frac{1}{2}$$

$$4. x = \tan^{-1}\left(-\sqrt{3}\right)$$

$$5. x = \cos^{-1}(-1)$$

How many answers do I find when looking for principal inverse values?

8.3 Evaluating Sinusoids with a Calculator

EQ:

$$1. \ f(x) = 2 + 3 \cos \frac{\pi}{9}(x - 6)$$

A) $f(8)$

B) $f(x) = 1.3$

How do I find the second solution for sin and cos?

$$2. \ f(x) = 4 + 3 \sin \frac{\pi}{6}(x - 2) \quad \text{Find the first 3 positive solutions where } f(x) = 6$$

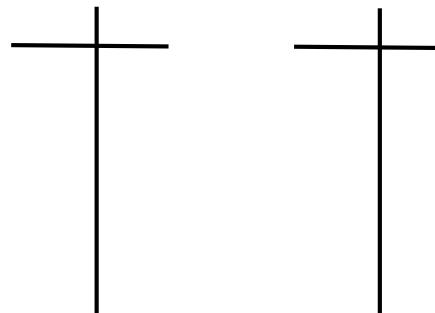
Steps:

1. Plug in $y = \#$
2. Isolate sin or cos
3. Inverse both sides
4. Find quadrants
5. Use calculator (in radians)
QI: Θ , QII: $\pi - \Theta$,
QIII: $\pi + \Theta$, QIV: $-\Theta$
6. Don't forget $+2\pi n$
7. Solve for x
8. Repeat steps 5-7 for 2nd solution

8.4 Inverse Parent Functions

EQ:

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



Restricted Range:

$$y = \cos^{-1} x$$

Restricted Range:

$$y = \tan^{-1} x$$

Restricted Range: