

Chapter 7 Section 6
Trigonometric Functions

$$\text{Cos}^{-1}x$$

the "cool" kid



$$\text{Domain: } 0 \leq \theta \leq \pi$$

$$0^\circ \leq \theta \leq 180^\circ$$

$$\text{Cos}^{-1}x$$

$$\text{Arc Cos } x$$

$$\text{Sin}^{-1}x$$

the "sleepy" kid



$$\text{Domain: } -\pi/2 \leq \theta \leq \pi/2$$

$$-90^\circ \leq \theta \leq 90^\circ$$

$$\text{Tan}^{-1}x$$

music "turned" off



$$\text{Domain: } -\pi/2 < \theta < \pi/2$$

$$-90^\circ < \theta < 90^\circ$$

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Example 1

Using a calculator, find the $\text{Cos}^{-1}(-1)$

	<u>In degree mode</u>	<u>In radian mode</u>
	180°	3.1416

Taking the inverse of a value is finding the angle measure which would produce that value.

Ask yourself, if $\cos \theta = -1$, what does θ have to be?

Example 2

Using a calculator, find the $\text{Tan}^{-1}4$

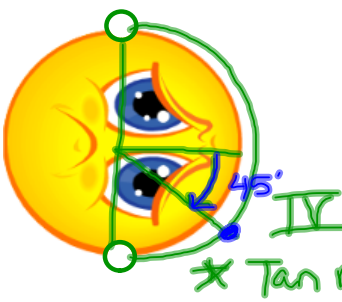
	<u>In degree mode</u>	<u>In radian mode</u>
	75.96°	1.3258

$$\tan \theta = 4$$

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Example 3

Without a calculator, find the exact answer of $Tan^{-1}(-1)$



$Tan \theta = -1 = \frac{y}{x}$


$\theta = 315^\circ$

$\theta = -45^\circ$

$\theta = -\frac{\pi}{4}$

Example 4

Without a calculator, find the exact answer of $Cos^{-1}(-0.5)$



$cos \theta = -0.5 = -\frac{1}{2}$

$\theta = 120^\circ$

$\theta = \frac{2\pi}{3}$

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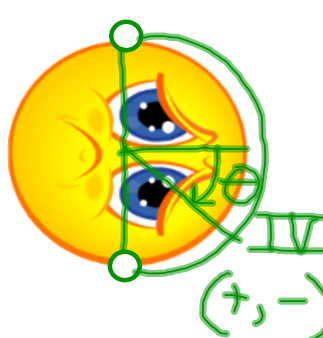
Example 5

Find the $cos\left(Tan^{-1}\left(-\frac{2}{3}\right)\right)$

a) with a calculator

.8321

b) without a calculator



$Tan \theta = -\frac{2}{3} = \frac{y}{x}$

$x = 3 \quad y = -2$

$cos \theta = \frac{x}{r} = \frac{3}{?}$

$x^2 + y^2 = r^2$

$\sqrt{3^2 + (-2)^2} = r$

$9 + 4 = 13 = r^2 \quad r = \sqrt{13}$

$cos \theta = \frac{3}{\sqrt{13}} \cdot \frac{\sqrt{13}}{\sqrt{13}}$

$\frac{3\sqrt{13}}{13}$

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Example 6

Find the $\cos\left(\sin^{-1}\left(\frac{4}{5}\right)\right)$ without a calculator.

~~$\sin(\sin^{-1} \frac{4}{5}) = \frac{4}{5}$~~ $\rightarrow \sin \theta = \frac{4}{5} = \frac{y}{r} = \frac{4}{5}$

\sin positive

$\cos \theta = \frac{x}{r} = \frac{x}{5}$

$x^2 + y^2 = r^2$

$x^2 + 4^2 = 5^2$

$x^2 + 16 = 25$

$\sqrt{x^2} = \sqrt{9} \quad x = 3$

$\frac{3}{5}$

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Homework

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