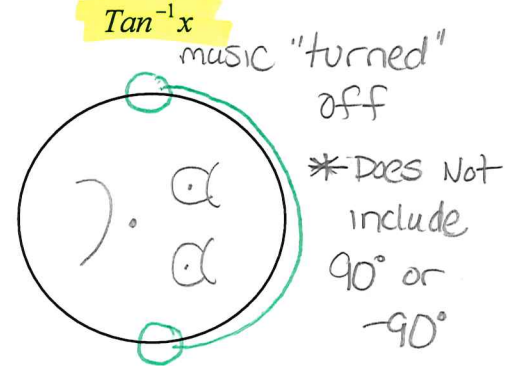
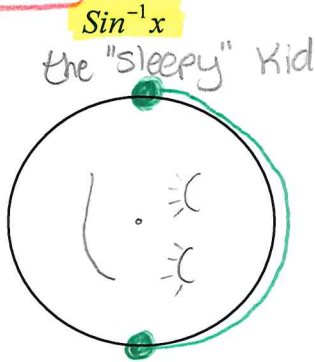
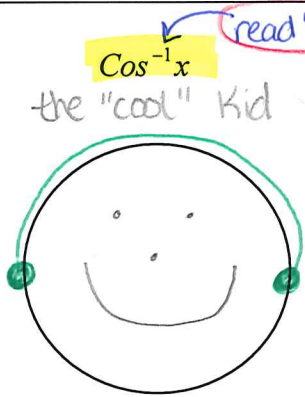


Key

Section 7.6: The Inverse Trigonometric Functions

Essential Question: What is an inverse trig function?



Domain: $0^\circ \leq \theta \leq 180^\circ$
or $0 \leq \theta \leq \pi$

Domain: $-90^\circ \leq \theta \leq 90^\circ$
or $-\pi/2 \leq \theta \leq \pi/2$

Domain: $-90^\circ < \theta < 90^\circ$
or $-\pi/2 < \theta < \pi/2$

Example 1

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

In degree mode: 180°

In radian mode: $3.1416 \rightarrow \pi$

Question is $\cos \theta = -1 \dots$ what's θ ?

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 to get (-1)?

look @ unit circle and locate where $\cos \theta$ (x-value) is -1

Example 2

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

In degree mode: 75.96°

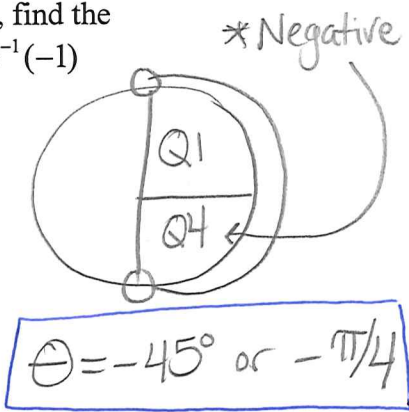
In radian mode: 1.3258

$\tan \theta = -4$ ← not on unit circle so use calculator to solve

Example 3

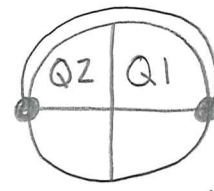
Without a calculator, find the exact answer of $\text{Tan}^{-1}(-1)$

$\tan \theta = -1$
 $\theta = ?$
When $\theta = 315^\circ$ but clockwise



Example 4

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



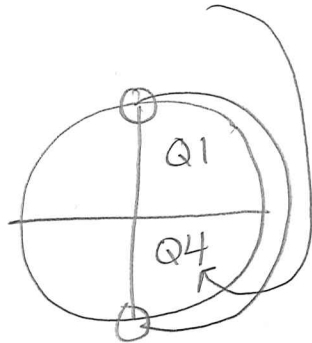
$\cos \theta = -1/2$
Neg = Q2
when $\theta = 120^\circ$ or $2\pi/3$

Example 5

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

a) with a calculator

$\boxed{.8321}$



b) without a calculator

$\tan^{-1}\left(\frac{-2}{3}\right) \rightarrow \tan\theta = \frac{-2}{3} = \frac{y}{x}$

but question $\cos(\theta) = ?$

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

$x^2 + y^2 = r^2$ $r = \sqrt{13}$
 $(3)^2 + (-2)^2 = r^2$ $\cos\theta = \frac{3}{\sqrt{13}}$
 $9 + 4$
 $13 = r^2$ $\boxed{\frac{3\sqrt{13}}{13}}$

Example 6

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

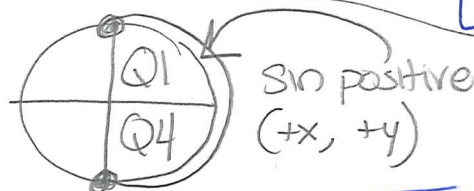
$\sin\theta = \frac{4}{5} = \frac{y}{r}$

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

$x^2 + y^2 = r^2$
 $(x)^2 + (4)^2 = (5)^2$

$x^2 + 16 = 25$

$x^2 = 9 \rightarrow x = \pm 3$



$\cos\theta = \frac{x}{r} = \boxed{\frac{3}{5}}$

Section 7.6 Summary:

Trig inverses are finding the θ that gives you the given x-value, y-value, or ratio y/x or x/y .

Given $\cos^{-1}(a)$, you need to find what θ would produce $\cos\theta = a$ and so forth with the other 5 trig functions