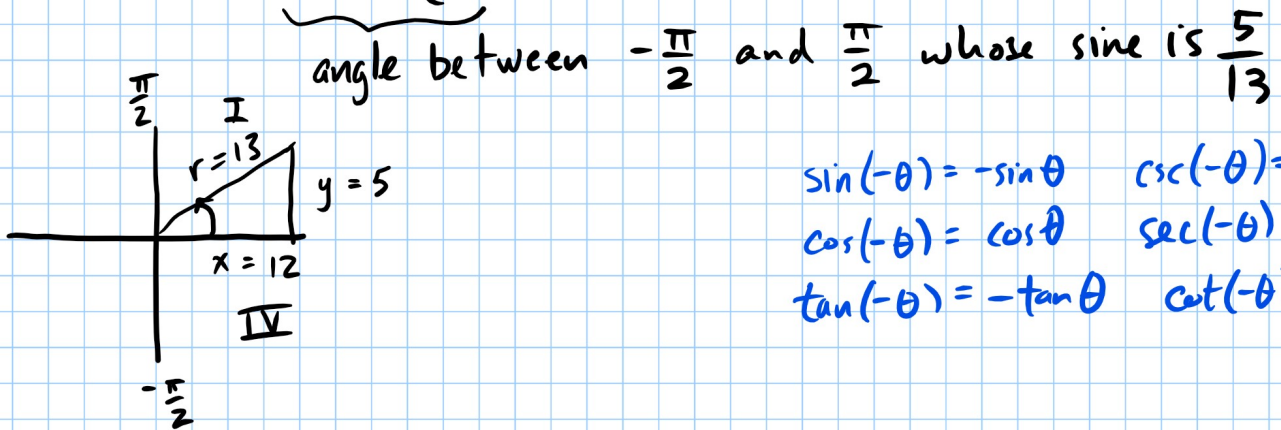


Section 6.2 Inverse Trig Functions Part 2

What does $\sin^{-1}\left(\frac{5}{13}\right)$ mean?



$$\begin{aligned} \sin(-\theta) &= -\sin\theta & \csc(-\theta) &= -\csc\theta \\ \cos(-\theta) &= \cos\theta & \sec(-\theta) &= \sec\theta \\ \tan(-\theta) &= -\tan\theta & \cot(-\theta) &= -\cot\theta \end{aligned}$$

ex: $\cot\left[\underbrace{\sin^{-1}\left(-\frac{1}{2}\right)}_{\text{New chart}}\right] = \cot\left(-\frac{\pi}{6}\right) = -\cot\frac{\pi}{6} = -\sqrt{3}$

ex: $\csc\left(\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right)\right) = \csc\frac{5\pi}{6} = 2$

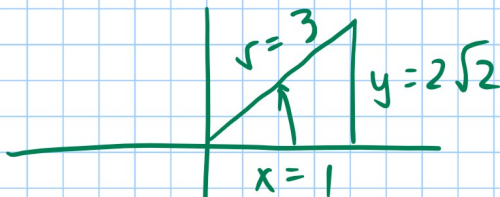
ex: $\csc\left(\cos^{-1}\frac{1}{3}\right) = \frac{3}{2\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}}$

$\cos\theta = \frac{1}{3}$
 between 0 and π

$$\sin\theta = \frac{y}{r} \quad \csc\theta = \frac{r}{y}$$

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

$$\tan\theta = \frac{y}{x} \quad \cot\theta = \frac{x}{y}$$



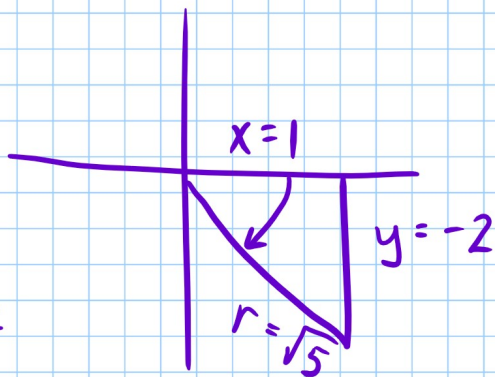
$$\frac{3\sqrt{2}}{2 \cdot 2} = \frac{3\sqrt{2}}{4}$$

$$\begin{aligned} x^2 + y^2 &= r^2 \\ 1 + y^2 &= 9 \\ y^2 &= 8 \end{aligned} \rightarrow y = \sqrt{8} = \sqrt{4\sqrt{2}} = 2\sqrt{2}$$

Angle	If $R > 0$	If $R < 0$
$\sin^{-1} R$	Q I	Q IV
$\cos^{-1} R$	Q I	Q II
$\tan^{-1} R$	Q I	Q IV
$\csc^{-1} R$	Q I	Q IV
$\sec^{-1} R$	Q I	Q II
$\cot^{-1} R$	Q I	Q II

ex: $\csc \left[\tan^{-1}(-2) \right] = \frac{\sqrt{5}}{-2}$

$$\frac{y}{x} = \frac{-2}{1}$$



$$1^2 + (-2)^2 = r^2$$

$$5 = r^2$$

ex: Evaluate $\sec^{-1} \left(-\frac{5}{3} \right)$ on calculator
 $\hookrightarrow \cos^{-1} \left(-\frac{3}{5} \right)$

$$\sec^{-1} \left(\frac{a}{b} \right) = \cos^{-1} \left(\frac{b}{a} \right)$$

$$\csc^{-1} \left(\frac{a}{b} \right) = \sin^{-1} \left(\frac{b}{a} \right)$$

$$\cot^{-1} \left(\frac{a}{b} \right) = \tan^{-1} \left(\frac{b}{a} \right)$$

Make sure you're in radian mode.

6.2 Assignment

Find exact value of each:

C
H
A
R
T
S

$$1) \cos(\sin^{-1} \frac{\sqrt{3}}{2})$$

$$2) \tan(\cos^{-1}(-\frac{\sqrt{3}}{2}))$$

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

$$4) \csc(\cos^{-1}(-\frac{\sqrt{3}}{2}))$$

$$5) \cot(\tan^{-1} \frac{\sqrt{3}}{3})$$

D
R
A
W

$$6) \cos(\tan^{-1} \frac{2}{\sqrt{3}})$$

$$7) \tan(\sin^{-1} \frac{1}{3})$$

$$8) \sec(\tan^{-1}(-\frac{12}{5}))$$

Δ

$$9) \csc(\cos^{-1}(-\frac{7}{25}))$$

$$10) \cot(\tan^{-1}(-\frac{40}{9}))$$