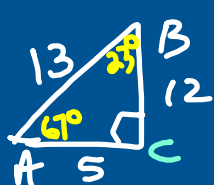


BASIC TRIG FACTS

Cofunctions – Complementary functions



$$\begin{aligned}\sin 67^\circ &= \frac{12}{13} & \sin 23^\circ &= \frac{5}{13} \\ \cos 67^\circ &= \frac{5}{13} & \cos 23^\circ &= \frac{12}{13}\end{aligned}$$

$$\begin{aligned}\sin 67^\circ &= \cos 23^\circ \\ \sin 60^\circ &= \cos 30^\circ\end{aligned}$$

$$\begin{aligned}\sin A &= \cos(90^\circ - A) \\ \sec A &= \csc(90^\circ - A) \\ \tan A &= \cot(90^\circ - A)\end{aligned}$$

Write in terms of its compl. func:

$$\csc 70^\circ = \sec^{90^\circ - 70^\circ} 20^\circ$$

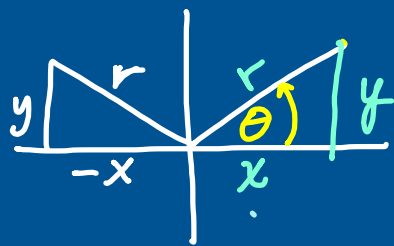
$$\tan 53^\circ 10' = \cot 36^\circ 50'$$

$$\begin{array}{r} 89^\circ 60' \\ - 53^\circ 10' \\ \hline 36^\circ 50' \end{array}$$

$$\cos \frac{\pi}{6} = \sin \left(\frac{\pi}{2} - \frac{\pi}{6} \right)$$

$$= \sin \left(\frac{3\pi}{6} - \frac{\pi}{6} \right)$$

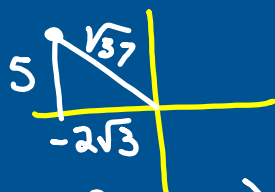
$$= \sin \frac{\pi}{3}$$



$\sin \theta = \frac{\text{y our}}{\text{r o t h e n}}$
 $\cos \theta = \frac{\text{x y l o p h o n e}}{\text{r i g h t}}$
 $\tan \theta = \frac{\text{y our}}{\text{x}}$
 crazy through

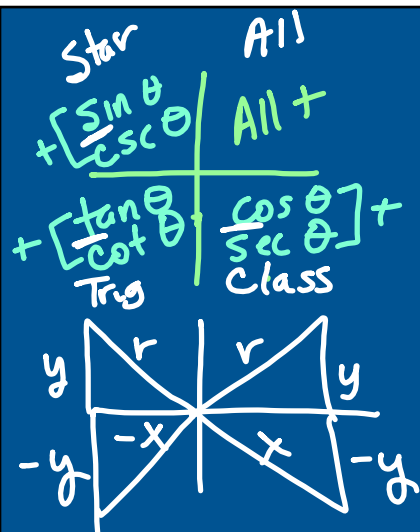
$\csc \theta = \frac{r}{y}$
 $\sec \theta = \frac{r}{x}$
 $\cot \theta = \frac{x}{y}$

Terminal side of angle θ passes through $(-2\sqrt{3}, 5)$. What is $\sec \theta$.



$$\begin{aligned}
 (5)^2 + (-2\sqrt{3})^2 &= r^2 \\
 25 + 12 &= r^2 \\
 \sqrt{37} &= r
 \end{aligned}$$

$$\begin{aligned}
 \sec \theta &= \frac{r}{x} \\
 &= \frac{\sqrt{37} \sqrt{3}}{-2\sqrt{3} \cdot \sqrt{3}} \\
 &= \frac{\sqrt{111}}{-6}
 \end{aligned}$$



Find quadrant.

$$\csc \theta > 0 \quad \tan \theta < 0$$

+ -

II



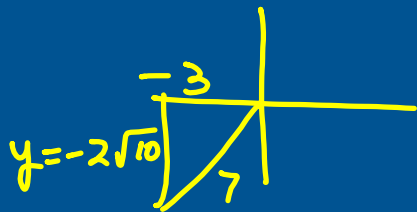
$$\sec \theta < 0 \quad \sin \theta < 0$$

- -

III

If $\cos \theta = -\frac{3}{7}$ and $\theta > 0$,
find $\csc \theta$.

Draw a picture of the Δ !



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

$$(-3)^2 + y^2 = 7^2$$

$$9 + y^2 = 49$$

$$\sqrt{y^2} = \sqrt{40}$$

$$y = \pm 2\sqrt{10}$$

$$= \frac{7}{-2\sqrt{10} \cdot \sqrt{10}}$$

$$= -\frac{7\sqrt{10}}{20}$$

Negative angles

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

$$\cos(-\theta) = \frac{x}{r}$$



$$\sin(-\theta) = -\sin \theta \quad \csc(-\theta) = -\csc \theta$$

$$\cos(-\theta) = \cos \theta \quad \sec(-\theta) = \sec \theta$$

$$\tan(-\theta) = -\tan \theta \quad \cot(-\theta) = -\cot \theta$$

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

$$\tan(-\theta) = -\frac{y}{x}$$

$$\sin \theta = -\frac{3}{5}$$

$$\sin(-\theta) = +\frac{3}{5}$$

$$\csc(-\theta) = \frac{5}{3}$$

$$\csc(\theta) = -\frac{5}{3}$$

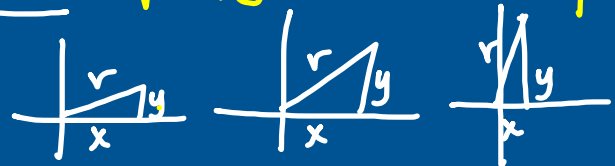
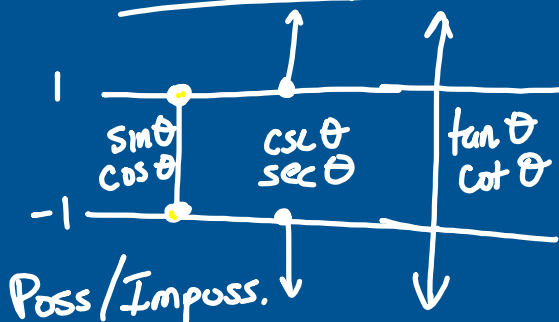
$$\sec(\theta) = -\frac{5}{2}$$

$$\cos(-\theta) = -\frac{2}{5}$$

Possible/Impossible Values.

$$\frac{y}{r} = \frac{\text{sm}}{\text{big}}$$

F



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

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

$$\tan \theta = \frac{y}{x} \quad \frac{\text{sm}}{\text{big}} \quad \frac{\text{big}}{\text{sm}}$$

$$2 \sec \gamma + 3 = -\frac{7}{3}$$

$$\frac{2 \sec \gamma}{2} = \frac{4}{2}$$

$$\sec \gamma = 2 \quad \text{Possible}$$

$$\tan \theta = \frac{7}{3} \quad \text{and} \quad \cot \theta = -\frac{3}{7}$$

Impossible