# BASIC TRIG FACTS

## Cofunctions — Complementary

$\sin 20° = \cos 70°$

$\sec 2° = \csc 88°$

$\tan 53° 10' = \cot 36° 50'$

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

$\csc \dfrac{\pi}{6} = \sec \dfrac{\pi}{3} \longleftarrow$

$\dfrac{\pi}{2} - \dfrac{\pi}{6} = \dfrac{3\pi}{6} - \dfrac{\pi}{6} = \dfrac{2\pi}{6}$

$\sin$

$\sin 30°$

$\sin \theta$

# Positive/Negative Values

**Star**

$+\begin{bmatrix} \sin\theta \\ \csc\theta \end{bmatrix}$

$+\begin{bmatrix} \tan\theta \\ \cot\theta \end{bmatrix}$

**Trig**

**All**

All +

$\begin{bmatrix} \cos\theta \\ \sec\theta \end{bmatrix} +$

**Class**

## Find quadrant(s)?

$\csc\theta > 0$  $\tan\theta < 0$  II
   +              −

$\sec\theta < 0$  $\sin\theta < 0$  III
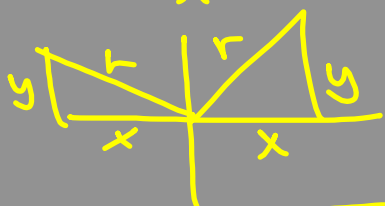   −              
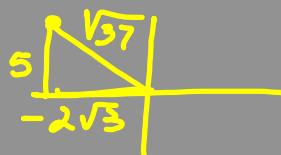
$\sin\theta = \dfrac{y}{r}$

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

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

Stick = $\dfrac{\text{your}}{\text{rotton}}$
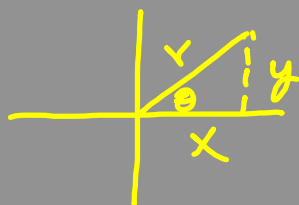
Crazy = $\dfrac{\text{xylophones}}{\text{right}}$

through = $\dfrac{\text{your}}{x}$

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

$\sec\theta = \dfrac{r}{x}$

$\cot\theta = \dfrac{x}{y}$

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

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

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

The terminal side of angle $\theta$ passes through $(-2\sqrt{3}, 5)$

What is $\sec\theta$?

$$(-2\sqrt{3})^2 + (5)^2 = r^2$$
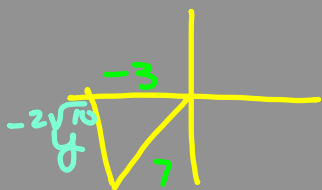
$$12 + 25 = r^2$$

$$\sqrt{37} = \sqrt{r^2}$$

$$\sec\theta = \frac{r}{x} = \frac{\sqrt{37} \cdot \sqrt{3}}{-2\sqrt{3}\sqrt{3}}$$

$$\boxed{-\frac{\sqrt{111}}{6}}$$

If $\cos\theta = -\frac{3}{7} \frac{x}{r}$ & $\cot\theta > 0$

Find $\sin\theta$.

$$\frac{y}{r} = \boxed{\frac{-2\sqrt{10}}{7}}$$

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

$$y^2 + 9 = 49$$

$$\sqrt{y^2} = \sqrt{40} \quad 4\cdot 10$$

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

$$\sin(-\theta) = \frac{-y}{r} = -\sin\theta$$

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

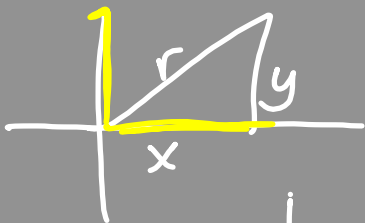$$\tan(-\theta) = \frac{-y}{x} = -\tan\theta$$

Even
$$f(-x) = f(x)$$

Odd
$$f(-x) = -f(x)$$

$$\tan(-\theta) = \frac{3}{2} \qquad \cot(-\theta) = \frac{2}{3}$$

$$\tan(\theta) = -\frac{3}{2}$$
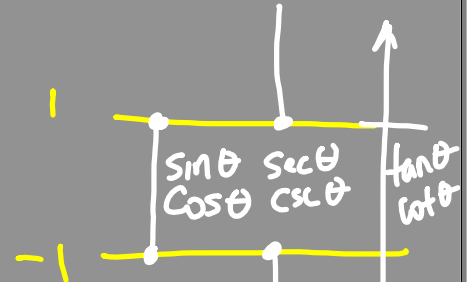
# Possible/Impossible Values

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

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

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

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

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

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

| | | |
|---|---|---|
| Sin θ | Sec θ | tan θ |
| Cos θ | Csc θ | cot θ |

$$2\sec\theta + 1 = 7$$
$$\phantom{2\sec\theta}\ -1\ \ -1$$

$$\frac{2\sec\theta}{2} = \frac{6}{2}$$

$$\sec\theta = 3 \quad \text{Possible}$$