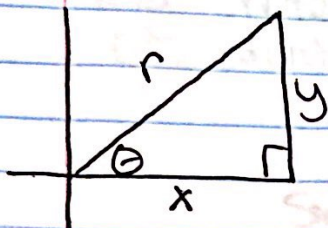


# Six Trigonometric Functions



## Reciprocal Functions

$$\cos \theta = \frac{\text{Adj}}{\text{Hyp}} = \frac{x}{r}$$

$$\sec \theta = \frac{\text{Hyp}}{\text{Adj}} = \frac{r}{x}$$

$$\sin \theta = \frac{\text{Opp}}{\text{Hyp}} = \frac{y}{r}$$

$$\csc \theta = \frac{\text{Hyp}}{\text{Opp}} = \frac{r}{y}$$

$$\tan \theta = \frac{\text{Opp}}{\text{Adj}} = \frac{y}{x}$$

$$\cot \theta = \frac{\text{Adj}}{\text{Opp}} = \frac{x}{y}$$

On the unit circle, the points  $(x, y)$  are equivalent to  $(\cos \theta, \sin \theta)$

Give the exact value of each expression.

$$1) \sin \frac{\pi}{3} = \frac{\sqrt{3}}{2}$$

$$2) \sin \left( -\frac{\pi}{3} \right) = -\frac{\sqrt{3}}{2}$$

$$3) \tan \left( \frac{13\pi}{4} \right) = \frac{-\frac{\sqrt{2}}{2}}{-\frac{\sqrt{2}}{2}} = 1$$

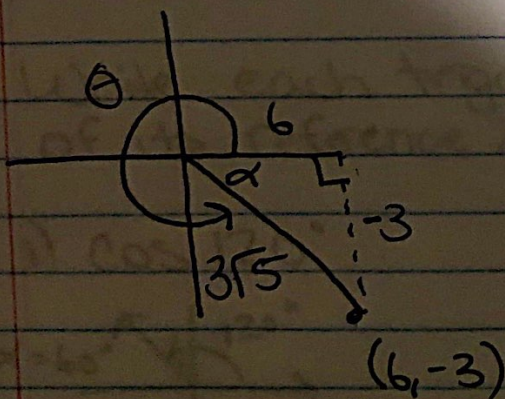
$$4) \tan \left( -\frac{3\pi}{2} \right) = \frac{1}{0}$$

Trig Functions are Positive in the following Quadrants.

<u>sin</u> $\theta$ csc $\theta$	All
<u>tan</u> $\theta$ cot $\theta$	<u>cos</u> $\theta$ sec $\theta$

The terminal side of an angle  $\theta$  in standard position passes through the given point. Find the values of the 6 trig functions.

1)  $(6, -3)$



$$\sin \theta = -\frac{\sqrt{5}}{5} \quad \csc \theta = -\sqrt{5}$$

$$\frac{-3}{3\sqrt{5}} = \frac{1}{\sqrt{5}} \left( \frac{\sqrt{5}}{\sqrt{5}} \right)$$

$$\cos \theta = \frac{2\sqrt{5}}{5} \quad \sec \theta = \frac{\sqrt{5}}{2}$$

$$\frac{6}{3\sqrt{5}} = \frac{2}{\sqrt{5}}$$

$$\tan \theta = -\frac{1}{2} \quad \cot \theta = -2$$

$$\frac{-3}{6}$$

$$6^2 + (-3)^2 = r^2$$

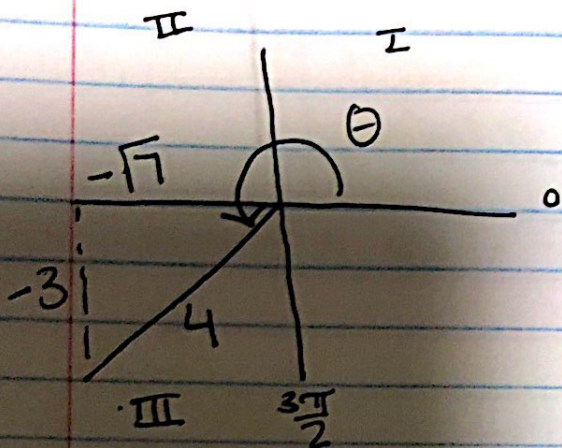
$$45 = r^2$$

$$\sqrt{45} = r$$

$$3\sqrt{5} = r$$

Given  $\sin \theta$ ,  $\cos \theta$ , or  $\tan \theta$ , find the other 2 trig functions.

1)  $\sin \theta = \frac{3}{4}$        $0 < \theta < \frac{3\pi}{2}$



$$\cos \theta = -\frac{\sqrt{7}}{4}$$

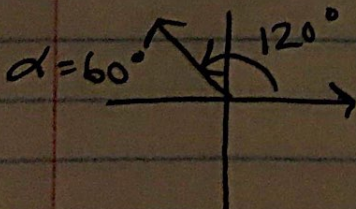
$$\tan \theta = \frac{3\sqrt{7}}{7}$$

$$\frac{-3}{-\sqrt{7}} = \frac{3}{\sqrt{7}}$$

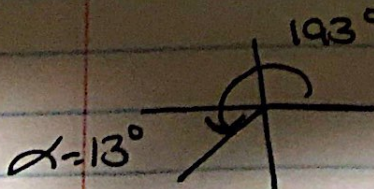
$$\begin{aligned} (-3)^2 + x^2 &= 4^2 \\ 9 + x^2 &= 16 \\ x^2 &= 7 \\ x &= \sqrt{7} \end{aligned}$$

Write each trigonometric function in terms of its reference  $\angle$ .

1)  $\cos 120^\circ$        $-\cos 60^\circ$



2)  $\tan 193^\circ$        $\tan 13^\circ$



$$3) \cot \frac{2\pi}{3}$$

$$= -\cot \frac{\pi}{3}$$

