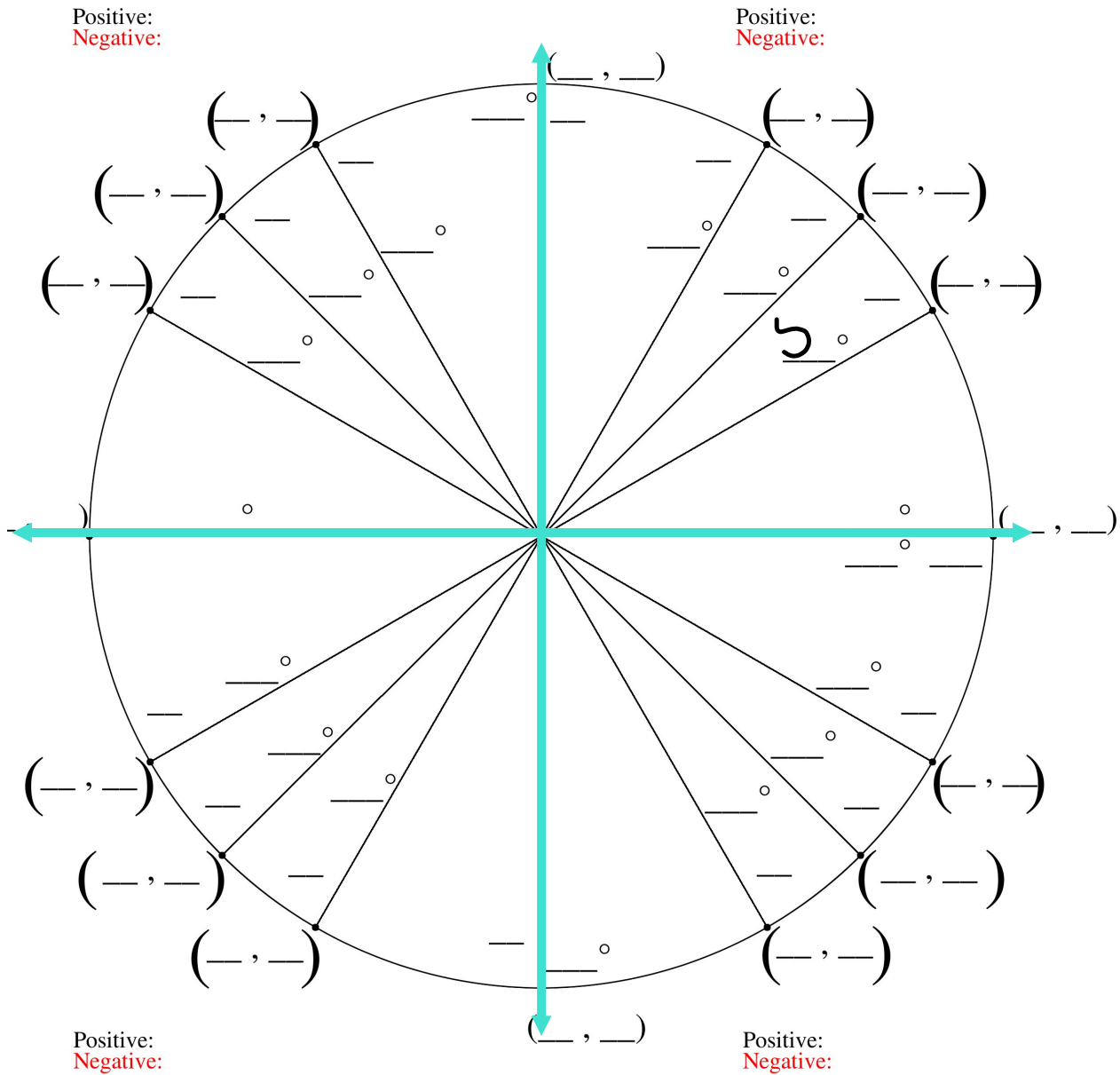
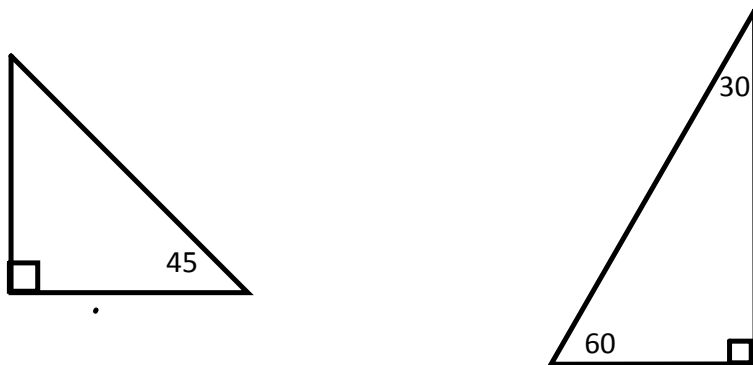


Fill in The Unit Circle



EmbeddedMath.com



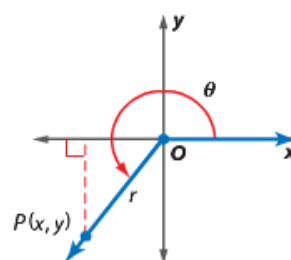
θ	$\sin\theta$	$\cos\theta$	$\tan\theta$	$\csc\theta$	$\sec\theta$	$\cot\theta$
30°						
45°						
60°						

KeyConcept Trigonometric Functions of General Angles

Let θ be an angle in standard position and let $P(x, y)$ be a point on its terminal side. Using the Pythagorean Theorem, $r = \sqrt{x^2 + y^2}$. The six trigonometric functions of θ are defined below.

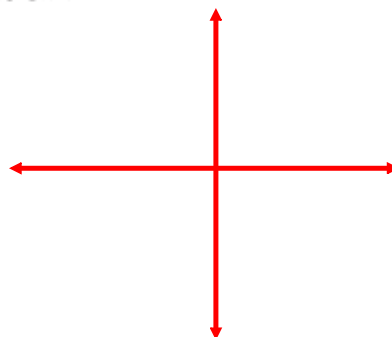
$$\sin \theta = \frac{y}{r} \quad \cos \theta = \frac{x}{r} \quad \tan \theta = \frac{y}{x}, x \neq 0$$

$$\csc \theta = \frac{r}{y}, y \neq 0 \quad \sec \theta = \frac{r}{x}, x \neq 0 \quad \cot \theta = \frac{x}{y}, y \neq 0$$



The terminal side of θ in standard position contains the point at $(-3, -4)$. Find the exact values of the six trigonometric functions of θ .

Step 1 Draw the angle, and find the value of r .



Step 2 Use $x = -3$, $y = -4$, and $r =$ to write the six trigonometric ratios.

The terminal side of θ in standard position contains the point at $(-6, 2)$.
Find the exact values of the six trigonometric functions of θ .

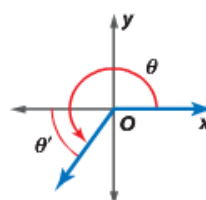
If the terminal side of angle θ in standard position lies on the x - or y -axis, the angle is called a **quadrantal angle**.

KeyConcept Quadrantal Angles

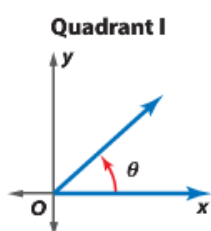
$\theta = 0^\circ$ or 0 radians	$\theta = 90^\circ$ or $\frac{\pi}{2}$ radians	$\theta = 180^\circ$ or π radians	$\theta = 270^\circ$ or $\frac{3\pi}{2}$ radians

2. The terminal side of θ in standard position contains the point at $(-2, 0)$. Find the values of the six trigonometric functions of θ .

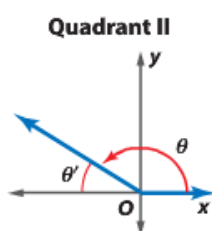
2 Trigonometric Functions with Reference Angles If θ is a nonquadrantal angle in standard position, its **reference angle** θ' is the acute angle formed by the terminal side of θ and the x -axis. The rules for finding the measures of reference angles for $0^\circ < \theta < 360^\circ$ or $0^\circ < \theta < 2\pi$ are shown below.



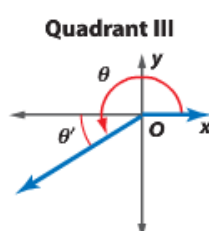
KeyConcept Reference Angles



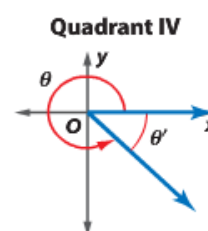
$$\theta' = \theta$$



$$\begin{aligned}\theta' &= 180^\circ - \theta \\ \theta' &= \pi - \theta\end{aligned}$$



$$\begin{aligned}\theta' &= \theta - 180^\circ \\ \theta' &= \theta - \pi\end{aligned}$$



$$\begin{aligned}\theta' &= 360^\circ - \theta \\ \theta' &= 2\pi - \theta\end{aligned}$$

Sketch each angle. Then find its reference angle.

a. 210°

b. $-\frac{5\pi}{4}$