

Trig 5.3

Use the unit circle to find the values of the six trig functions

Find the (6) values of an angle in standard position given terminal side

six trig functions

standard position

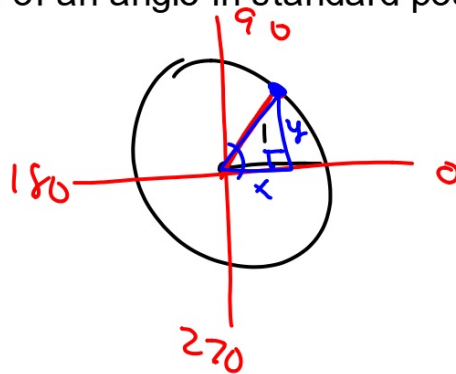
terminal side

quadrantal angles

reference angles

unit circle

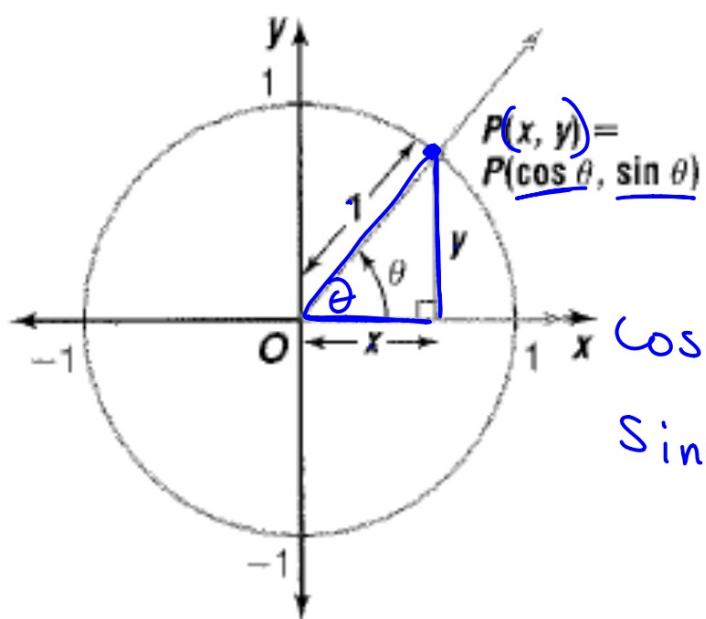
circular function



Quiz 5.1-5.2 Wed.

Handy angles quiz Fri.

Floor graphing



$$\cos \theta = \frac{x}{1}$$

$$\sin \theta = \frac{y}{1}$$

Unit circle

$$x = \cos \theta$$

$$y = \sin \theta$$

Unit circle: circle with radius=1 unit

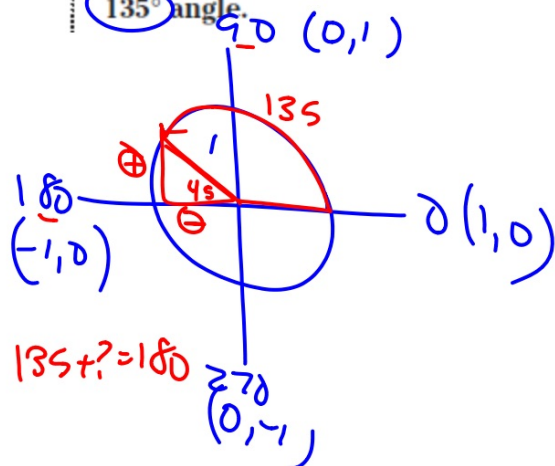
$$\cos \theta = x/1 \dots \dots \dots x = \cos \theta$$

$$\sin \theta = y/1 \dots \dots \dots y = \sin \theta$$

Use reference angles
pos...neg...if not in
Q1

$$\frac{2}{\sqrt{2}} \frac{\sqrt{2}}{\sqrt{2}} = \frac{\cancel{2}\sqrt{2}}{\cancel{2}}$$

3 Use the unit circle to find the values of the six trigonometric functions for a 135° angle.



$$\sin 135 = +\frac{\sqrt{2}}{2}$$

$$\csc 135 = +\sqrt{2}$$

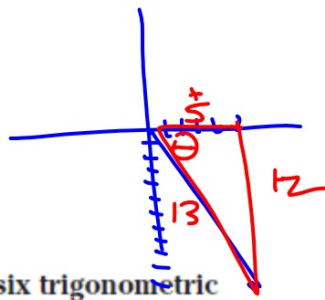
$$\cos 135 = -\frac{\sqrt{2}}{2}$$

$$\sec 135 = -\sqrt{2}$$

$$\tan 135 = -1$$

$$\cot 135 = -1$$

pythagorean theorem
 what quadrant?
 Is it on the unit circle?



What does the triangle look like?

- 4** Find the values of the six trigonometric functions for angle θ in standard position if a point with coordinates $(5, -12)$ lies on its terminal side.

$$\sin \theta = -\frac{12}{13}$$

$$\cos \theta = +\frac{5}{13}$$

$$\tan \theta = -\frac{12}{5}$$

$$\csc \theta = -\frac{13}{12}$$

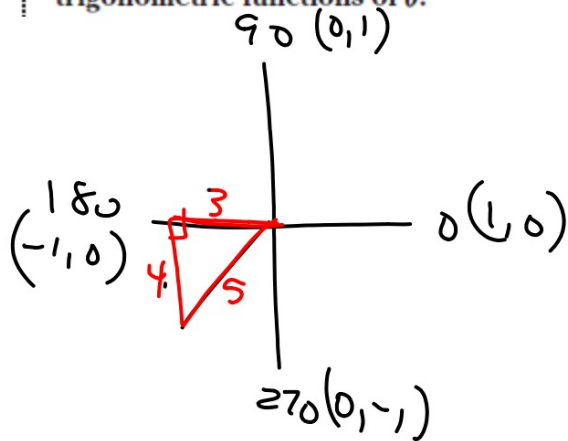
$$\sec \theta = +\frac{13}{5}$$

$$\cot \theta = -\frac{5}{12}$$

$$\frac{-4}{-5} =$$

One picture is worth 1000 words...

- 5 Suppose θ is an angle in standard position whose terminal side lies in Quadrant III. If $\sin \theta = -\frac{4}{5}$, find the values of the remaining five trigonometric functions of θ .



$$\sin \theta = -\frac{4}{5}$$

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

$$\tan \theta = +\frac{4}{3}$$

$$\csc \theta = -\frac{5}{4}$$

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

$$\cot \theta = +\frac{3}{4}$$

Is it in the unit circle?

Use landmarks (x,y) if quadrant lines



Use the unit circle to find each value.

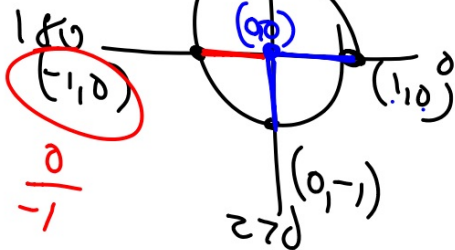
$$5(\tan 180^\circ) = 0$$

$$\tan = \frac{\text{opp}}{\text{adj}} = \frac{0}{x}$$

$$6. \sec(-90^\circ)$$

$$\cos \frac{a}{h}$$

$$\frac{h}{a} \quad \frac{1}{0} = \text{undefined}$$



$$x = \cos \theta \quad y = \sin \theta$$

Use the unit circle to find the values of the six trigonometric functions for each angle.

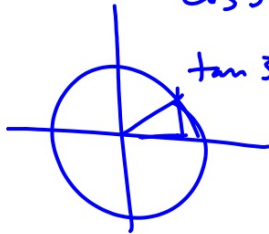
7. 30°

$$\sin 30 = \frac{1}{2}$$

$$\cos 30 = \frac{\sqrt{3}}{2}$$

$$\tan 30 = \frac{1}{\sqrt{3}}$$

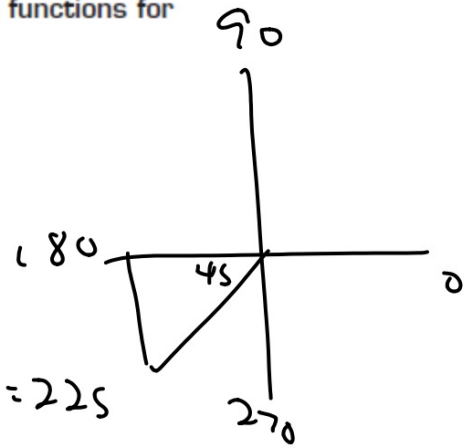
$$= \frac{\sqrt{3}}{3}$$



$$\csc 30 = \frac{2}{1} = 2$$

$$\sec 30 = \frac{2}{\sqrt{3}} = \frac{2\sqrt{3}}{3}$$

$$\cot 30 = \sqrt{3}$$



$$180 + ? = 225$$

Reference angles $0 < x < 90$ then determine positive or negative based on quadrant

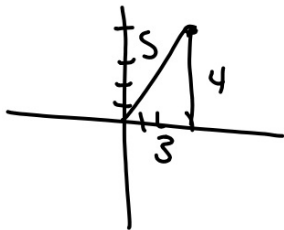
Are we on the unit circle?

$$\frac{36}{36} = 1$$

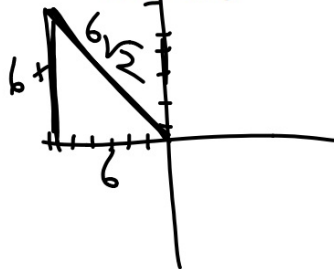
(36) 2

Find the values of the six trigonometric functions for angle θ in standard position if a point with the given coordinates lies on its terminal side.

9. (3, 4)



10. (-6, 6)



$$\begin{aligned}\sin \theta &= + \frac{4}{5} \\ \cos \theta &= + \frac{3}{5} \\ \tan \theta &= + \frac{4}{3} \\ \csc \theta &= + \frac{5}{4} \\ \sec \theta &= + \frac{5}{3} \\ \cot \theta &= + \frac{3}{4}\end{aligned}$$

$$\frac{1}{\frac{1}{6\sqrt{2}}} = \frac{6\sqrt{2}}{1} = 6\sqrt{2}$$

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