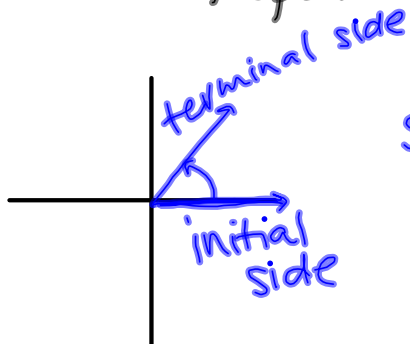


## 43 Trig extended: The Circular Functions

- Obj: 1. Solve problems involving trig fns.  
2. Properties of sine & cosine.



Standard position:

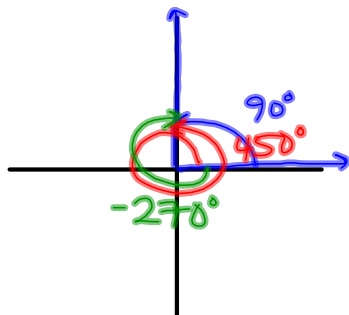
initial side is on the positive x axis.

positive angles: rotate counterclockwise  
negative angles: rotate clockwise

Jan 8-9:08 AM

2 angles can have the same initial sides & terminal sides, but have different angle measures.

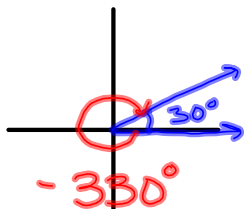
\* Coterminal angles



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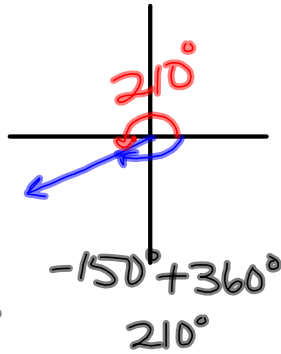
Find & draw the coterminal angle for:

a.  $30^\circ$

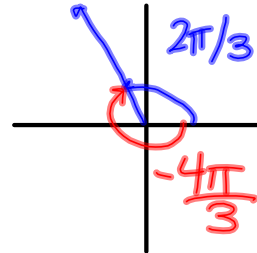


$$30^\circ - 360^\circ = -330^\circ$$

b.  $-150^\circ$

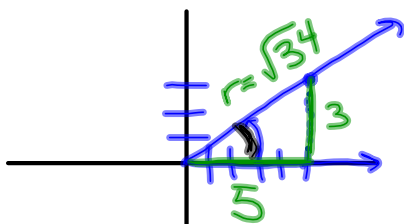


c.  $\frac{2\pi}{3}$



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Let  $\theta$  be an acute positive angle in standard position whose terminal side contains the point  $(5,3)$ . Find the 6 trig fncs.



$$5^2 + 3^2 = r^2$$

$$r = \sqrt{34}$$

$$\sin \theta = \frac{3}{\sqrt{34}} = \frac{3\sqrt{34}}{34}$$

$$\cos \theta = \frac{5}{\sqrt{34}} = \frac{5\sqrt{34}}{34}$$

$$\tan \theta = \frac{3}{5}$$

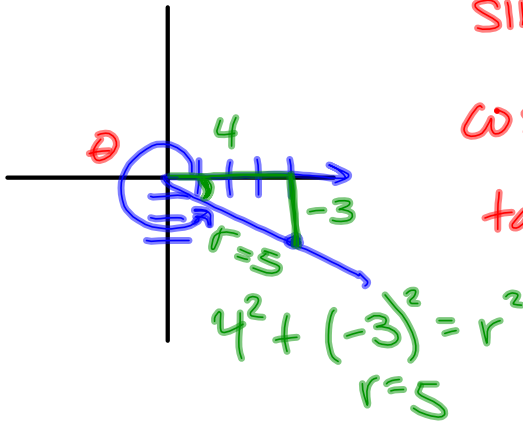
$$\csc \theta = \frac{\sqrt{34}}{3}$$

$$\sec \theta = \frac{\sqrt{34}}{5}$$

$$\cot \theta = \frac{5}{3}$$

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Positive  $\theta$  is in standard position and the terminal side contains  $(4, -3)$ . Find 6 trig fncs.



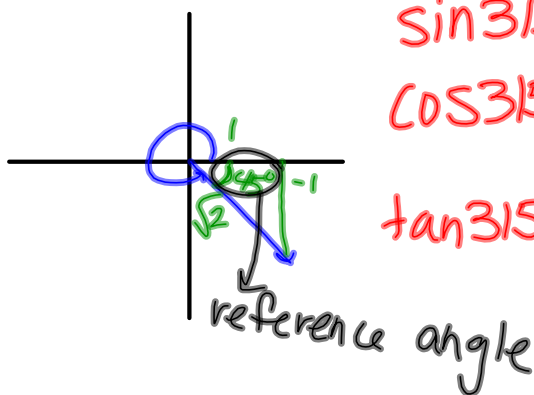
$$\sin \theta = -\frac{3}{5} \quad \csc \theta = -\frac{5}{3}$$

$$\cos \theta = \frac{4}{5} \quad \sec \theta = \frac{5}{4}$$

$$\tan \theta = -\frac{3}{4} \quad \cot \theta = -\frac{4}{3}$$

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Find the exact values for the 6 trig. fncs. of  $315^\circ$ .  
no calculator



$$\sin 315^\circ = \frac{-1}{\sqrt{2}} = -\frac{\sqrt{2}}{2} \quad \csc 315^\circ = -\sqrt{2}$$

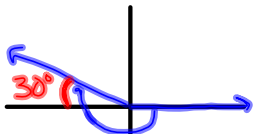
$$\cos 315^\circ = \frac{\sqrt{2}}{2} \quad \sec 315^\circ = \sqrt{2}$$

$$\tan 315^\circ = -1 \quad \cot 315^\circ = -1$$

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Reference Angle: an acute, positive angle that measures the distance between the terminal side & the closest x-axis.

Find the reference angle of  $-210^\circ$

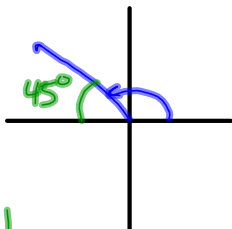


$$|-210^\circ + 180^\circ| = |-30^\circ|$$

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Find the reference angle:

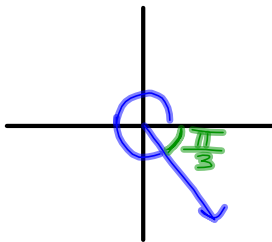
a.  $135^\circ$



$$|135^\circ - 180^\circ| = |-45^\circ|$$

$45^\circ$

b.  $\frac{5\pi}{3}$

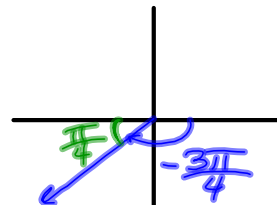


$$\left| \frac{5\pi}{3} - \frac{3\pi}{3} \right|$$

$$\left| \frac{2\pi}{3} - \frac{3\pi}{3} \right|$$

$\frac{\pi}{3}$

c.  $-\frac{3\pi}{4}$

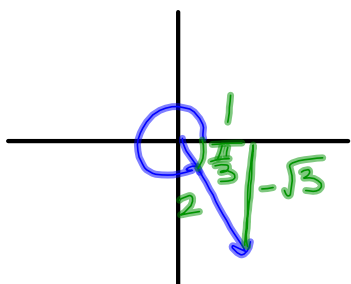


$$\left| -\frac{3\pi}{4} + \frac{4\pi}{4} \right|$$

$\frac{\pi}{4}$

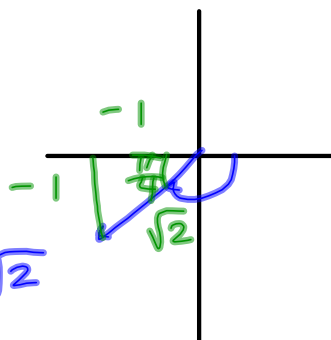
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Find  $\tan \frac{5\pi}{3} = -\sqrt{3}$



$\sec(-\frac{3\pi}{4})$

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



Jan 8-10:10 AM

What is positive and where:

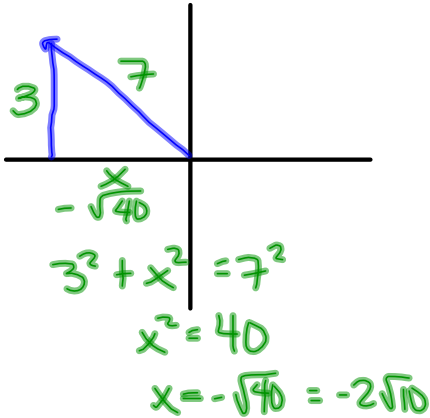
Sine	All
Tan	Cos

Jan 8-10:17 AM

Find  $\cos\theta$  &  $\tan\theta$  if

$\sin\theta = \frac{3}{7} = \frac{0}{7}$  and  $\tan\theta < 0$ .

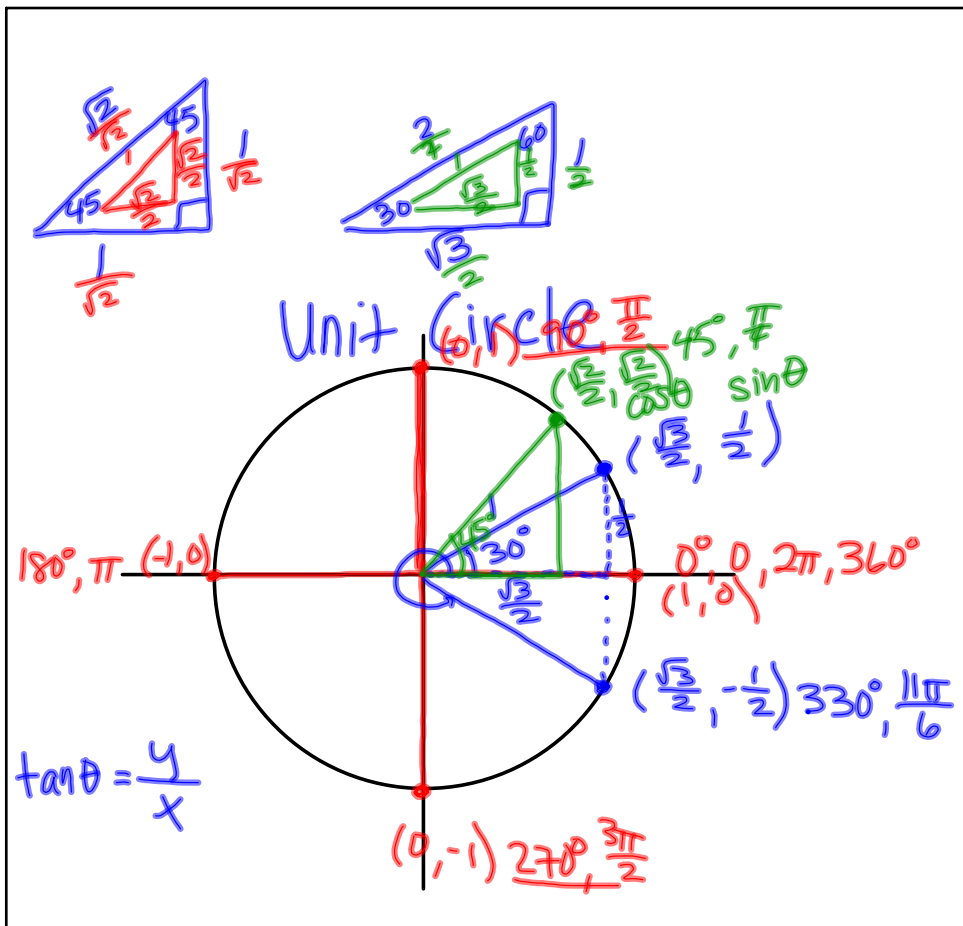
pos neg



$\cos\theta = \frac{-\sqrt{40}}{7}$

$\tan\theta = \frac{3}{-\sqrt{40}} = \frac{3\sqrt{40}}{40}$

Jan 8-10:19 AM



Jan 8-10:24 AM