

Quiz #1 Solutions

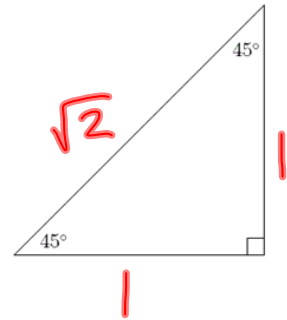
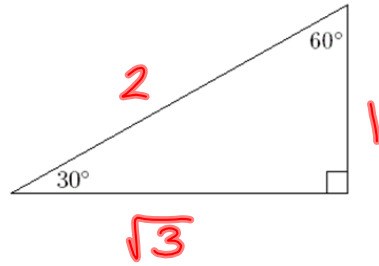
$$\frac{1}{\sec x} = \cos x$$

$$\frac{\sin x}{\cos x} = \tan x$$

$$\frac{1}{\sin x} = \csc x$$

$$\csc(90^\circ - x) = \sec x$$

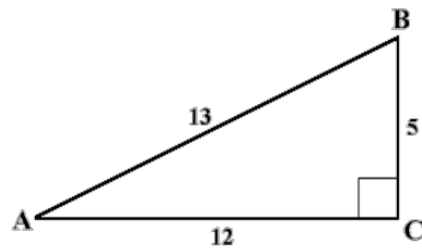
$$\tan(90^\circ - x) = \cot x$$



$$\sin B = \frac{12}{13}$$

$$\tan A = \frac{5}{12}$$

$$\csc A = \frac{13}{5}$$



Mon  
5.1 # 1-15 odd, 17-28 all

Tues-Wed  
5.2 # 19, 21, 23, 29, 31

5.3 # 1-27 odd

} should have been turned in Friday

Homework questions?

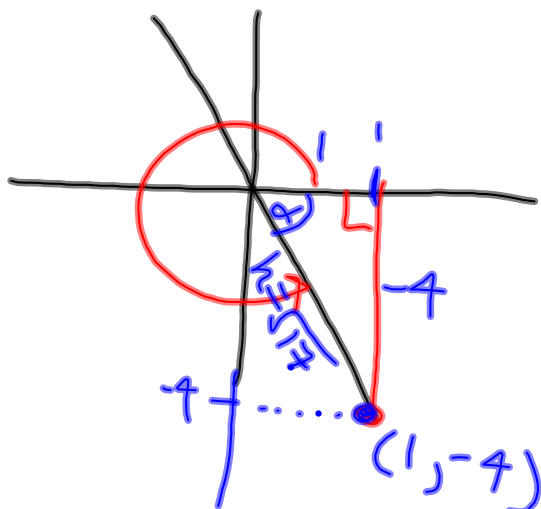
83-92 (5.1)  $\rightarrow$   $30^\circ, 60^\circ, 90^\circ$  &  
 $45^\circ, 45^\circ, 90^\circ \Delta$ 's

$$\uparrow \text{7. } \sin 25^\circ = \cos 65^\circ$$

$$\tan 25^\circ = \cot 65^\circ$$

### 5.3 Trigonometric Functions of Any Angle

30. The terminal side of angle  $\theta$  lies along the line  $4x + y = 0$  in *QIV*.  
 Find  $\sin \theta$ ,  $\cos \theta$ , and  $\tan \theta$ .



$$y = -4x + 0$$

$$(1, -4)$$

$$h^2 = 1^2 + (-4)^2$$

$$= 1 + 16 = 17$$

$$h = \sqrt{17}$$

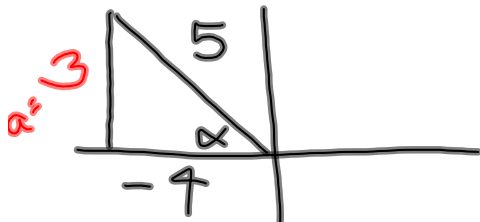
$$\sin \theta = \frac{-4}{\sqrt{17}}$$

$$\cos \theta = \frac{1}{\sqrt{17}}$$

$$\tan \theta = \frac{-4}{1} = -4$$

36. Given that  $\cos \alpha = -\frac{4}{5}$  and  $\alpha \in QII$ ,

find the other 5 trigonometric function values of  $\alpha$ .



$$a^2 + (-4)^2 = 5^2$$

\*hypotenuse is always positive!

$$\sin \alpha = \frac{3}{5}$$

$$\tan \alpha = -\frac{3}{4}$$

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

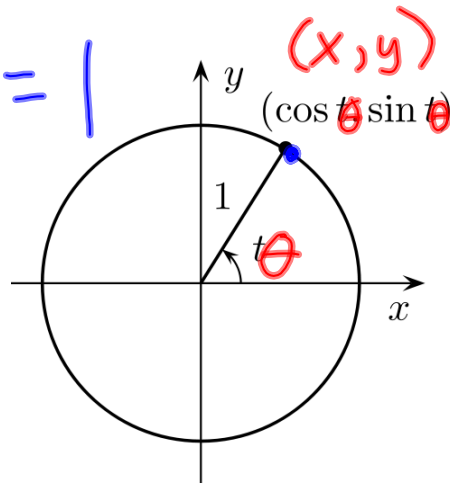
$$\csc \alpha = \frac{5}{3}$$

$$\cot \alpha = -\frac{4}{3}$$

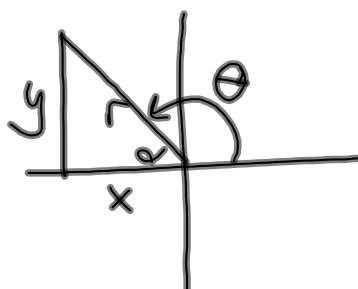
The unit circle and function values of 30°, 45°, and 60° reference angles

unit circle:  
radius  $r = 1$   
center  $(0, 0)$

$$x^2 + y^2 = 1$$

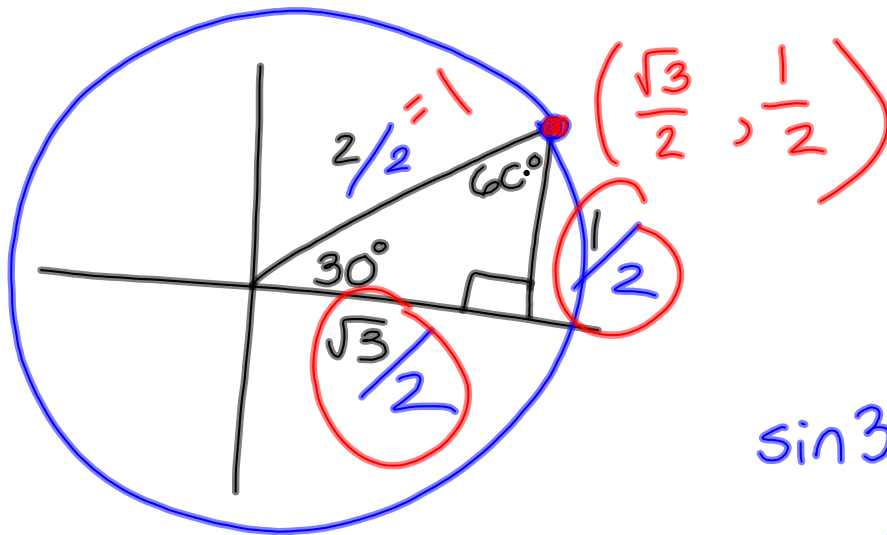


$(x-h)^2 + (y-k)^2 = r^2$   
center:  $(h, k)$ ; radius:  $r$



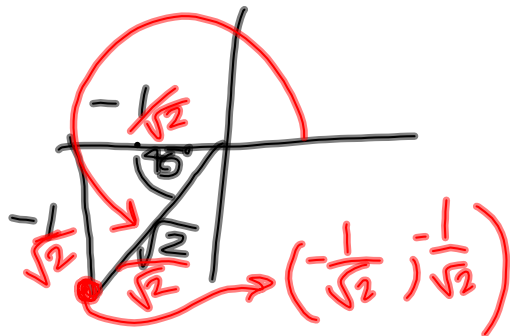
$$\sin \theta = \frac{y}{r} \quad y = r \sin \theta$$

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

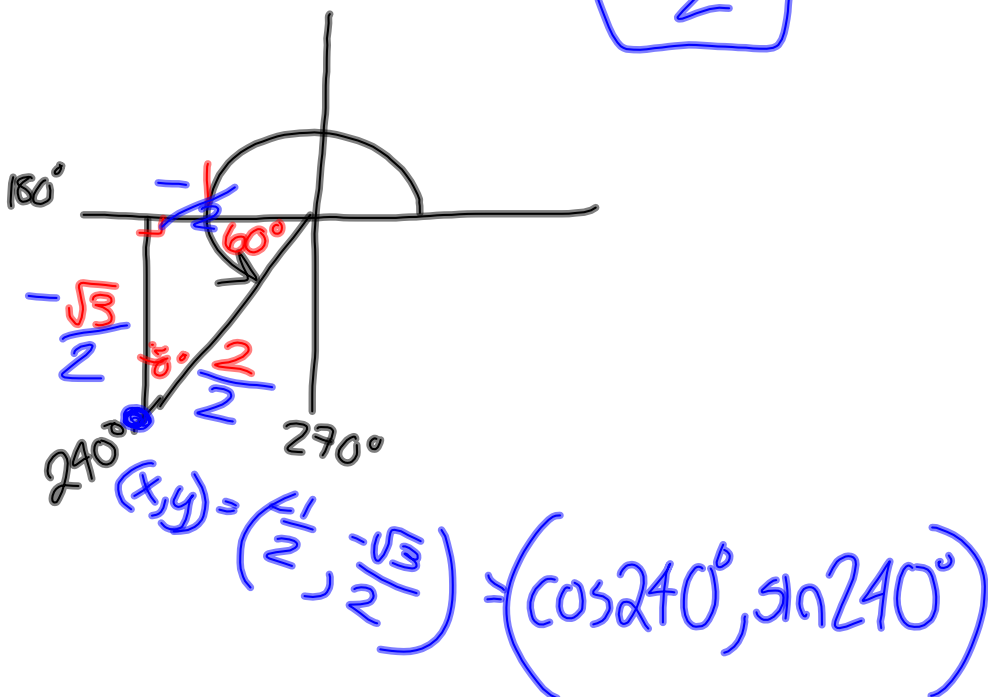


$$\sin 30^\circ = \frac{1}{2}$$

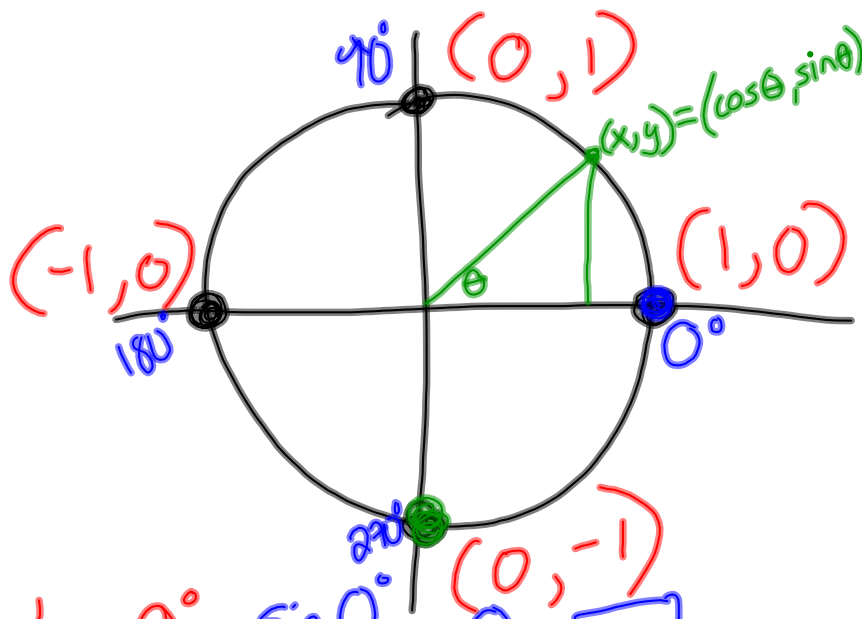
$$\cos 30^\circ = \frac{\sqrt{3}}{2}$$



$$\sin 240^\circ = ? = \boxed{\frac{-\sqrt{3}}{2}}$$



What about quadrantal angles?



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

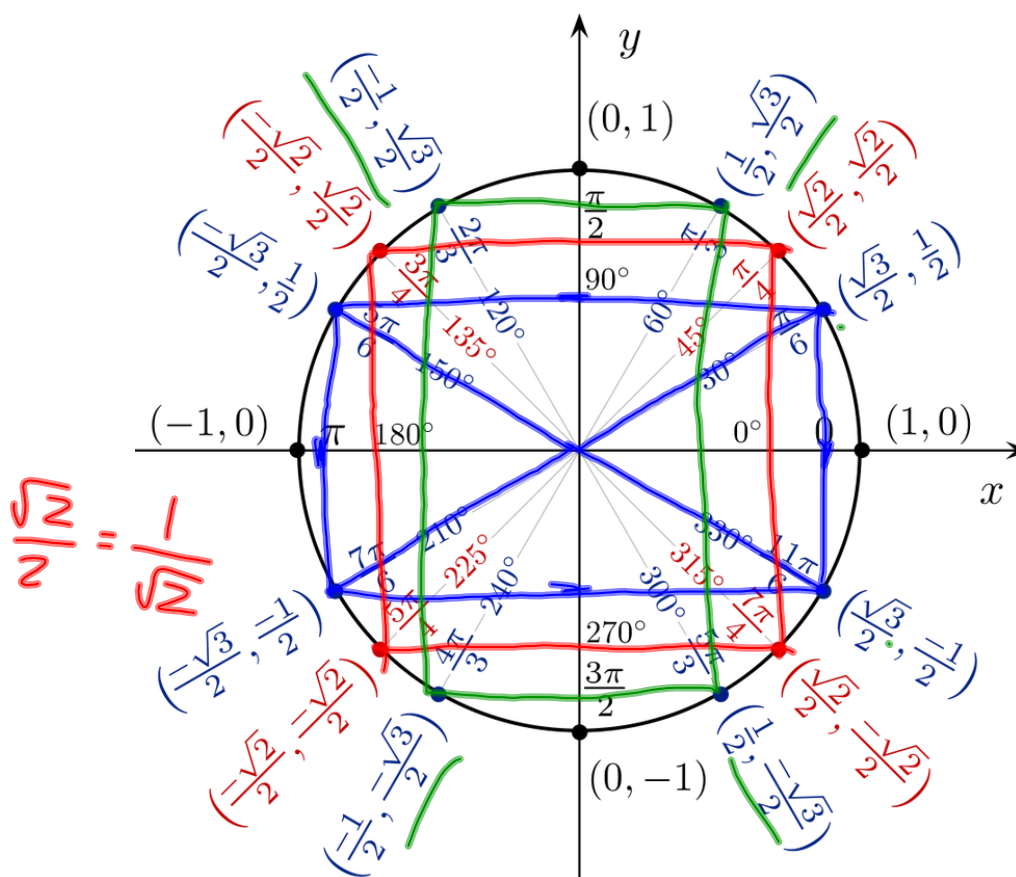
$$\csc \theta = \frac{1}{\sin \theta}$$

$$\tan \theta = \frac{\sin \theta}{\cos \theta}$$

$$\cot \theta = \frac{\cos \theta}{\sin \theta}$$

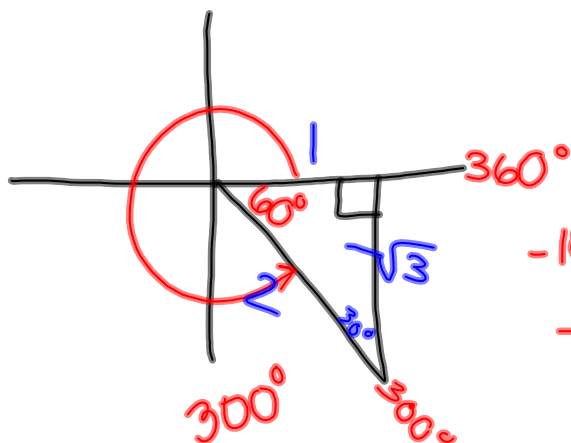
$$\tan 0^\circ = \frac{\sin 0^\circ}{\cos 0^\circ} = \frac{0}{1} = 0$$

$$\sec 270^\circ = \frac{1}{\cos 270^\circ} = \frac{1}{0} = \text{undefined}$$



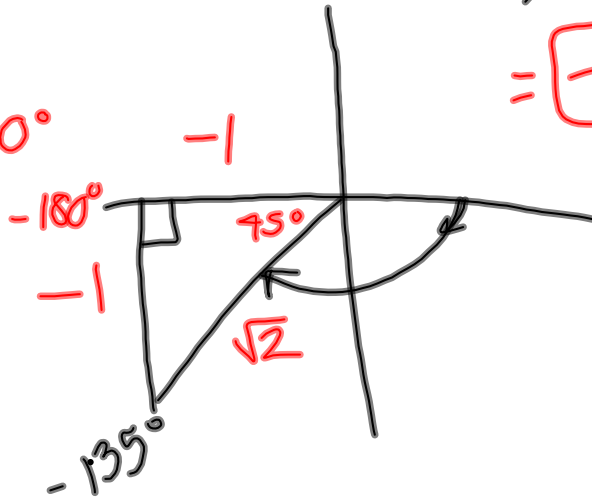
Find the trig function value of the given angle (note that they all have either a 30°, 45°, or 60° reference angle OR are quadrantal angles).

$$\tan 300^\circ = \frac{-\sqrt{3}}{1} = \boxed{-\sqrt{3}}$$

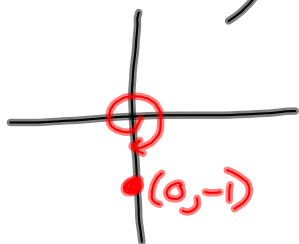


$$\sec(-135^\circ) = \frac{\sqrt{2}}{-1}$$

$$= \boxed{-\sqrt{2}}$$

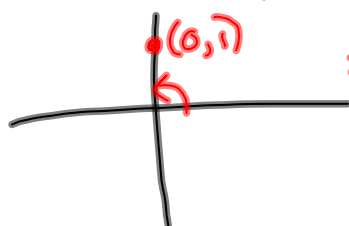


$$\sin(-450^\circ) = \boxed{-1}$$



$$\csc(90^\circ) = \frac{1}{\sin 90^\circ}$$

$$= \frac{1}{1} = \boxed{1}$$



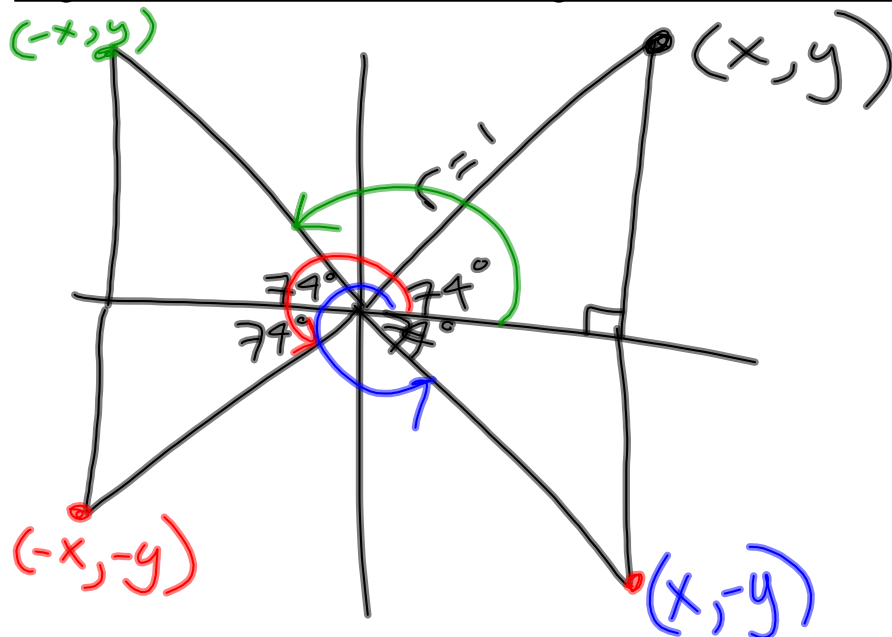
$$\cot(-90^\circ) = \frac{\cos(-90^\circ)}{\sin(-90^\circ)} = \frac{0}{-1} = \boxed{0}$$



$$\cos(120^\circ) = \boxed{-\frac{1}{2}}$$



Angles with the same reference angles have the same trig function values.



80. Given that  $\sin 27^\circ \approx 0.4540$ ,  $\cos 27^\circ \approx 0.8910$ , and  $\tan 27^\circ \approx 0.5095$ , find the trigonometric function values for  $333^\circ$ .

Homework: 5.3 #29-37 odd, 39-70 all; ~~71-81 odd~~

