Quiz #1 Solutions
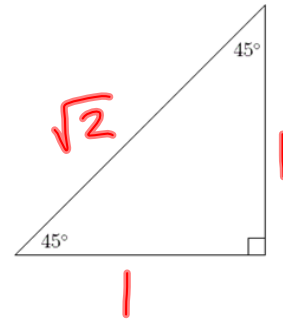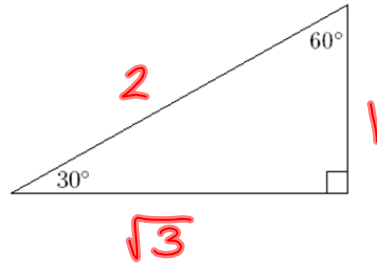
$$\frac{1}{\sec x} = \cos x$$

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

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

$$\csc(90° - x) = \sec x$$
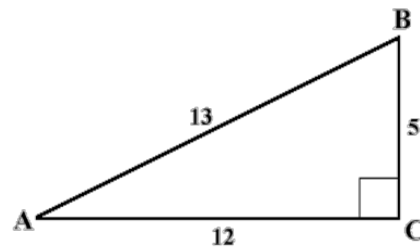
$$\tan(90° - x) = \cot x$$

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

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

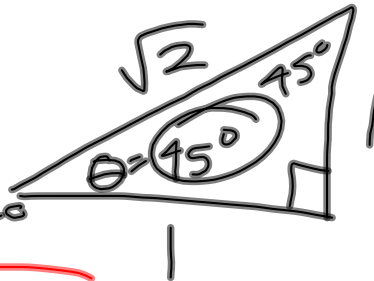$$\csc A = \frac{13}{5}$$

Mon
5.1 #1–15odd, 17–28all   should have been turned in Friday

Tues–Wed
5.2 #19,21,23,29,31

5.3 #1–27odd

Homework questions?

83. $\sin\theta = \dfrac{\sqrt{2}}{2} \cdot \dfrac{\sqrt{2}}{\sqrt{2}} = \dfrac{1}{\sqrt{2}} = \dfrac{opp}{hyp}$

what is θ?
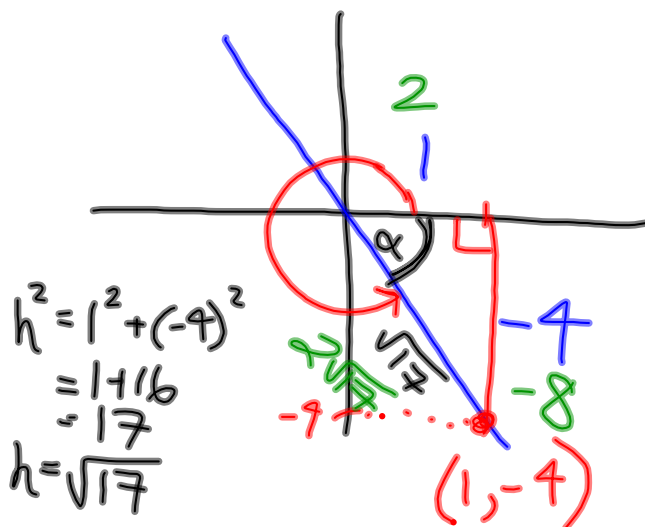
$\theta = 45°$

95. $\tan 52° = \cot 38°$

$= \dfrac{1}{\cot 52°}$

5.3 Trigonometric Functions of Any Angle

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

$y = -4x + 0$

$(1, -4)$

$h^2 = 1^2 + (-4)^2$
$= 1 + 16$
$= 17$
$h = \sqrt{17}$
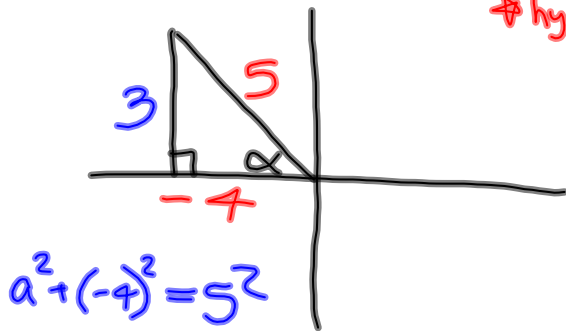
$(1, -4)$

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

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

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

2

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

find the other 5 trigonometric function values of α.

$\#$ hypotenuse is always positive!

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

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

$\tan \alpha = -\frac{3}{4}$
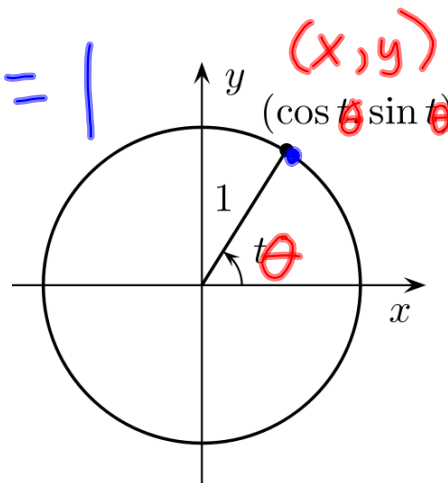
$\sec \alpha = -\frac{5}{4}$
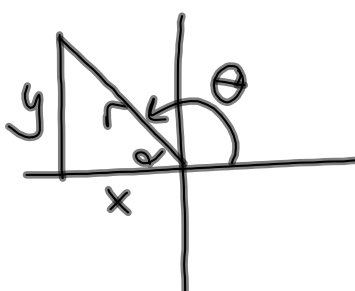
$\csc \alpha = \frac{5}{3}$

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

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

unit circle:
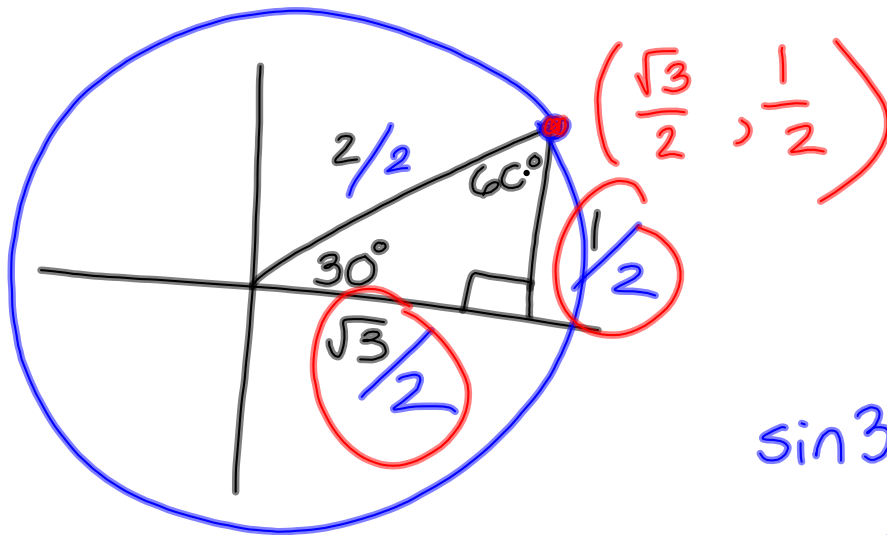
radius $r = 1$

center $(0,0)$

$X^2 + y^2 = 1$

(x,y)
$(\cos t, \sin t)$

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

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

$\cos \theta = \frac{x}{r}$ $x = r \cos \theta$
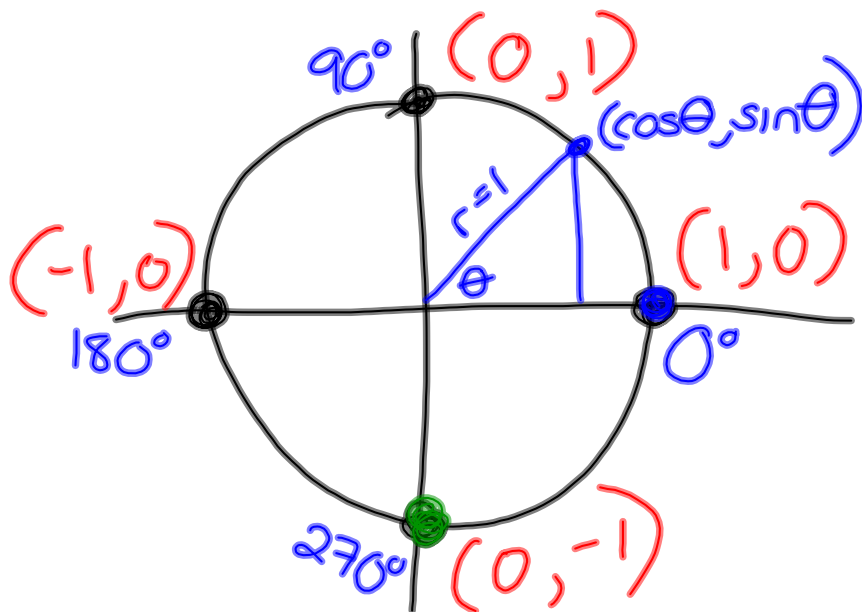
3

$$\left(\frac{\sqrt{3}}{2}, \frac{1}{2} \right)$$

$$\frac{2}{2} \qquad 60° \qquad 30° \qquad \frac{1}{2}$$

$$\frac{\sqrt{3}}{2}$$

$$\sin 30° = \frac{1}{2}$$

$$\cos 30° = \frac{\sqrt{3}}{2}$$

$$\sin 240° = ? = \boxed{-\sqrt{3}/2}$$

$$90°$$

$$180° \quad \frac{-1/2}{60°} \qquad 0°$$

$$-\frac{\sqrt{3}}{2} \quad 30° \qquad \frac{2}{2} = -1$$

$$240° \qquad 270°$$

$$\left(\frac{-1}{2}, \frac{-\sqrt{3}}{2} \right)$$

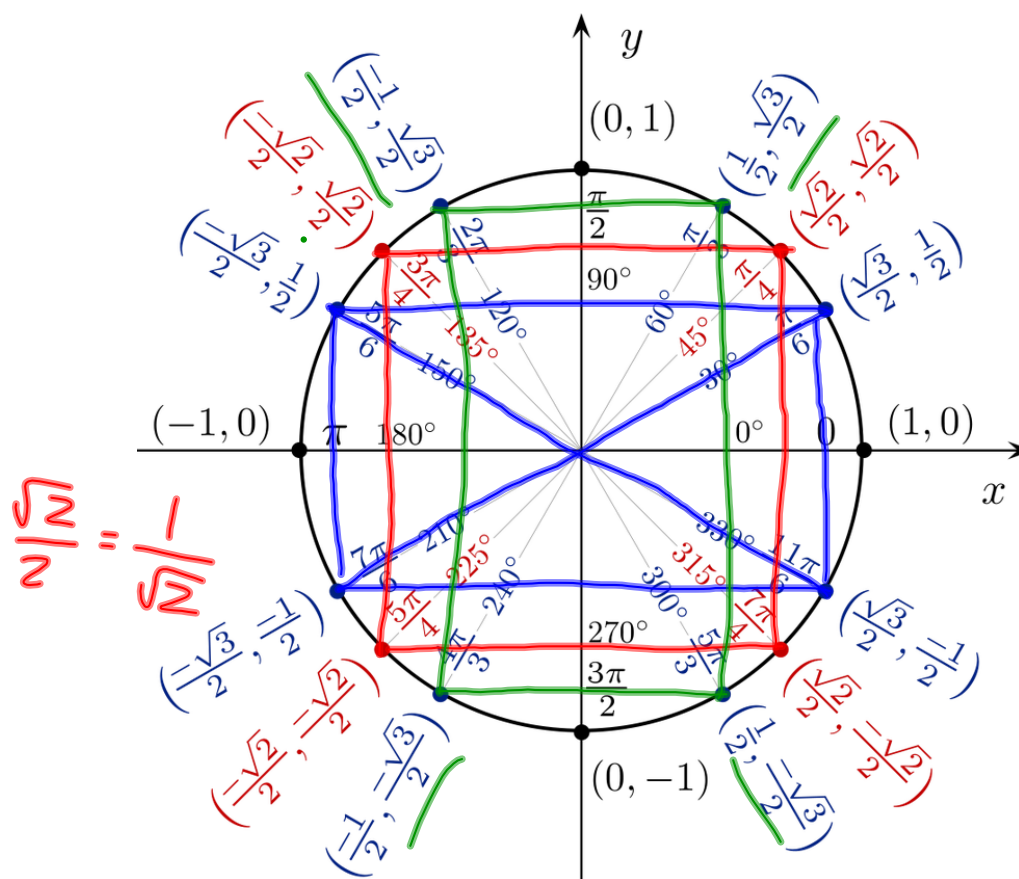What about quadrantal angles?

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

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

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

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

90°   (0, 1)

(cos θ, sin θ)

r = 1

θ

(−1, 0)   (1, 0)
180°   0°

270°   (0, −1)

$$\tan 0° = \frac{\sin 0°}{\cos 0°} = \frac{0}{1} = 0$$

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

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

Find the trig function value of the given angle (note that they all have either a 30º, 45º, or 60º reference angle OR are quadrantal angles).
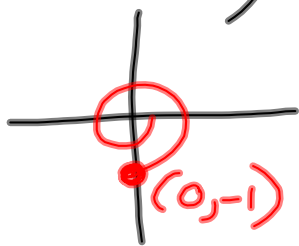
$$\tan 300° = \frac{-\sqrt{3}}{1} = \boxed{-\sqrt{3}}$$

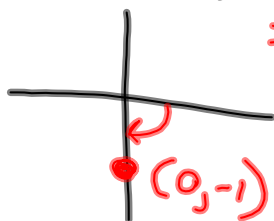$$\sec(-135°) = \frac{\sqrt{2}}{-1}$$
$$= \boxed{-\sqrt{2}}$$

$$360° - 180°$$

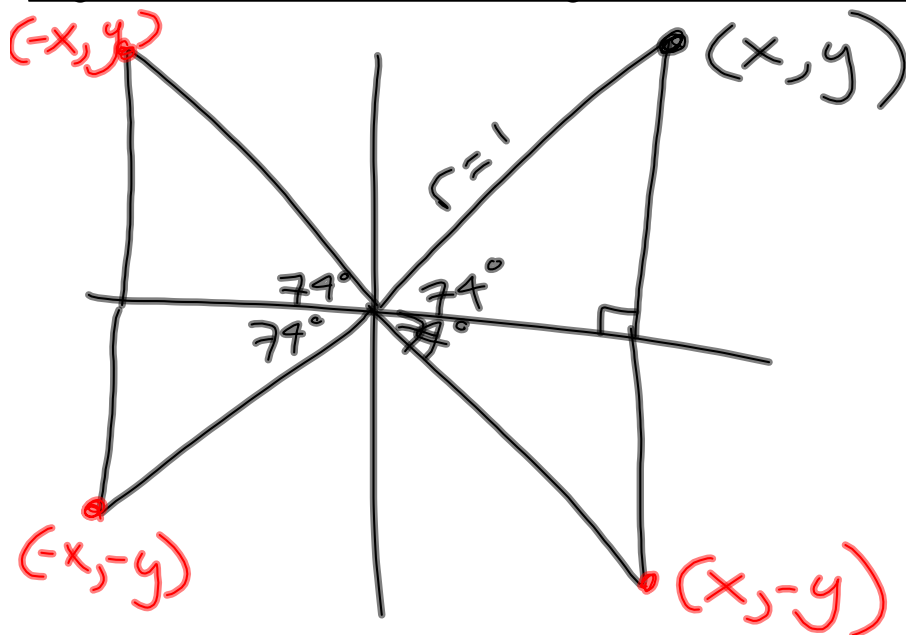$$\sin(-450°) = \boxed{-1}$$

$$\csc(90°) = \frac{1}{\sin 90°} = \boxed{1}$$

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

$$\cos(120°) = \boxed{\frac{-1}{2}}$$

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

(-x,y)   (x,y)

r=1

74°   74°
74°   74°

(-x,-y)   (x,-y)

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

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