Monday, November 26, 2018
1:04 PM

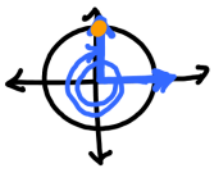
PRECALCULUS **4.1 - 4.3 REVIEW**

Name: KEY Date _____ Period: _____

For each of the following, try to solve the problem without using the Unit Circle then you can use the Unit Circle to check your answers.

1. Evaluate the *exact* values of the six trigonometric functions of the real number *t*. (in simplest radical form).

a. $\theta = -\frac{7\pi}{2}$



point: (0,1)

$\sin t = y$ $\csc t = \frac{1}{y}$

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

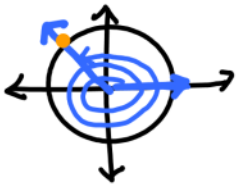
$\tan t = \frac{y}{x}$ $\cot t = \frac{x}{y}$

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

$\cos\theta$ 0 $\sec\theta$ $\frac{1}{0}$ = undef

$\tan\theta$ $\frac{1}{0}$ = undef. $\cot\theta$ $\frac{0}{1} = 0$

b. $\theta = \frac{11\pi}{4}$



point: $(-\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2})$

$\sin\theta$ $\frac{\sqrt{2}}{2}$ $\csc\theta$ $\frac{2}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{2\sqrt{2}}{2} = \sqrt{2}$

$\cos\theta$ $-\frac{\sqrt{2}}{2}$ $\sec\theta$ $-\sqrt{2}$

$\tan\theta$ -1 $\cot\theta$ -1

2. Given that $\sec\theta = -\frac{5}{3}$, use trigonometric identities to find the indicated trigonometric functions:

(NOTE: Use trig identities (not a triangle) but you can check your answers with a triangle.)

a. $\cos\theta =$ $\frac{1}{\sec\theta}$ $\boxed{-\frac{3}{5}}$

b. $\sin\theta =$ $\sin^2\theta + \cos^2\theta = 1$

$\sin^2\theta + (-\frac{3}{5})^2 = 1$

$\sin^2\theta + \frac{9}{25} = 1$

$\sin^2\theta = \frac{16}{25}$

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

c. $\tan\theta =$ $\frac{\sin\theta}{\cos\theta} = \frac{\frac{4}{5}}{-\frac{3}{5}}$

$= \frac{4}{5} \cdot -\frac{5}{3} = \boxed{-\frac{4}{3}}$

d. $\csc\theta =$ $\frac{1}{\sin\theta} = \boxed{\frac{5}{4}}$

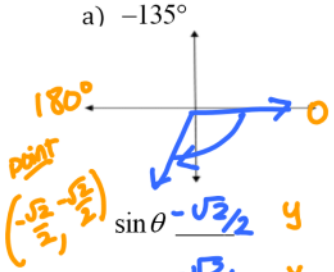
$\sin\theta = y$ $\csc = \frac{1}{y}$

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

$\tan\theta = \frac{y}{x}$ $\cot = \frac{x}{y}$

3. Sketch each angle in standard position. Then evaluate the *exact* values for the trigonometric functions given for that angle, if possible. Answers should be in simplest radical form.

a) $-135°$

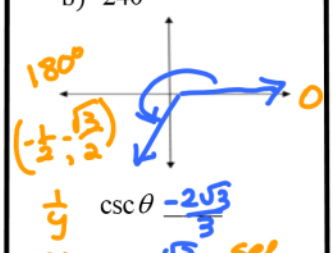


$\sin\theta$ $-\sqrt{2}/2$ y

$\cos\theta$ $-\sqrt{2}/2$ x

$\tan\theta$ 1

b) $240°$ 90°



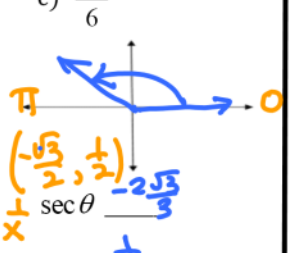
$\frac{1}{y}$ $\csc\theta$ $\frac{-2\sqrt{3}}{3}$

$\frac{x}{y}$ $\cot\theta$ $\frac{\sqrt{3}}{3}$ see next pg

x $\cos\theta$ $-1/2$

$\csc\theta = \frac{1}{y} = \frac{-2}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{-2\sqrt{3}}{3}$

c) $\frac{5\pi}{6}$

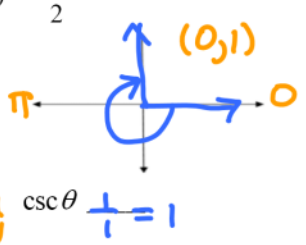


$\frac{1}{x}$ $\sec\theta$ $\frac{-2\sqrt{3}}{3}$

y $\sin\theta$ $\frac{1}{2}$

$\frac{y}{x}$ $\tan\theta$ $\frac{-\sqrt{3}}{3}$

d) $-\frac{3\pi}{2}$



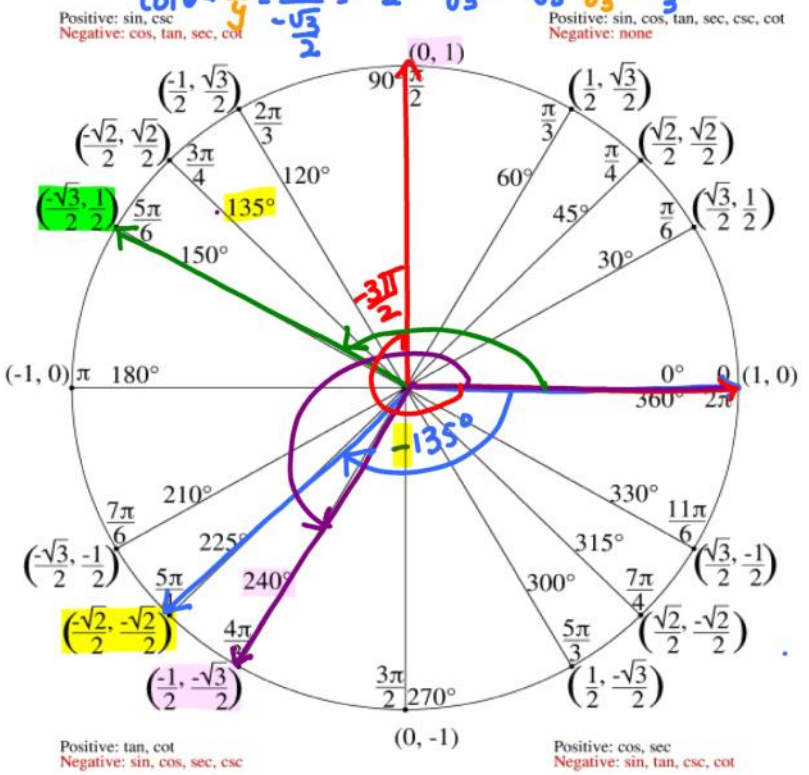
$\frac{1}{y}$ $\csc\theta$ $\frac{1}{1} = 1$

x $\cos\theta$ 0

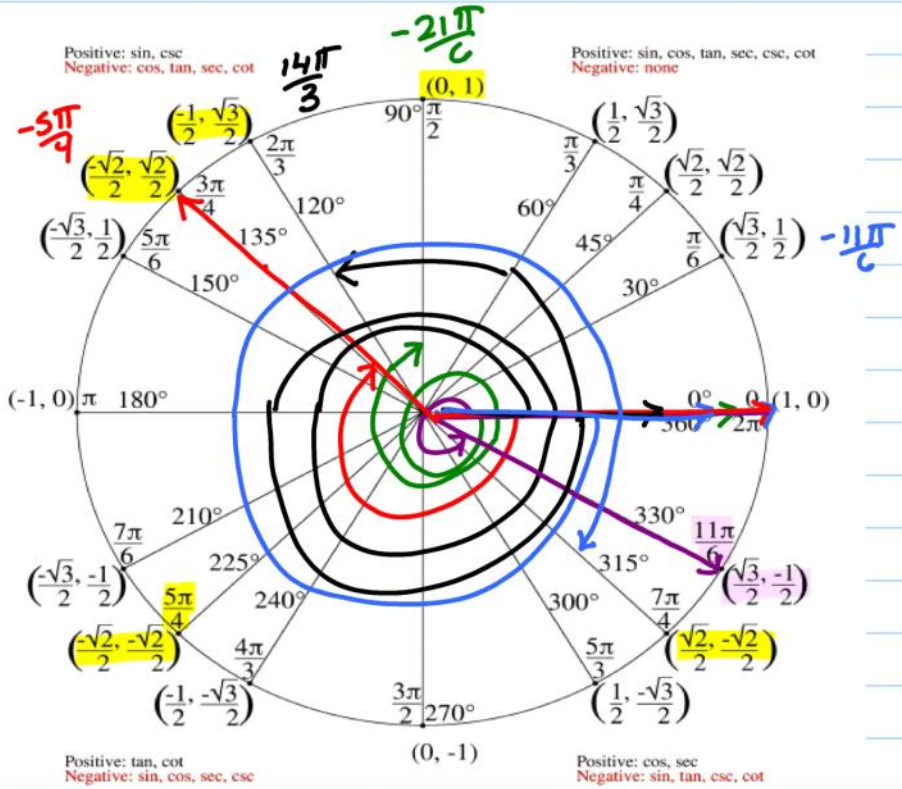
$\frac{x}{y}$ $\cot\theta$ $\frac{0}{1} = 0$

3)

$\cot\theta = \frac{x}{y} = \frac{-\frac{1}{2}}{-\frac{\sqrt{3}}{2}} = -\frac{1}{2} \cdot -\frac{2}{\sqrt{3}} = \frac{1}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{3}}{3}$



4)



$\cot\theta = \frac{x}{y} = \frac{-\frac{1}{2}}{-\frac{\sqrt{3}}{2}} = -\frac{1}{2}\cdot\frac{-2}{\sqrt{3}} = \frac{1}{\sqrt{3}}\cdot\frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{3}}{3}$

PRECALCULUS **4.1 - 4.3 REVIEW**

4. Find the point (x, y) on the unit circle that corresponds to the real number t:

a. $t = \frac{11\pi}{6}$ $\left(\frac{\sqrt{3}}{2}, -\frac{1}{2}\right)$

b. $t = \frac{5\pi}{4}$ $\left(-\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2}\right)$

c. $t = -\frac{21\pi}{6}$ $(0, 1)$

d. $t = -\frac{5\pi}{4}$ $\left(-\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}\right)$

e. $t = \frac{14\pi}{3}$ $\left(-\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$

f. $t = -\frac{9\pi}{4}$ $\left(\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2}\right)$

5. Find t in the interval $0° \le t < 360°$ if the point is:

a. $\left(-\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}\right)$ $t = \frac{3\pi}{4} = 135°$

b. $\left(-\frac{1}{2}, -\frac{\sqrt{3}}{2}\right)$ $t = \frac{4\pi}{3} = 240°$

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

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

6. Find **two** values of θ in the interval $0° \le \theta < 360°$, then in $0 \le \theta < 2\pi$ where:

a. $\sec\theta = -\sqrt{2}$ $\theta = 135°, 225°$ $\theta = 3\pi/4, 5\pi/4$

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

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

* Look at unit circle
* where is $x = -\frac{\sqrt{2}}{2}$?

b. $\csc\theta = \frac{2}{\sqrt{3}}$ $\theta = 60°$ or $\frac{\pi}{3}$ $\theta = 120°$ or $\frac{2\pi}{3}$

$\frac{1}{y} = \frac{2}{\sqrt{3}}$ $y = \frac{\sqrt{3}}{2}$

* where is $y = \frac{\sqrt{3}}{2}$?

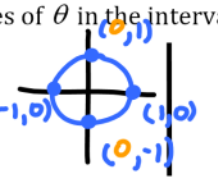
7. Use the Unit Circle to find all values of θ in the interval $0° \le \theta < 360°$, then in $0 \le \theta < 2\pi$ where $\tan\theta$ is:

a. undefined $\tan\theta = \frac{y}{x}$

* where is $x = 0$?

$\theta = 90°, 270°$

$\theta = \frac{\pi}{2}, \frac{3\pi}{2}$

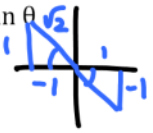


b. equal to -1 $\tan\theta = \frac{opp}{adj}$

where is $\frac{y}{x} = -1$?

$\theta = 135°, 315°$

$\theta = \frac{3\pi}{4}, \frac{7\pi}{4}$



8. Use the diagram to find θ, to the nearest tenth of a degree, in the interval $0° \le \theta < 360°$, or a missing side to the nearest hundredth.

a.

ADJ

$\cos\theta = \frac{1000}{2500}$

$\cos^{-1}\left(\frac{1000}{2500}\right) =$

$\theta = 66.4°$

b.

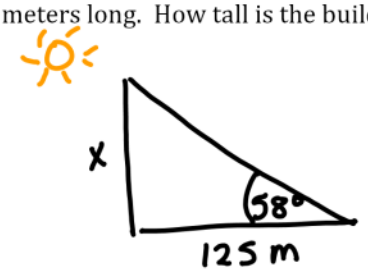
ADJ

$\tan 43° = \frac{x}{1000}$

$1000 \tan 43° = x$

$x = 932.52$

9. The sun is at an angle of elevation of 58°. It is shining on a building which casts a shadow that is 125 meters long. How tall is the building?



$\tan 58° = \frac{x}{125}$

$125 \tan 58° = x$

$x = 200.04$ meters tall