Reciprocal Trig Functions

$$\sec = \frac{1}{\cos} \qquad \csc = \frac{1}{\sin} \qquad \cot = \frac{1}{\tan}$$

sec = secant

csc = cosecant

cot = cotangent

$$\sin \frac{5\pi}{6} = \frac{1}{2}$$

$$\csc \frac{5\pi}{6} = 2$$

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

Find each value without using a calculator.

1) $sec(-\pi)$ $\frac{1}{-1} = -1$

2) $csc\left(\frac{5\pi}{4}\right) = \frac{-2}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{-2\sqrt{2}}{2} = -\sqrt{2}$

$sin \frac{5\pi}{4} = -\frac{\sqrt{2}}{2}$

3) $cot\left(\frac{-3\pi}{2}\right) = \frac{0}{1} = 0$

4) $sec\left(\frac{\pi}{2}\right) = \frac{1}{0} = undefined$

5) $cot\left(-\frac{\pi}{3}\right) = \frac{\frac{1}{2}}{-\frac{\sqrt{3}}{2}} = \frac{1}{-\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{-\sqrt{3}}{3}$

6) $csc\left(\frac{7\pi}{6}\right) = \frac{1}{-\frac{1}{2}} = -2$

Use a calculator to find each value. Round your answers to the nearest thousandth.

7) $\sec(2.5) = \dfrac{1}{\cos(2.5)} = -1.248$

8) $\csc(-0.2)\ \dfrac{1}{\sin(-0.2)} = -5.033$

9) $\cot(56°)\ \dfrac{1}{\tan(56°)} = 0.675$

10) $\sec(195°)\ \dfrac{1}{\cos(195)}\ -1.035$

11) $\cot(-0.6)\ -1.462$

12) $\csc(0)\ \dfrac{1}{\sin(0)} = $ undefined

13) A woman looks out a window of a building. She is 94 feet above the ground. Her line of sight makes an angle of θ with the building. The distance in feet of an object from the woman is modeled by the function d = 94secθ. How far away are objects sighted at an angle of 25° and 55°?

$$d = 94 \sec \theta$$
$$94 \sec 25$$
$$= 103.7 ft$$

$$d = 94 \sec 55$$
$$d = 163.9 ft$$

Describe any phase shift and vertical shift in the graph.

14) $y = \sec 2\theta + 3$ up 3 units

15) $y = \sec 2\left(\theta + \frac{\pi}{2}\right)$ left $\frac{\pi}{2}$ units

16) $y = \sec \frac{1}{4}\theta = $ none

17) $y = 3\csc(x+2) - 1$ down 1
                      left 2