

## Spiral Review

1.) Determine which quadrant the angle is in.

a.)  $\frac{5\pi}{3}$

IV

b.)  $-\frac{7\pi}{4}$

I

2.) Convert angle from radians to degrees.

a.)  $\frac{2\pi}{9} \cdot \frac{180}{\pi} = 40$

$40^\circ$

b.)  $-3\pi \cdot \frac{180}{\pi} = -540$

$-540^\circ$

3.) Convert angle from degrees to radians.

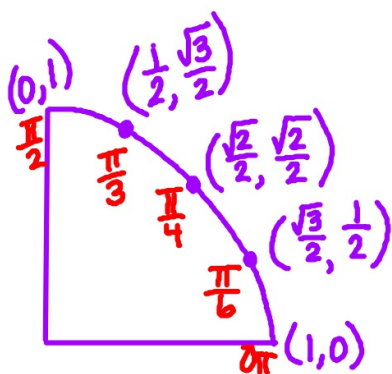
a.)  $135^\circ \cdot \frac{\pi}{180}$

$\frac{27\pi}{36} = \frac{3\pi}{4}$

b.)  $-25^\circ \cdot \frac{\pi}{180}$

$-\frac{5\pi}{36}$

## p.265 4.2 Trigonometric Functions: Unit Circle



Quadrant I

### Six Trigonometric Functions

Sine (sin)    Cosine (cos)    Tangent (tan)

$y$

$x$

$\frac{y}{x}$

Cosecant (csc)

Secant (sec)

Cotangent (cot)

$\frac{1}{y}$

$\frac{1}{x}$

$\frac{x}{y}$

Student will be able to determine the exact values of the six trigonometric functions.

Example 1: Determine the exact values of the six trigonometric functions of the angle  $\theta$ .

a.)  $(\frac{12}{13}, \frac{5}{13})$

$$\sin\theta = \frac{5}{13} \quad \csc\theta = \frac{13}{5}$$

$$\cos\theta = \frac{12}{13} \quad \sec\theta = \frac{13}{12}$$

$$\tan\theta = \frac{\frac{5}{13}}{\frac{12}{13}} = \frac{5}{12} \quad \cot\theta = \frac{12}{5}$$

b.)  $(-\frac{4}{5}, -\frac{3}{5})$

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

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

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

Student will be able to determine the point the corresponds to the given angle.

Example 2: Find the point  $(x,y)$  on the unit circle that corresponds to the real number  $t$ .

a.)  $t = \frac{\pi}{3}$  QI (+,+)  $(\frac{1}{2}, \frac{\sqrt{3}}{2})$

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

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

$$\boxed{(-\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2})}$$

c.)  $t = \pi$  x-axis (-,0) (1,0) (left)

$$\boxed{(-1, 0)}$$

d.)  $t = -\frac{4\pi}{3}$  QII (-,+)  $(\frac{1}{2}, \frac{\sqrt{3}}{2})$

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

Student will be able to evaluate the six trigonometric functions of the real number.

Example 3: Evaluate (if possible) the six trigonometric functions of the real number.

a.)  $t = \frac{5\pi}{6}$  **QII (-, +)**  $(\frac{\sqrt{3}}{2}, \frac{1}{2})$   
 $(-\frac{\sqrt{3}}{2}, \frac{1}{2})$

b.)  $t = \frac{3\pi}{2}$  **y-axis (bottom)**  $(0, -)$   $(0, 1)$   
 $(0, -1)$

$\sin\theta = \frac{1}{2}$        $\csc\theta = 2$

$\sin\theta = -1$        $\csc\theta = -1$

$\cos\theta = -\frac{\sqrt{3}}{2}$        $\sec\theta = -\frac{2}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = -\frac{2\sqrt{3}}{3}$

$\cos\theta = 0$        $\sec\theta = \frac{1}{0} = \text{und.}$

$\tan\theta = \frac{\frac{1}{2}}{-\frac{\sqrt{3}}{2}} = -\frac{\sqrt{3}}{3}$        $\cot\theta = -\sqrt{3}$

$\tan\theta = \frac{-1}{0} = \text{und.}$        $\cot\theta = 0$

Student will be able to evaluate each trigonometric function using the definition of even and odd functions.

Example 4: Use the value of the trigonometric function to evaluate each function.

1.)  $\cos t = -\frac{3}{4}$  **(even), no signs change**

Even:  $f(-t) = f(t)$

\*Cosine

\*Secant

a.)  $\cos(-t)$   
 $\boxed{-\frac{3}{4}}$

b.)  $\sec(-t)$   
 $\boxed{-\frac{4}{3}}$

Odd:  $f(-t) = -f(t)$

\*Sine

\*Cosecant

\*Tangent

\*Cotangent

2.)  $\sin(-t) = \frac{3}{8}$  **(odd), change sign**

a.)  $\sin t$   
 $\boxed{-\frac{3}{8}}$

b.)  $\csc t$   
 $\boxed{-\frac{8}{3}}$

Turn-in:

p. 270 (22, 30, 38, 52)

HW:

p.270 (9-37, 47-51 odds)