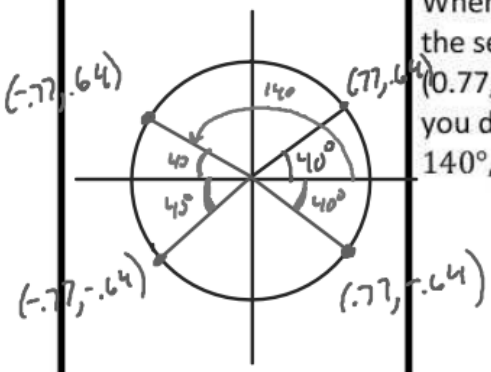
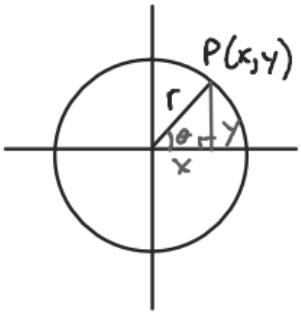
$\theta = 220°$ $\theta = 270°$ $\theta = 310°$



When the Ferris wheel has rotated through an angle of 40°, the seat that started at A(1, 0) will be at about A' (0.77,0.64). Explain how the symmetry of the circle allows you deduce the location of the seat after rotations of $140°, 220°, 320°$ and some other angles as well.



Suppose that P(x, y) is a point on the Ferris wheel model with $m\angle PCA = \theta$ in degrees.

a. What are the coordinates of x and y?

$x = \cos\theta$ $y = \sin\theta$

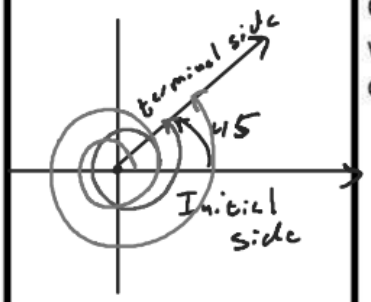
b. How will the coordinates values be different if the radius of the circle is r decameters?

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

$x = r\cos\theta$ $y = r\sin\theta$

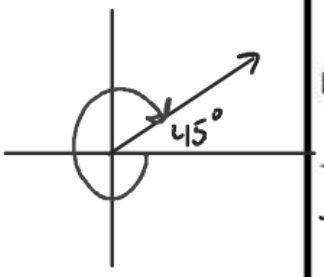
With your calculator set in degree mode, graph the functions $\cos\theta$ *and* $\sin\theta$ *for* $0° \leq \theta \leq 360°$. Compare the patterns in those of graphs to your ideas in first problem.

How will the x- and y- coordinates of you seat change during a second complete revolution? How will those patterns be represented in graphs of the coordinate functions for $360° \leq \theta \leq 720°$?



Coterminal Angles – Angels in standard position (angles with the initial side on the positive x-axis) that have a common terminal side.

$45° \rightarrow 405° \rightarrow 765° \rightarrow -315°$



Find the coterminal angle between $0°$ *and* $360°$.

-330°

$-330 + 360$

$30°$

-450°

$-450 + 360$

$-90 + 360$

$270°$

$750° - 360$

$390° - 360$

$30°$

$640° - 360$

$280°$

$-275° + 360$

$85°$

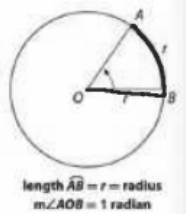
$-1034° + 360$

$-674 + 360$

$-314 + 360$

$46°$

Radian Measure = A radian is the measure of any central angle in a circle that intercepts an arc equal in length to the radius of the circle.



Converting degree measure to radian measure.

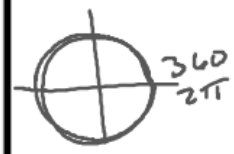
Angle measure $\left(\frac{\pi}{180}\right)$

Finding revolutions equivalent to the angle.

$$\frac{\text{Angle measure}}{360}$$

$\frac{90}{360} = \frac{1}{4}$

$Cir = 2\pi r$



$360\left(\frac{\pi}{180}\right) = 2\pi$

Find the measures in radians and revolutions equivalent to these degree measures.

90°	150°	75°	210°
$90\left(\frac{\pi}{180}\right)$	$150\left(\frac{\pi}{180}\right)$	$\frac{75}{360}$	$\frac{210}{360}$
$\frac{90\pi}{180} = \frac{\pi}{2}$	$\frac{150\pi}{180}$	$\frac{5\pi}{12}$	$\frac{7\pi}{6}$
	$\frac{5\pi}{6}$	$\frac{5}{24}$	$\frac{7}{12}$
		$\frac{5}{12}$	

-36°	-135°
$\frac{-36}{360}$	$\frac{-135}{360}$
$-\frac{\pi}{5}$	$-\frac{3\pi}{4}$
$-\frac{1}{10}$	$-\frac{3}{8}$

Find the coterminal angle between 0 *and* 2π.

$\frac{11\pi}{3} - 2\pi$	$-\frac{35\pi}{18} + 2\pi$	$\frac{15\pi}{4} - 2\pi$	$-\frac{19\pi}{12} + 2\pi$
$\frac{11\pi}{3} - \frac{6\pi}{3}$	$-\frac{35\pi}{18} + \frac{36\pi}{18}$	$\frac{15\pi}{4} - \frac{8\pi}{4}$	$-\frac{19\pi}{12} + \frac{24\pi}{12}$
$\frac{5\pi}{3}$	$\frac{\pi}{18}$	$\frac{7\pi}{4}$	$\frac{5\pi}{12}$

Convert from radian measure to degree measure.

$Radian\left(\frac{180}{\pi}\right)$

Find the measures in degree and revolutions equivalent to these radian measures.

$\frac{\pi}{3}\left(\frac{180}{\pi}\right)$	$\frac{5\pi}{4} \cdot \frac{180}{\pi}$	$\frac{2\pi}{5}\left(\frac{180}{\pi}\right)$	$\left(-\frac{15\pi}{16}\right)\left(\frac{180}{\pi}\right)$
$\frac{180}{3}$	$\frac{5 \cdot 180}{4}$	$\frac{2(180)}{5}$	$-168.75°$
$60°$	$225°$	$72°$	

$30\left(\frac{\pi}{180}\right) = \frac{30\pi}{180}$

$\frac{30}{360} =$

Complete a copy of the following table to show equivalent revolution, degree, and radian measurements. Save the table as a reference for later use.

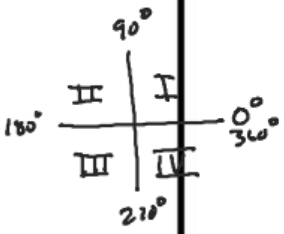
Revolutions	0	$\frac{1}{12}$			
Degree	0	30			90
Radians	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	
Revolutions					
Degree		135	150		
Radians	$\frac{2\pi}{3}$			π	

Revolutions				
Degree	210		240	270
Radians		$\frac{5\pi}{4}$		

Revolutions				
Degree	300	315		360
Radians			$\frac{11\pi}{6}$	

$180-\theta$ $\pi-\theta$	θ
$\theta-180$ $\theta-\pi$	$360-\theta$ $2\pi-\theta$

Reference angle:



Find the reference angle.

230°
$230-180$
$50°$

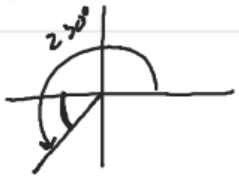
112°
$180-112$
$68°$

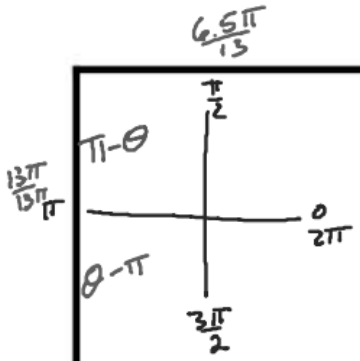
345°
$360-345$
15

$-125°+360$
235

$-285°$
$75°$

$235-180°$
$55°$





$\frac{7\pi}{9}$

$\pi - \frac{7\pi}{9}$

$\frac{9\pi}{9} - \frac{7\pi}{9}$

$\frac{2\pi}{9}$

$\frac{16\pi}{13}$

$\frac{16\pi}{13} - \pi$

$\frac{16\pi}{13} - \frac{13\pi}{13}$

$\frac{3\pi}{13}$

$\frac{17\pi}{9}$

$2\pi - \frac{17\pi}{9}$

$\frac{18\pi}{9} - \frac{17\pi}{9}$

$\frac{1\pi}{9}$

$-\frac{29\pi}{18} + \frac{36\pi}{18}$

$\frac{7}{18}\pi$

Special Right Triangles