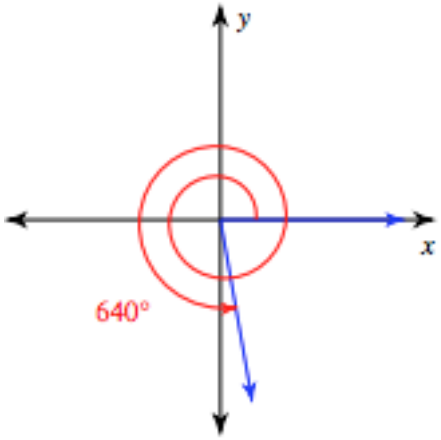
Unit Circle Stations

Station One: Problem One A fly leaves its spot on the top of a bookshelf and lands 1.5 feet away on the end of a blade of a ceiling fan. It rides around for four revolutions before flying back to its original spot on the bookshelf. The ceiling fan has a diameter of four feet. Sketch a graph of the model of the distance the fly is from the spot on the bookshelf with respect to the number of revolutions.	**Station One: Problem Two** A frog clings to the edge of a paddle of a wheel that is spinning behind a paddle boat. The wheel has a diameter of 16 feet. The frog hops on right before the wheel goes into the water and manages to stay on for four revolutions of the wheel before falling into the water. Sketch a graph of the model of the height of the frog above water with respect to the number of revolutions.
Station One: Problem Three A bug hops on the tip of a 7-inch long second hand of a mantel clock while it is pointing to the twelve and rides the second hand around the clock. The bug stays on the second hand for five full minutes before jumping off. Sketch a graph of the model of the height of the bug above the mantel with respect to the number of revolutions. Assume that the distance between the mantel and the six on the clock is four inches.	**Station One: Problem Four** Franco's favorite ride at the fair is the 30-foot diameter carousel. He hops on the black horse while his grandmother stands outside the gate across from him. Before the ride begins, Franco is 10 feet from his grandmother. The carousel goes eight times during the ride and then stops in its original position. Sketch a graph of the model of the distance France is from his grandmother with respect to the number of revolutions.

Station Two: Problem One Find the coordinates given the angle measure in standard position and the radius of the circle. Leave your answer in exact form. $\theta = 270°; radius = 2\ units$	**Station Two: Problem Two** Find the coordinates given the angle measure in standard position and the radius of the circle. Leave your answer in exact form. $\theta = \frac{5\pi}{4} radians; radius = 28\ units$
Station Two: Problem Three Find the coordinates given the angle measure in standard position and the radius of the circle. Round your answer to the nearest hundredth. $\theta = 156°; radius = 7\ units$	**Station Two: Problem Four** Find the coordinates given the angle measure in standard position and the radius of the circle. Round your answer to the nearest hundredth. $\theta = \frac{\pi}{12} radians; radius = 12\ units$

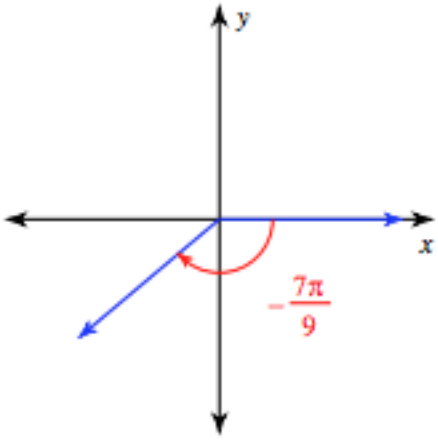
Station Three: Problem One

Find the equivalent angle between 0° and 360°.



Station Three: Problem Two

Find the equivalent angle between 0 and 2π radians. Leave your answer in exact form.



Station Three: Problem Three

Find the equivalent angle between 0° and 360°.

$\theta = -330°$

Station Three: Problem Four

Find the equivalent angle between 0 and 2π radians. Leave your answer in exact form.

$\theta = \frac{15\pi}{4} radians$

Station Four: Problem One

Domingo decides to ride the ferris wheel at the carnival. When he gets into a seat that is at the bottom of the ferris wheel, he is 4 feet above the ground. The radius of the wheel is 36 feet. The ferris wheel rotates 300° counterclockwise and stops to let other passengers on. How high above the ground is Domingo when he stops?

Station Four: Problem Two

Domingo decides to ride the ferris wheel at the carnival. When he gets into a seat that is at the bottom of the ferris wheel, he is 4 feet above the ground. The radius of the wheel is 36 feet. The ferris wheel rotates $\frac{5\pi}{4} radians$ counterclockwise and stops to let other passengers on. How high above the ground is Domingo when he stops?

Station Four: Problem Three

Domingo decides to ride the ferris wheel at the carnival. The radius of the wheel is 30 feet. Passengers board the wheel on the right side of the ride at the level of the horizontal axis. The ferris wheel rotates 150° counterclockwise and stops to let other passengers on. How high above the ground is Domingo when he stops?

Station Four: Problem Four

Domingo decides to ride the ferris wheel at the carnival. The radius of the wheel is 30 feet. Passengers board the wheel on the right side of the ride at the level of the horizontal axis. The ferris wheel rotates $\frac{4\pi}{3} radians$ counterclockwise and stops to let other passengers on. How high above the ground is Domingo when he stops?

Station Five: Problem One

Given the following start coordinates on the unit circle and a counter-clockwise rotation in degree or radian measure, find the end coordinates.

$\left\{\frac{\sqrt{2}}{2}, \frac{-\sqrt{2}}{2}\right\}$ Rotated π radians

Station Five: Problem Two

Given the following start coordinates on the unit circle and a counter-clockwise rotation in degree or radian measure, find the end coordinates.

$\left\{\frac{-1}{2}, \frac{-\sqrt{3}}{2}\right\}$ Rotated 90 degrees

Station Five: Problem Three

Given the following start coordinates on the unit circle and a counter-clockwise rotation in degree or radian measure, find the end coordinates.

$\{-1,0\}$ Rotated $\frac{3\pi}{2}$ radians

Station Five: Problem Four

Given the following start coordinates on the unit circle and a counter-clockwise rotation in degree or radian measure, find the end coordinates.

$\left\{\frac{\sqrt{3}}{2}, \frac{1}{2}\right\}$ Rotated 180 degrees

Station Six: Problem One

Convert the following radian measures to degrees and the degree measures to radians. Leave in exact form.

57^{o}

Station Six: Problem Two

Convert the following radian measures to degrees and the degree measures to radians. Leave in exact form.

$\frac{\pi}{6}$

Station Six: Problem Three

Convert the following radian measures to degrees and the degree measures to radians. Leave in exact form.

$\frac{18\pi}{26}$

Station Six: Problem Four

Convert the following radian measures to degrees and the degree measures to radians. Leave in exact form.

120^{o}

Station Seven: Problem One

The given point P is located on the Unit Circle. State the quadrant and find the angle θ, also sin θ, and cos θ.

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

Station Seven: Problem Two

The given point P is located on the Unit Circle. State the quadrant and find the angle θ, also sin θ, and cos θ.

P $(0, -1)$

Station Seven: Problem Three
The given point P is located on the Unit Circle. State the quadrant and find the angle θ, also sin θ, and cos θ.

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

Station Seven: Problem Four
The given point P is located on the Unit Circle. State the quadrant and find the angle θ, also sin θ, and cos θ.

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

Station Eight: Problem One
Solve the problem using your Unit Circle.

$\sin(90^{o})$

Station Eight: Problem Two
Solve the problem using your Unit Circle.

$\cos\left(\frac{\pi}{4}\right)$

Station Eight: Problem Three
Solve the problem using your Unit Circle.

$\sin\left(\frac{5\pi}{4}\right)$

Station Eight: Problem Four
Solve the problem using your Unit Circle.

$\cos(135^{o})$

Station Nine: Problem One
Solve the problem using your Unit Circle.

$\sin\left(\frac{-\pi}{4}\right)$

Station Nine: Problem Two
Solve the problem using your Unit Circle.

$\cos(-90^{o})$

Station Nine: Problem Three
Solve the problem using your Unit Circle.

$\sin(1440^{o})$

Station Nine: Problem Four
Solve the problem using your Unit Circle.

$\cos\left(\frac{23\pi}{6}\right)$