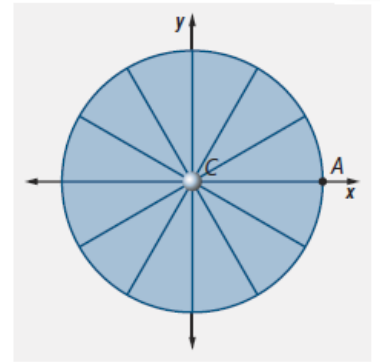


To aid your thinking about positions on a rotating circle, it might be helpful to think about a Ferris wheel model that uses a disk to represent the wheel with  $x$  and  $y$ -coordinate axes on a fixed backboard. The disk is connected to the coordinate axis backboard with a fastener that allows the disk to turn freely while the horizontal and vertical axes remain fixed in place.



1. Imagine that a small Ferris wheel has radius 1 decameter (about 33 feet) and that your seat is at point A. When the Ferris wheel begins it turns counterclockwise about its center at point C.

a) How does the  $x$ -coordinate of your seat change as the wheel turns?

b) How does the  $y$ -coordinate of your seat change as the wheel turns?

2. Find the angles of rotation between 0 degrees and 360 degrees that will take the seat from point A to the following special points.

a) Maximum and minimum distance from the horizontal axis.

Maximum Distance:

Minimum Distance:

b) Maximum and minimum distance from the vertical axis

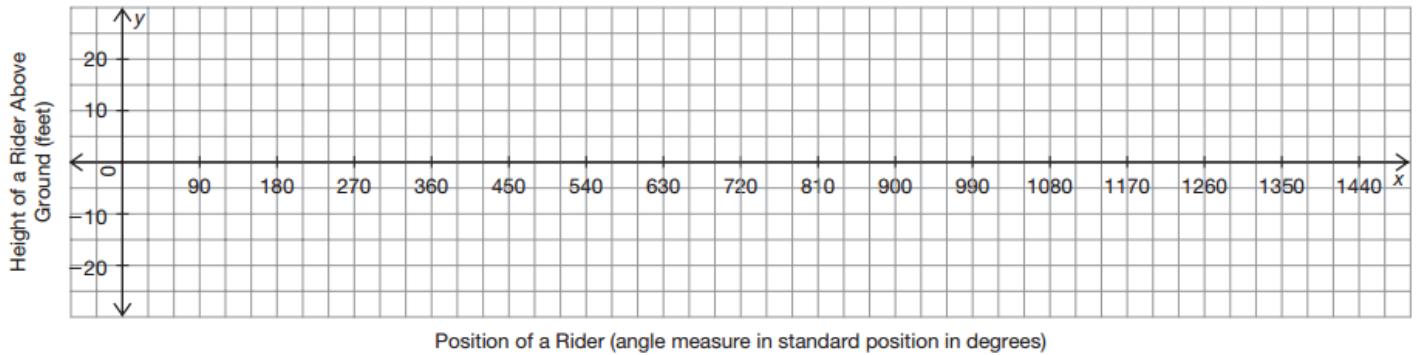
Maximum Distance:

Minimum Distance:

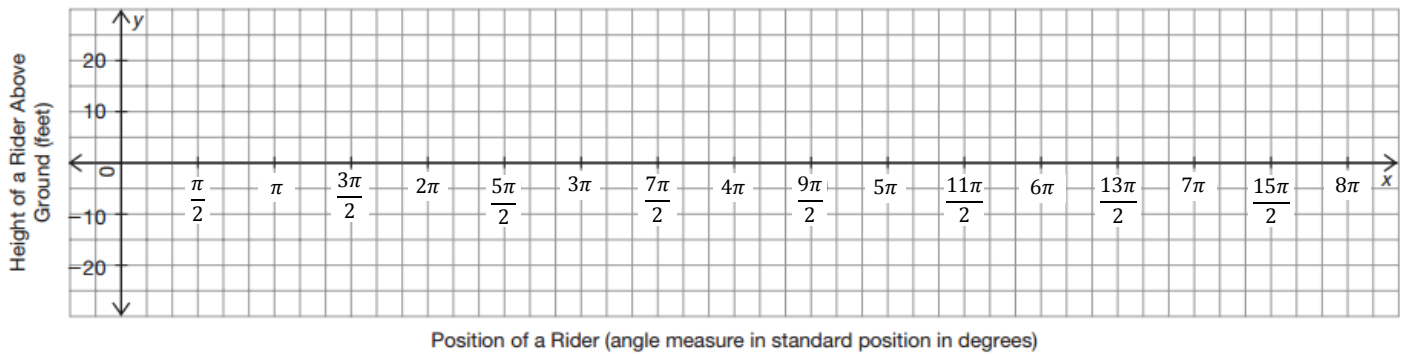
c) Points with equal  $x$  and  $y$  coordinates

d) Points with opposite  $x$  and  $y$  coordinates

3. A Ferris wheel is designed so that half of the wheel is actually below ground. The radius of this underground Ferris wheel is 20 feet. The top of the ride reaches 20 feet above ground and the bottom of the ride reaches 20 feet below ground. Riders board the cars at ground level to the right and the Ferris wheel moves counterclockwise. Create a sketch of the height of the rider as a function of the angle measure in standard position in degrees.



4. Now, create a sketch of the height of the rider as a function of the angle measure in standard position in radians.



5. Using the graphs above, give the angle measure in both **degrees and radians** for the following number of revolutions around the Ferris wheel.

a) 1 revolution	b) $\frac{1}{4}$ revolution	c) $1\frac{1}{2}$ revolutions
d) 3 revolutions	e) $2\frac{1}{3}$ revolutions	f) $3\frac{1}{4}$ revolutions

6. Using the graphs above, determine the equivalent angle measure between 0 and 360 degrees or 0 and  $2\pi$  radians for each angle measure given.

a) 720 degrees	b) $6\pi$ radians	c) 900 degrees
d) $\frac{15\pi}{2}$ radians	e) 750 degrees	f) $\frac{13\pi}{2}$ radians