Assignment

Write

Complete each sentence.

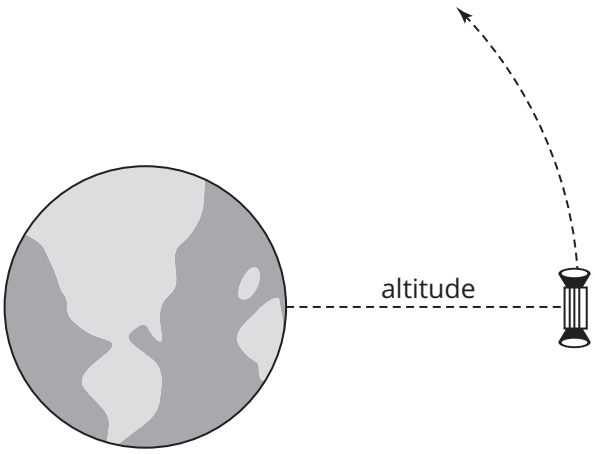
1. A unit circle has a radius of _____.
2. A symbol used to identify the central angle measure of a circle in standard position is _____.
3. There are 2π _____ in 360°.

Remember

The ratio of the intercepted arc length of a central angle to the radius is the measure of the central angle in radians. There are π radians in 180°.

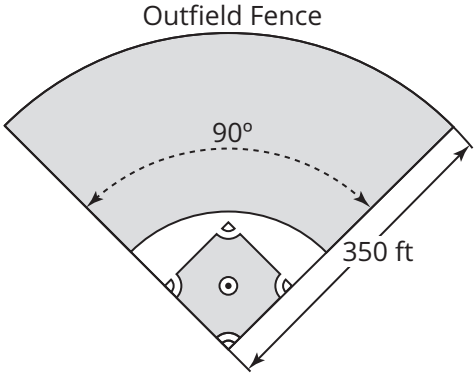
Practice

1. A Global Positioning System (GPS) satellite completes 1 orbit of Earth every 12 hours. The satellite follows a circular path with its center at the center of Earth.



   a. Determine the angle of rotation, in radians, that corresponds to 1 complete orbit of the satellite around Earth.
   b. Determine the radius of the circular path the satellite follows during its orbit if Earth's radius is 3,959 miles and the altitude of the satellite is 12,645 miles.
   c. Determine the angle of rotation, in radians, that corresponds to an 8-hour time period.
   d. Determine the distance traveled by the satellite in an 8-hour time period.
   e. The computer onboard the satellite had to be remotely shut down and rebooted in order to repair a software glitch. The satellite traveled a distance of 27,000 miles during that time. How long did it take to shut down and reboot the computer?

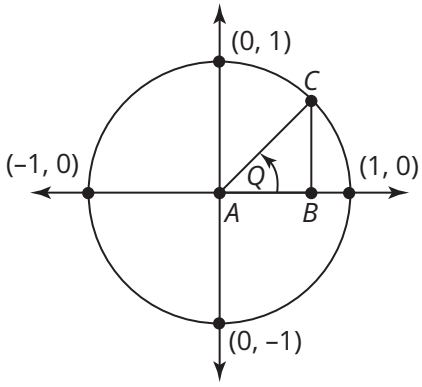
2. The outfield fence on a baseball field needs to be replaced. The fence is an arc with its center at home plate and a central angle of 90°. The distance from home plate to any point on the fence is 350 feet.



   a. Determine the central angle of the outfield fence in radians.
   b. Determine the length of the outfield fence that needs to be replaced.

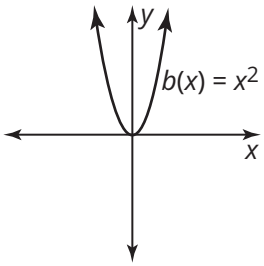
Stretch

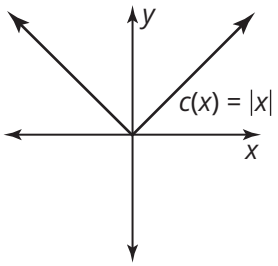
1. An automobile tire has a diameter of 28 inches.
   a. What angle does the wheel turn through if the car has moved 2 feet? Give the answer in both radians and degrees.
   b. If the tire makes 10 turns in 1 second, how fast is the car going in miles per hour?
2. A unit circle is shown. Determine the coordinates of points B and C on the triangle for the different measures of θ.
   a. $\theta = \frac{\pi}{6}$ radians
   b. $\theta = \frac{\pi}{4}$ radians
   c. $\theta = \frac{\pi}{3}$ radians

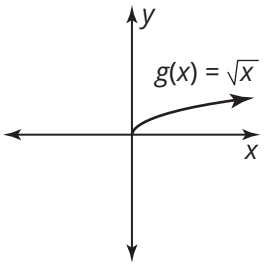


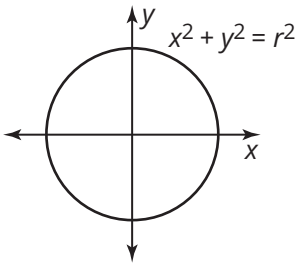
Review

1. Consider the relations shown.









   Graph each relation to create a picture.

   $y = g(-x - 1) + 4$, $\quad -5 \le x \le -1$

   $y = g(x - 1) + 4$, $\quad 1 \le x \le 5$

   $y = -2c(x) + 6$, $\quad -3 \le x \le 3$

   $x^2 + (y - 7)^2 = 1$

2. Identify the number of complex zeros for the polynomial equation.
   a. $12x^5 - 20x^4 + 19x^3 - 6x^2 - 2x + 1 = 0$
   b. $5x^4 + 3x^3 + 3x^2 + 3x - 2 = 0$