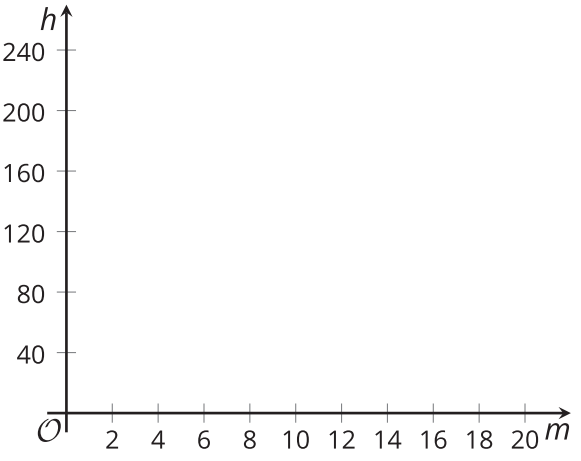
Lesson 18 Practice Problems

1. Jada is riding on a Ferris wheel. Her height, in feet, is modeled by the function $h(m) = 100\sin\left(-\frac{\pi}{2} + \frac{2\pi m}{10}\right) + 110$, where m is the number of minutes since she got on the ride.

   a. How many minutes does it take the Ferris wheel to make one full revolution? Explain how you know.

   b. What is the radius of the Ferris wheel? Explain how you know.



   c. Sketch a graph of h.

2. The vertical position, in feet, of the point P on a windmill is represented by $y = 5\sin\left(\frac{2\pi t}{3}\right) + 20$, where t is the number of seconds after the windmill started turning at a constant speed. Select **all** the true statements.

   A. The windmill blades are 5 feet long.

   B. The windmill blades make 5 revolutions per second.

   C. The midline for the graph of the equation is 20.

   D. The windmill makes one revolution every 3 seconds.

   E. The windmill makes 3 revolutions per second.

3. A seat on a Ferris wheel travels 250π feet in one full revolution. How many feet is the carriage from the center of the Ferris wheel?

   A. $\frac{125}{\pi}$

   B. $\frac{250}{\pi}$

   C. 125

   D. 250

4. A carousel has a radius of 20 feet. The carousel makes 8 complete revolutions.

   a. How many feet does a person on the carousel travel during these 8 revolutions?

   b. What angle does the carousel travel through?

   c. What is the relationship between the angle of rotation and the distance traveled on this carousel? Explain your reasoning.

5. a. For which angle measures between 0 and 2π is the cosine negative and the sine positive?

   b. For which angle measures between 0 and 2π is the cosine negative and the sine negative?

(From Unit 6, Lesson 6.)

6. A $\frac{\pi}{2}$ radian rotation takes a point D on the unit circle to a point E. Which other radian rotation also takes point D to point E?

   A. $\frac{3\pi}{2}$

   B. $\frac{4\pi}{2}$

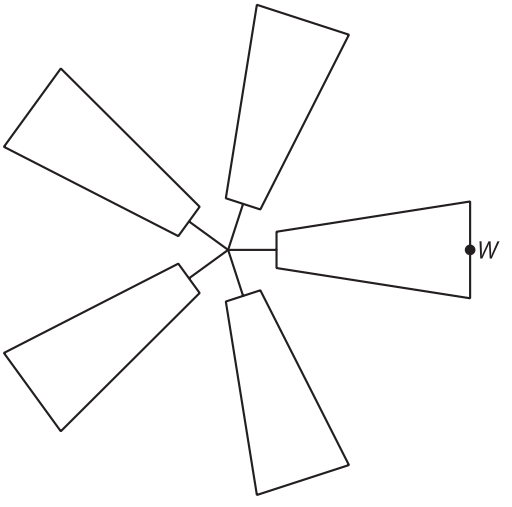
   C. $\frac{5\pi}{2}$

   D. $\frac{7\pi}{2}$

(From Unit 6, Lesson 10.)

7. A windmill blade spins in a counterclockwise direction, making one full revolution every 5 seconds.

   Which statements are true? Select **all** that apply.



   A. After 15 seconds, the point W will be in its starting position.

   B. After $\frac{1}{5}$ of a second, the point W will be in its starting position.

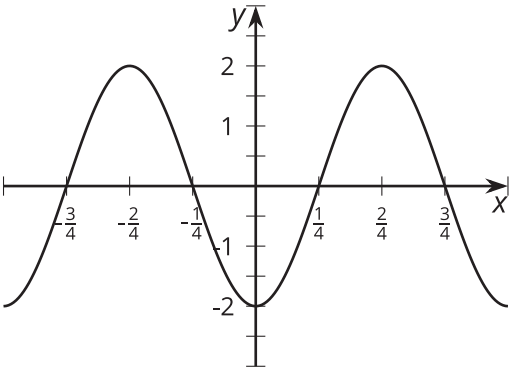
   C. In 1 second, the point W travels through an angle of $\frac{\pi}{5}$.

   D. The position of W repeats every 5 seconds.

   E. The position of W repeats every 10 seconds.

(From Unit 6, Lesson 16.)

8. Here is the graph of a trigonometric function.



Which equation has this graph?

A. $y = -2\sin(2x)$

B. $y = 2\sin\left(2\pi\left(x + \frac{1}{4}\right)\right)$

C. $y = 2\sin\left(2\pi\left(x - \frac{1}{4}\right)\right)$

D. $y = 2\sin\left(2\pi\left(x - \frac{\pi}{4}\right)\right)$

(From Unit 6, Lesson 17.)