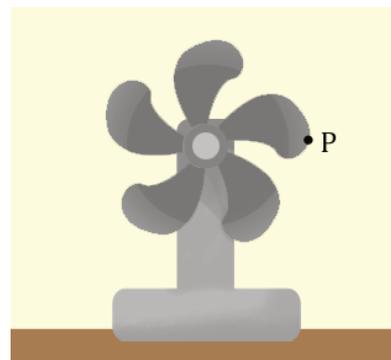


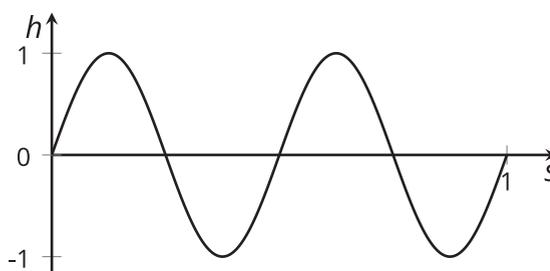
## Lesson 8 Practice Problems

1. A fan blade spins counterclockwise once per second.

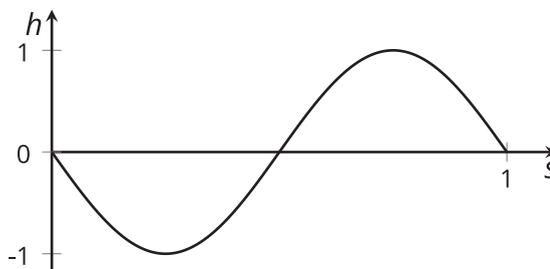
Which of these graphs best depicts the height,  $h$ , of  $P$  after  $s$  seconds? The fan blades are 1 foot long and the height is measured in feet from the center of the fan blades.



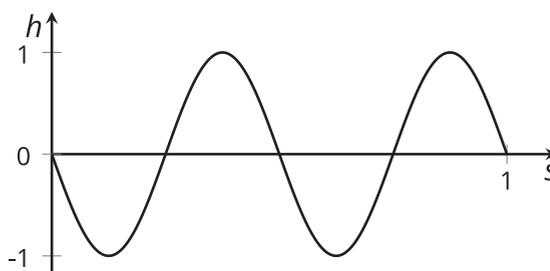
A.



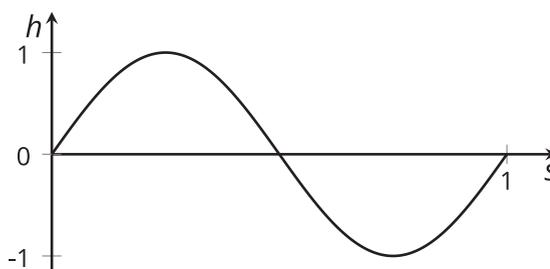
B.



C.



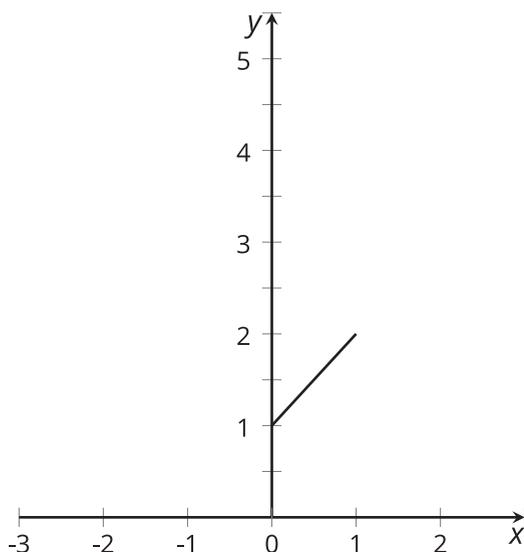
D.



2. Which situations are modeled accurately by a periodic function? Select **all** that apply.

- A. the distance from the earth to the sun as a function of time
- B. the vertical height of a point on a rotating wheel as a function of time
- C. the area of a sheet of paper as a function of the number of times it is folded in half
- D. the number of centimeters in  $x$  inches
- E. the height of a swinging pendulum as a function of time
- F. the height of a ball tossed in the air as a function of time

3. Here is the graph of a function for some values of  $x$ .



a. Can you extend the graph to the whole plane so that the function  $f$  is periodic? Explain your reasoning.

b. Can you extend the graph to the whole plane so that the function  $f$  is not periodic? Explain your reasoning.

4. a. Can a non-constant linear function be periodic? Explain your reasoning.

b. Can a quadratic function be periodic? Explain your reasoning.

5. Do  $(7, 1)$  and  $(-5, 5)$  lie on the same circle centered at  $(0, 0)$ ? Explain how you know.

(From Unit 6, Lesson 1.)

6. The measure of angle  $\theta$  is between 0 and  $2\pi$  radians. Which statements *must* be true of  $\sin(\theta)$  and  $\cos(\theta)$ ? Select **all** that apply.

- A.  $\cos^2(\theta) + \sin^2(\theta) = 1$
- B. If  $\sin(\theta) = 0$ , then  $\cos(\theta) = 1$ .
- C. If  $\sin(\theta) = 1$ , then  $\cos(\theta) = 0$ .
- D.  $\cos(\theta) + \sin(\theta) = 1$ .
- E. The point  $(\cos(\theta), \sin(\theta))$  lies on the unit circle.

(From Unit 6, Lesson 5.)

7. The center of a clock is the origin  $(0, 0)$  in a coordinate system. The hour hand is 4 units long. What are the coordinates of the end of the hour hand at:

- a. 3:00
- b. 8:00
- c. 11:00

(From Unit 6, Lesson 7.)