Lesson 8 Practice Problems
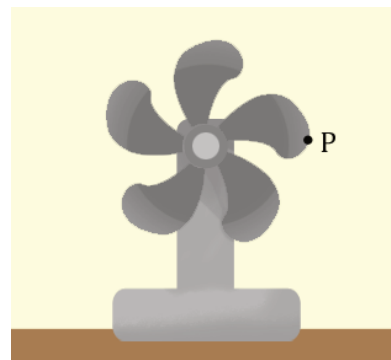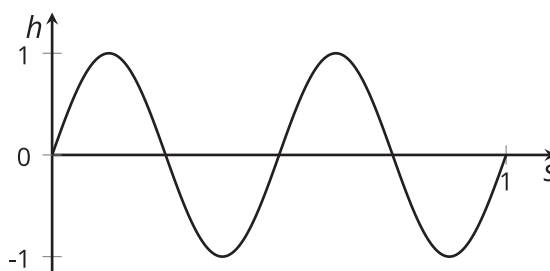
1. A fan blade spins counterclockwise once per second.
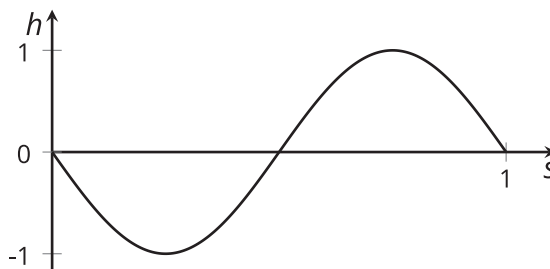
   Which of these graphs best depicts the height, h, of P after s seconds? The fan blades are 1 foot long and the height is measured in feet from the center of the fan blades.

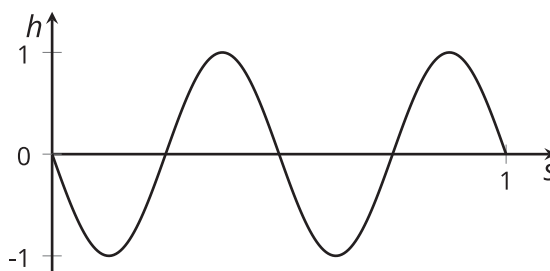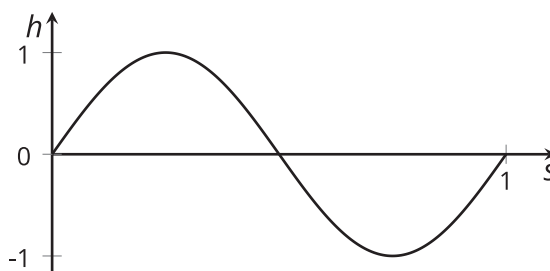A.

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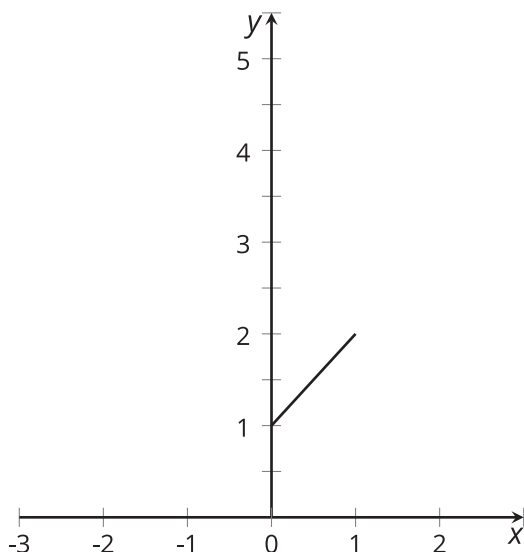
   a. Can you extend the graph to the whole plane so that the function f is periodic? Explain your reasoning.

   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.

6. The measure of angle θ is between 0 and 2π 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.

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