Name _____ Class _____ Date _____

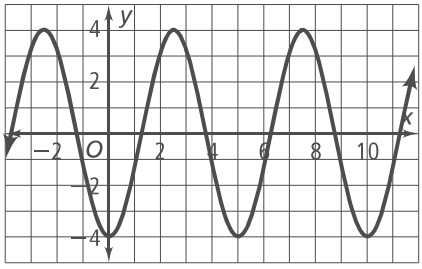
13-1 Reteaching

Exploring Periodic Data

The graph of a periodic function shows a repeating pattern of y-values. One complete pattern is a *cycle*. The horizontal distance from one point on the graph to the point where the pattern begins repeating is called the *period* of the function.

Problem

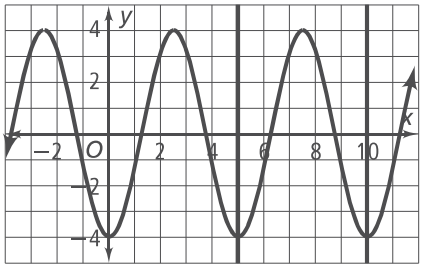
Is the function periodic? If it is, what is the period?



The repeating pattern of y-values shows that this function is periodic.

Name one cycle:

- Draw a vertical line through a point where the graph reaches its minimum y-value.
- Trace the graph with your finger until you feel the pattern repeat.
- Draw a second vertical line through the point where the pattern starts to repeat. The vertical lines mark the beginning and end of one cycle.



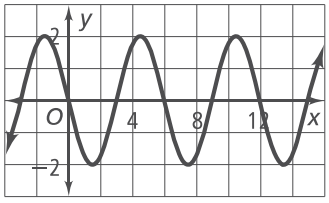
Find the period of the function:

- Find the points where the vertical lines intersect the graph: $(5, -4)$ and $(10, -4)$.
- Subtract the x-values to find the horizontal length of one cycle: $10 - 5 = 5$.

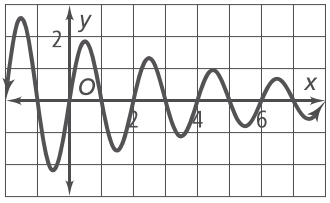
The period of the function is 5.

Exercises

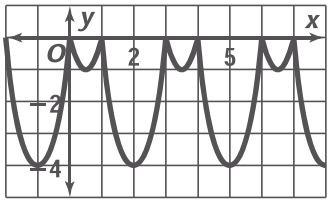
Determine whether each function *is* or *is not* periodic. If it is, find the period.

1. 

periodic; 6

2. 

not periodic

3. 

periodic; 3

Name _____ Class _____ Date _____

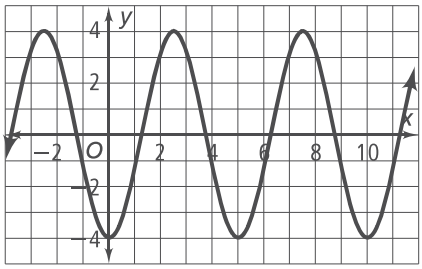
13-1 Reteaching (continued)

Exploring Periodic Data

You can measure the amount of variation in the y-values of a periodic function. The *amplitude* of a periodic function is the difference between the maximum and minimum values, divided by 2: $A = \frac{1}{2}(\text{maximum value} - \text{minimum value})$.

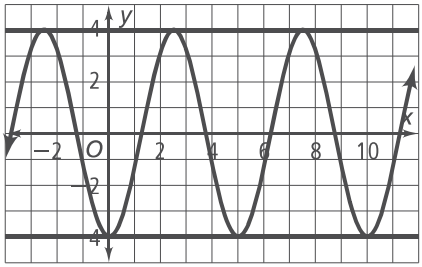
Problem

What is the amplitude of the periodic function?



Name the maximum and minimum y-values:

- Draw one horizontal line across the highest points on the graph.
- Draw a second horizontal line across the lowest points on the graph.



Find the amplitude of the function:

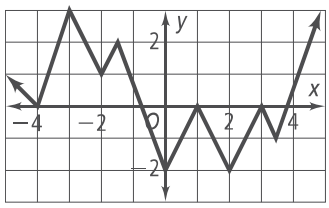
- Find a point where the first horizontal line intersects the graph: (7.5, 4). The y-value, 4, is the maximum value.
- Find a point where the second horizontal line intersects the graph: (10, −4). The y-value, −4, is the minimum value.
- Use the amplitude formula: $A = \frac{1}{2}(\text{maximum value} - \text{minimum value})$

$$A = \frac{1}{2}(4 - (-4)) = \frac{1}{2}(8) = 4$$

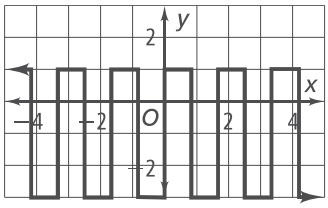
The amplitude of the function is 4.

Exercises

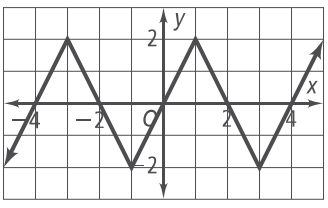
Determine whether each function *is* or *is not* periodic. If it is, find the amplitude.

4. 

not periodic

5. 

periodic; 2

6. 

periodic; 2