A **periodic function** is a function whose graph repeats at regular intervals or cycles. The following is a periodic function.

axis $\cdots\cdots$ ⎫ amplitude
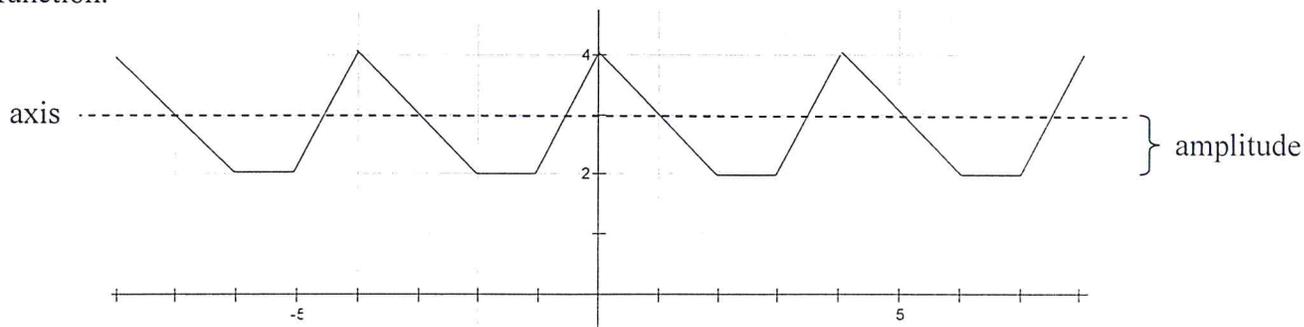
The **period** is the length of one cycle. The pattern repeats every 4 units so the period of the above function is 4.

The **axis** is the line half-way between the maximum and minimum values of the function. It is always written as an equation. The axis of the above function is $y = 3$.

The **amplitude** is the distance from the axis to the maximum or minimum values of the function. The amplitude of the above function is 1.

Determine whether or not the function is periodic. Why or why not?

1.

2.

3.
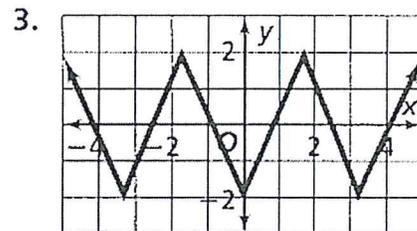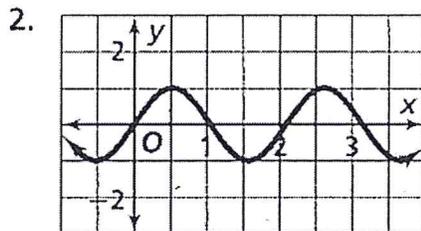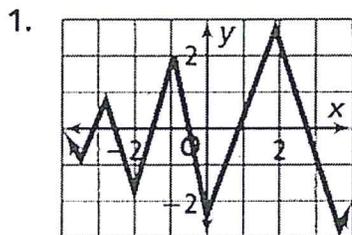
For each function, identify one cycle in two different ways. Then determine the period of the function.

4.

5.

6.
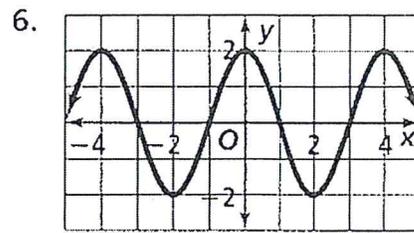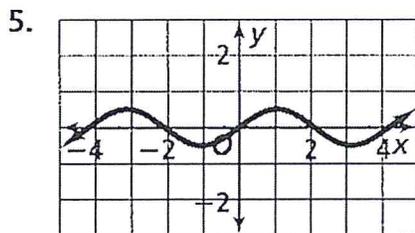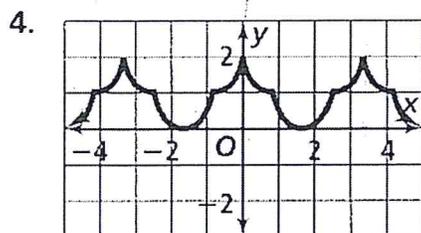
Find the period, axis and amplitude for each periodic function.

7.

8.

9.

10.

11.

12.

13.

14.

15.

16.

17.

18.
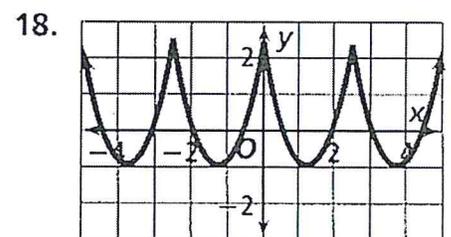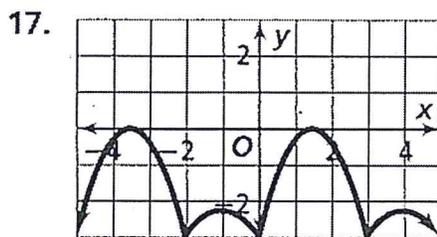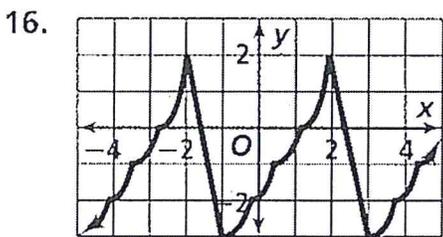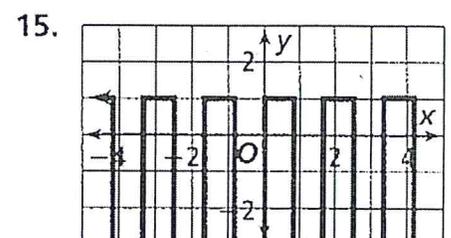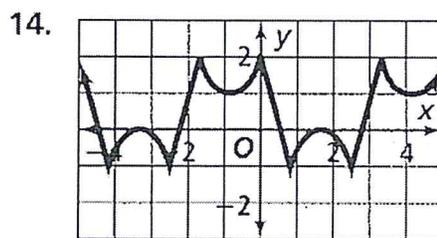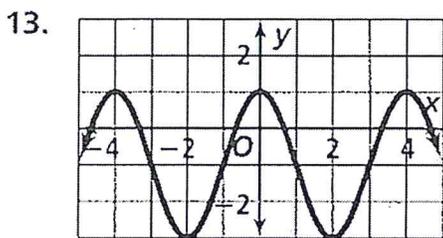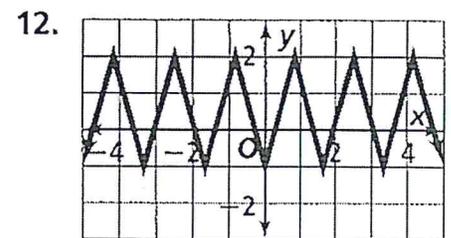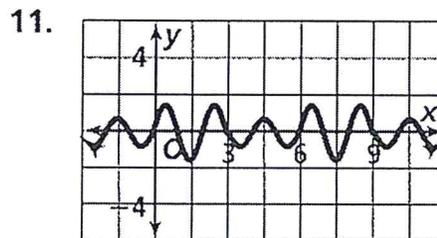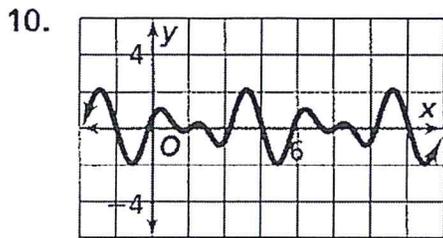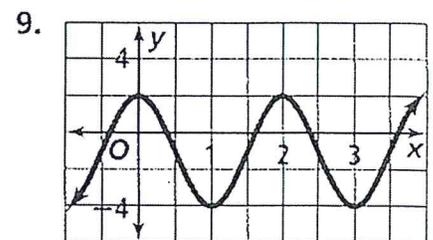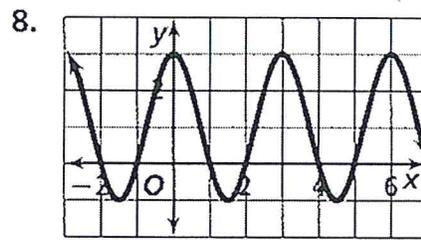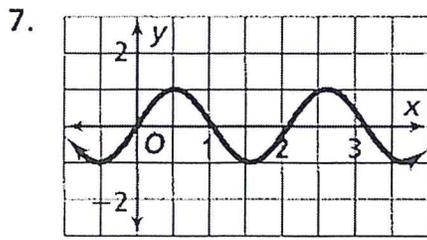
19. Draw a periodic function with a period of 5, an amplitude of 4, and an axis of $y = 2$.
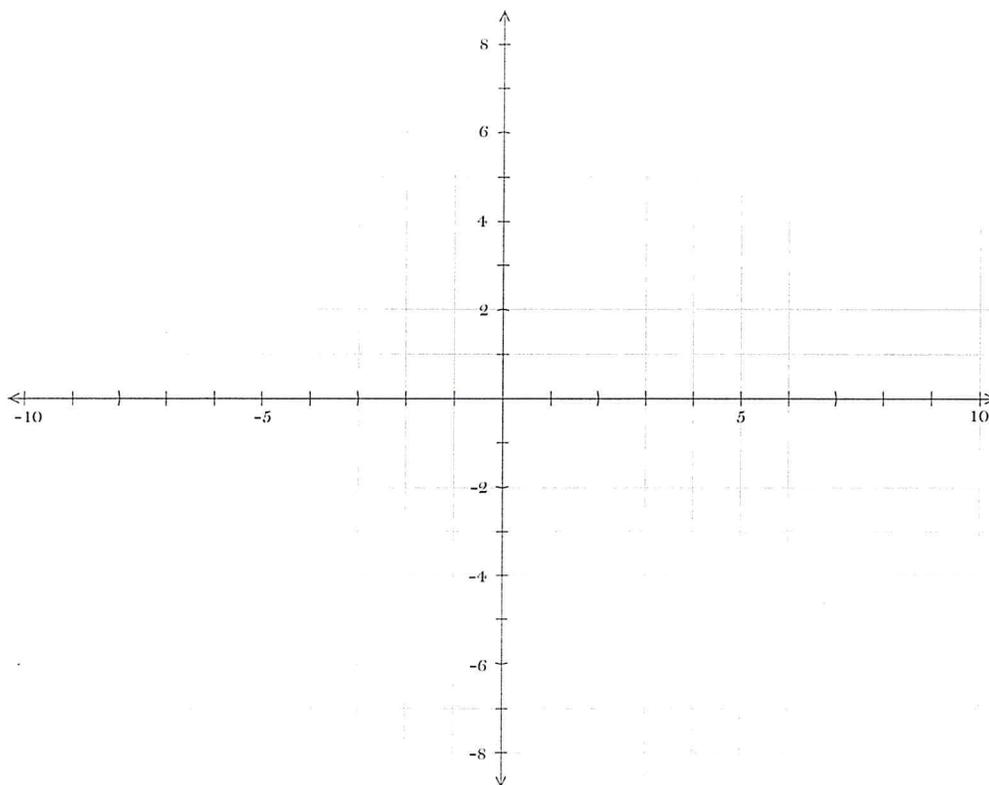
Answers:

1. No,

2. Yes

3. Yes

4. Approx. $3\frac{1}{3}$

5. 4

6. 4

7. Period: 2
   Axis: $y = 0$
   Amplitude: 1

8. Period: 3
   Axis: $y = 1$
   Amplitude: 2

9. Period: 2
   Axis: $y = -1$
   Amplitude: 3

10. Period: 6
    Axis: $y = 0$
    Amplitude: 2

11. Period: 6
    Axis: $y = 0$
    Amplitude: approx. $1\frac{1}{2}$

12. Period: approx. $1\frac{1}{2}$
    Axis: $y = \frac{1}{2}$
    Amplitude: approx. $1\frac{1}{2}$

13. Period: 4
    Axis: $y = -1$
    Amplitude: 2

14. Period: 5
    Axis: $y = \frac{1}{2}$
    Amplitude: $1\frac{1}{2}$

15. Period: $1\frac{2}{3}$
    Axis: $y = -1$
    Amplitude: 2

16. Period: 4
    Axis: $y = \frac{1}{2}$
    Amplitude: $2\frac{1}{2}$

17. Period: 5
    Axis: $y = -1\frac{1}{2}$
    Amplitude: $1\frac{1}{2}$

18. Period: $2\frac{1}{2}$
    Axis: $y = 1$
    Amplitude: $1\frac{1}{2}$

19. Answers will vary.