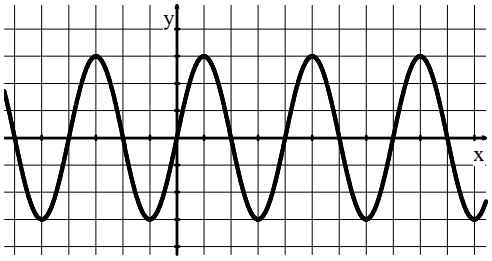
AP Precalc

Write your questions and thoughts here!

3.1 Periodic Phenomena

3.1 Notes

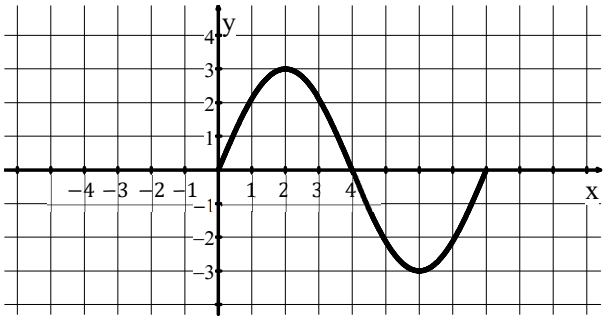
As input values increase, if the output values demonstrate a repeating pattern over successive equal-length intervals we have what is called a _____ relationship. Another word to describe this would be **cyclical**.



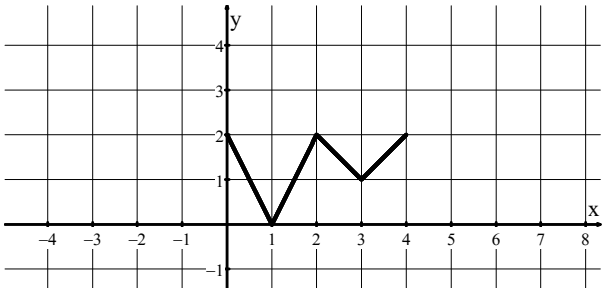
If we have the graph of a single period (cycle), then we can construct the graph of the periodic relationship. The following graphs show one period of a periodic function.

Sketch the rest of the graph on the given axes.

1.



2.

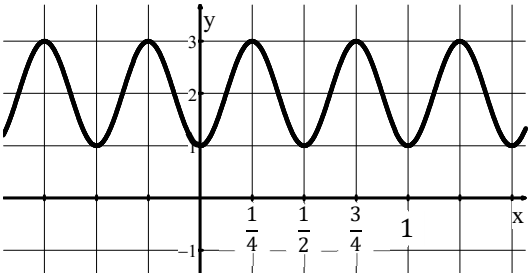


The ***period*** of the function is the smallest change in x-values it takes for the function to repeat itself. In fancy math terms, we say:

The ***period*** of the function is the smallest positive value of k such that $\qquad = f(x)$ for all x in the domain.

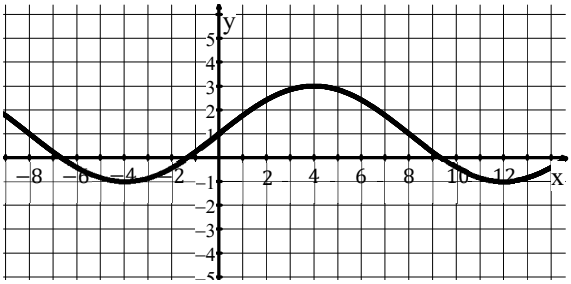
Identify the length of the period for each function.

3.



Period = _____

4.

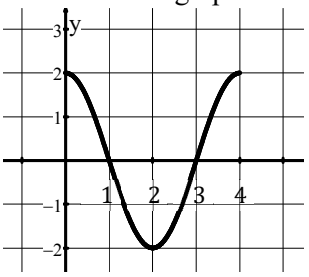


Period = _____

Write your questions and thoughts here!

Periodic functions take on various characteristics of a function such as increasing, decreasing, different concavities, etc. Recognize that any characteristics found in one period of the function will be in every period of the function.

5. Below is one cycle of a periodic function. Use the graph to answer the questions.



a. Is the function increasing, decreasing or both on the interval $18 < x < 20$?

b. Is the function concave up, concave down, or both on the interval $31 < x < 33$?

c. Is there a relative max, relative min, or neither at the point $x = 82$?

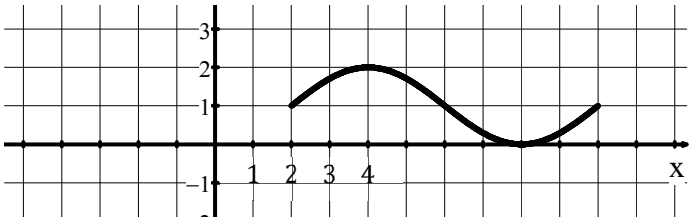
3.1 Periodic Phenomena

AP Precalculus

3.1 Practice

The following graphs show one period of a periodic function. Sketch the rest of the graph on the given axes and answer any questions that follow.

1.

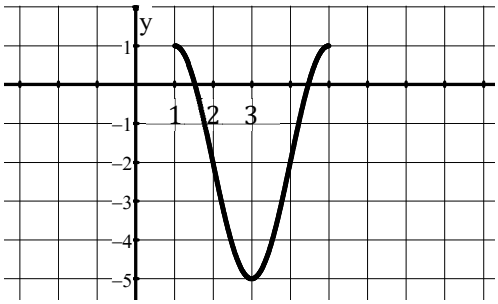


a. Is the function increasing, decreasing or both on the interval $52 < x < 56$?

b. Is the function concave up, concave down, or both on the interval $30 < x < 34$?

c. Is there a relative max, relative min, or neither at the point $x = 44$?

2.

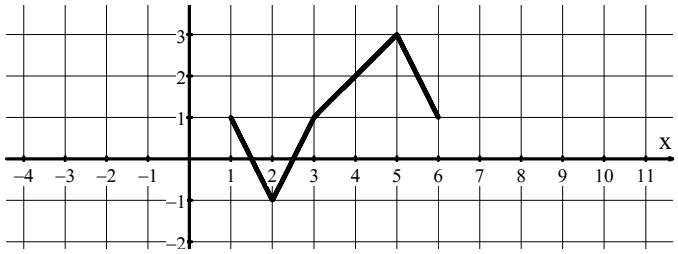


a. Is the function increasing, decreasing or both on the interval $25 < x < 27$?

b. Is the function concave up, concave down, or both on the interval $34 < x < 36$?

c. Is there a relative max, relative min, or neither at the point $x = 47$?

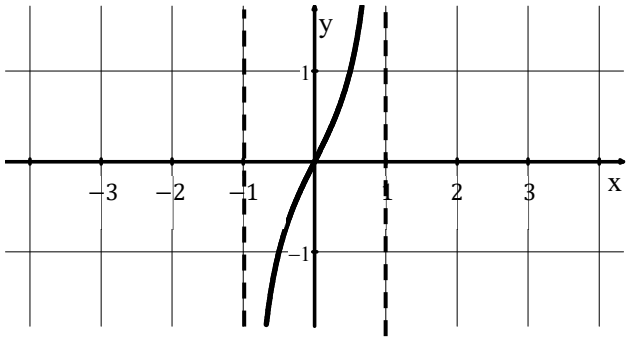
3.



a. Is the function increasing, decreasing or both on the interval $22 < x < 23$?

b. Is there a relative max, relative min, or neither at the point $x = 30$?

4.

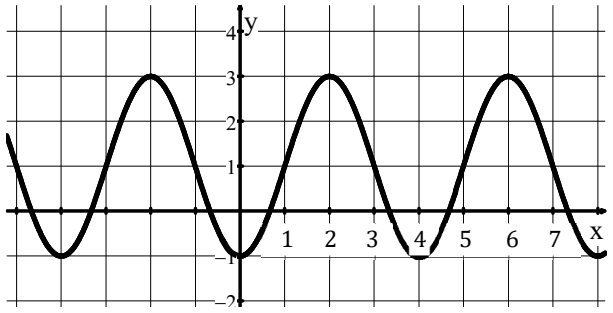


a. Is the function increasing, decreasing or both on the interval $37 < x < 39$?

b. Is the function concave up, concave down, or both on the interval $27 < x < 28$?

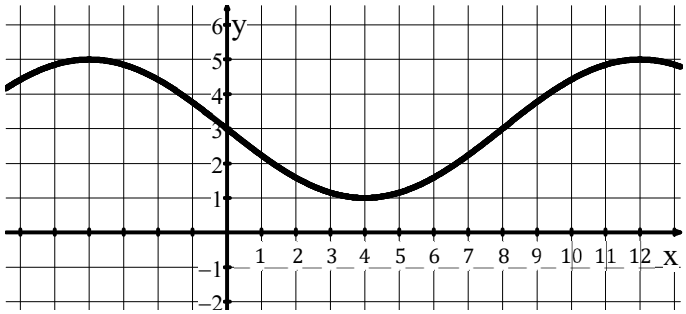
Identify the length of the period for each function.

5.



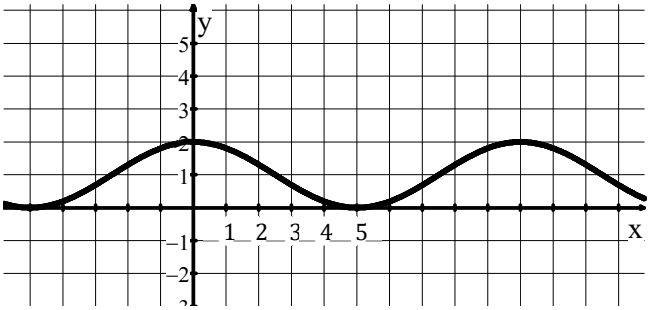
Period = _____

6.



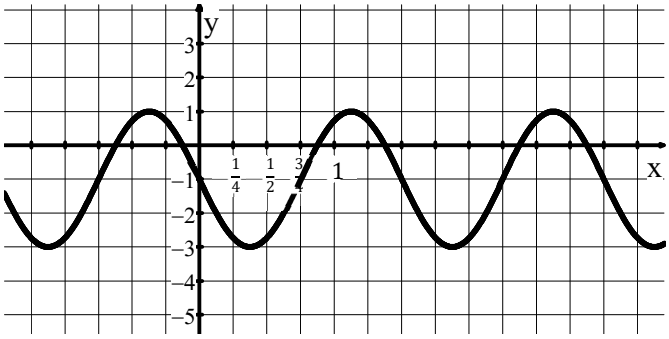
Period = _____

7.



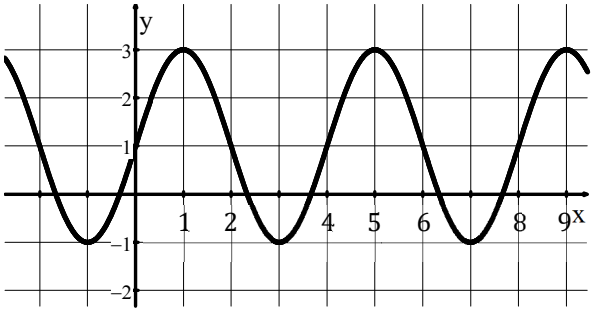
Period = _____

8.



Period = _____

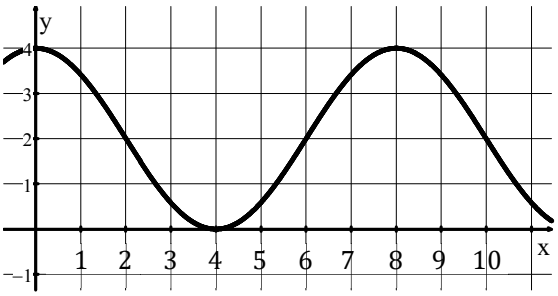
9.



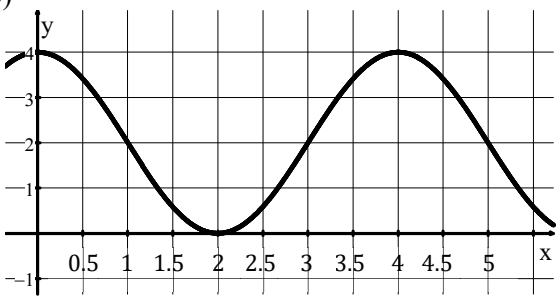
Graph of f

The graph of the function f is givn in the xy-plane. Which of the following functions has the same period as f?

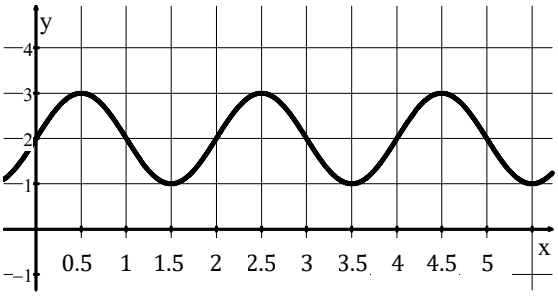
(A)



(B)



(C)



(D)