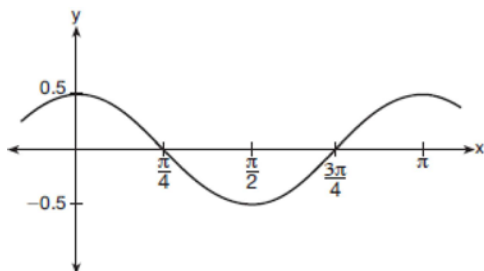
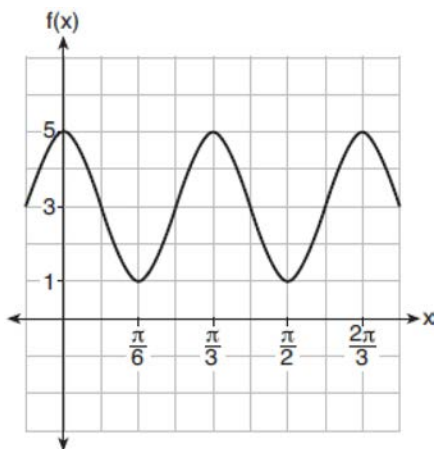


F.TF.B.5: Modeling Trigonometric Functions 1b

- 1 Which equation is represented by the graph shown below?

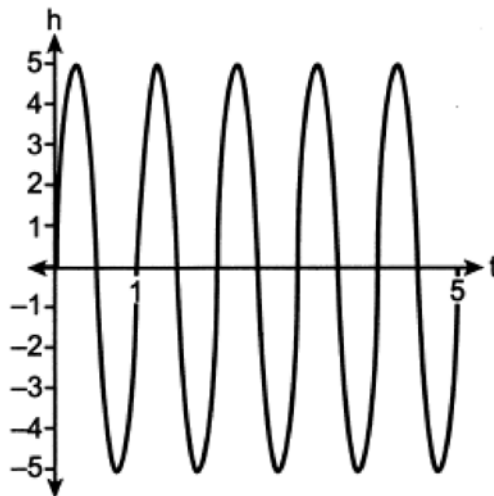


- 2 The function $f(x) = a \cos bx + c$ is plotted on the graph shown below.



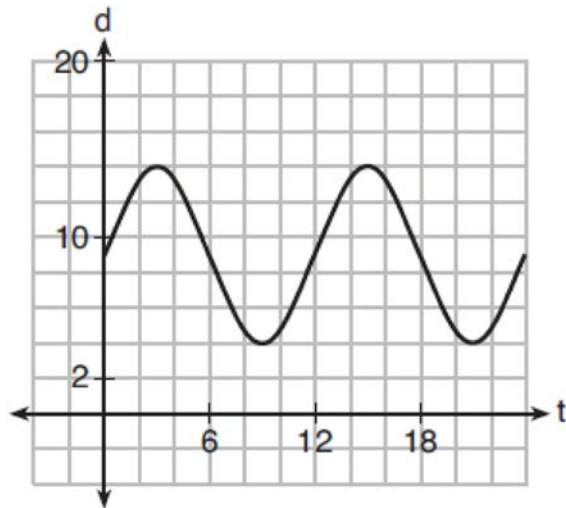
What are the values of a , b , and c ?

- 3 A cyclist pedals a bike at a rate of 60 revolutions per minute. The height, h , of a pedal at time t , in seconds, is plotted below.



The graph can be modeled by the function $h(t) = 5 \sin(kt)$, where k is equal to

- 4 The depth of the water at a marker 20 feet from the shore in a bay is depicted in the graph below.



If the depth, d , is measured in feet and time, t , is measured in hours since midnight, what is an equation for the depth of the water at the marker?

- 5 The voltage used by most households can be modeled by a sine function. The maximum voltage is 120 volts, and there are 60 cycles *every second*. Which equation best represents the value of the voltage as it flows through the electric wires, where t is time in seconds?

F.TF.B.5: Modeling Trigonometric Functions 1b **Answer Section**

1 ANS:

$$y = \frac{1}{2} \cos 2x$$

REF: 061708aaii

2 ANS:

$$a = 2, b = 6, c = 3$$

The cosine function has been translated +3. Since the maximum is 5 and the minimum is 1, the amplitude is 2.

$$\frac{\pi}{3} = \frac{2\pi}{b}.$$

$$b = 6$$

REF: 011913aaii

3 ANS:

$$2\pi$$

$$1 = \frac{2\pi}{k}$$

$$k = 2\pi$$

REF: 012313aaii

4 ANS:

$$d = 5 \sin\left(\frac{\pi}{6} t\right) + 9$$

$$a = \frac{14-4}{2} = 5, d = \frac{14+4}{2} = 9$$

REF: 061810aaii

5 ANS:

$$V = 120 \sin(120\pi t)$$

$$\text{period} = \frac{2\pi}{B}$$

$$\frac{1}{60} = \frac{2\pi}{B}$$

$$B = 120\pi$$

REF: 061624aaii