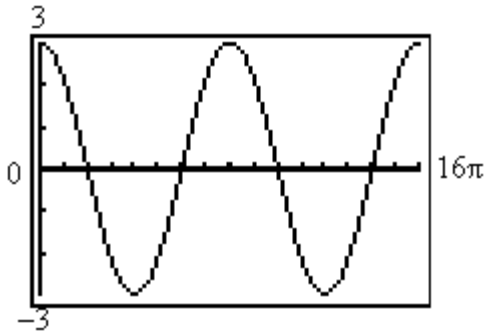
Name_____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question. Write the steps to arrive at your answers.

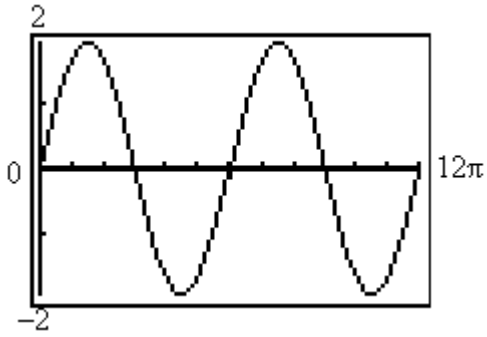
Answer the question.

1) Which one of the equations below matches the graph? **1)** _____



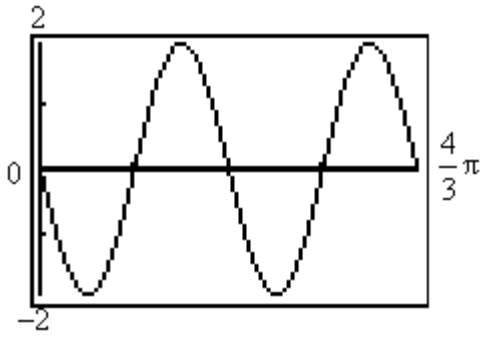
A) $y = -3\sin(4x)$ **B)** $y = 3\cos(4x)$ **C)** $y = 3\sin\left(\frac{1}{4}x\right)$ **D)** $y = 3\cos\left(\frac{1}{4}x\right)$

2) Which one of the equations below matches the graph? **2)** _____



A) $y = 2\cos\left(\frac{1}{3}x\right)$ **B)** $y = -2\sin\left(\frac{1}{3}x\right)$ **C)** $y = 2\sin\left(\frac{1}{3}x\right)$ **D)** $y = 2\cos(3x)$

3) Which one of the equations below matches the graph? **3)** _____



A) $y = -2\cos(3x)$ **B)** $y = 2\sin\left(\frac{1}{3}x\right)$ **C)** $y = -2\sin(3x)$ **D)** $y = -2\sin\left(\frac{1}{3}x\right)$

SHORT ANSWER. Write the steps to arrive at your answer.

Without graphing the function, determine its amplitude or period as requested.

4) $y = -2\sin\frac{1}{3}x$ Find the amplitude. **4)** _____

5) $y = \sin 5x$ Find the period. **5)** _____

6) $y = -3\cos\frac{1}{4}x$ Find the period. **6)** _____

7) $y = \frac{5}{8}\sin\left(-\frac{8\pi}{3}x\right)$ Find the period. **7)** _____

Write the equation of a sine function that has the given characteristics.

8) Amplitude: 4
Period: 3π **8)** _____

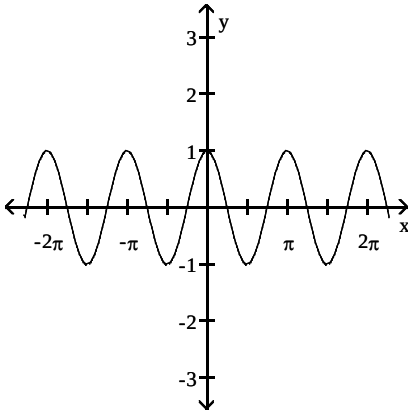
Solve the problem.

9) For what numbers x, $0 \le x \le 2\pi$, does $\sin x = 0$? **9)** _____

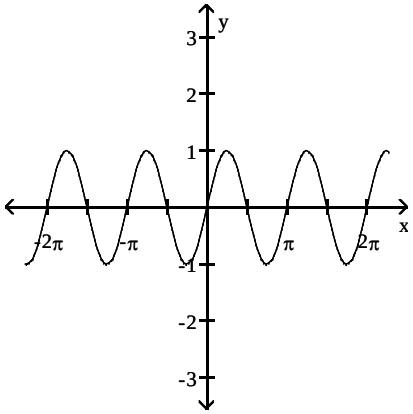
Match the given function to its graph.

10) 1) $y = \sin 2x$ 2) $y = 2 \cos x$ **10)** _____
3) $y = 2 \sin x$ 4) $y = \cos 2x$

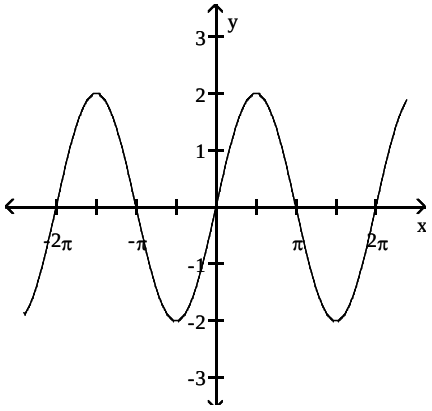
A



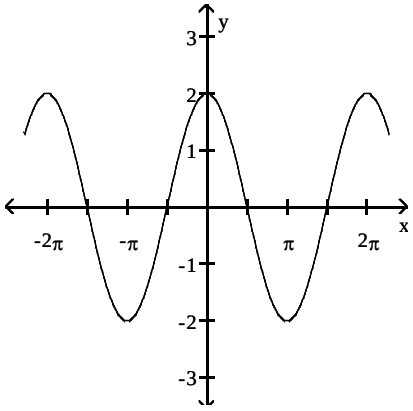
B



C



D

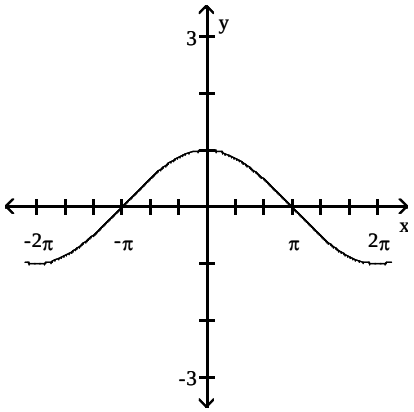


11) Match the equations to the graphs below. **11) _____**

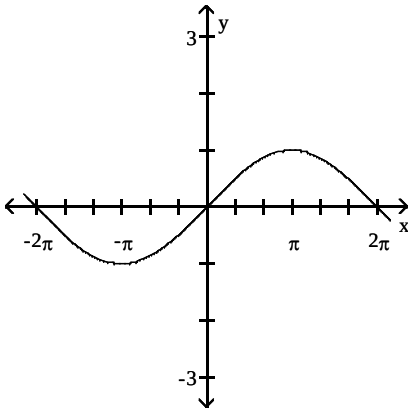
1) $y = \sin(\frac{1}{2}x)$ 2) $y = \frac{1}{2}\cos x$

3) $y = \frac{1}{2}\sin x$ 4) $y = \cos(\frac{1}{2}x)$

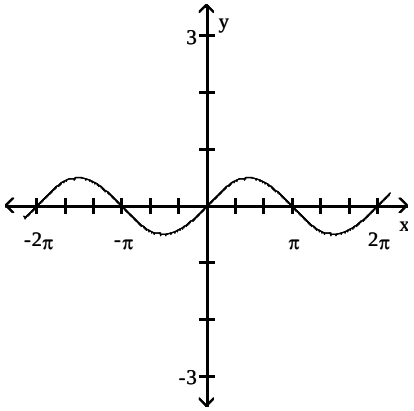
A



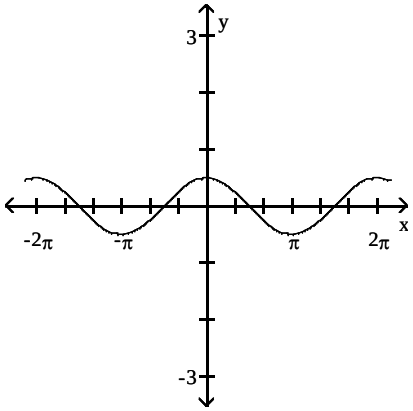
B



C



D

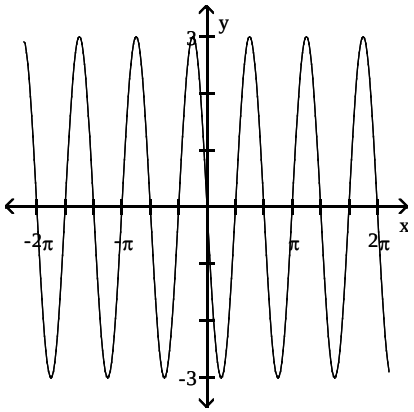


12) Match the equations to the graphs below. **12)** _____

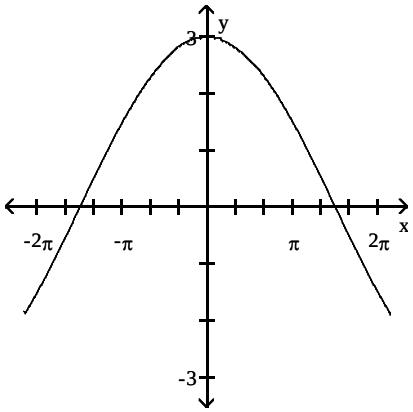
1) $y = -3 \sin(3x)$ 2) $y = -3 \sin(\frac{1}{3}x)$

3) $y = 3 \cos(3x)$ 4) $y = 3 \cos(\frac{1}{3}x)$

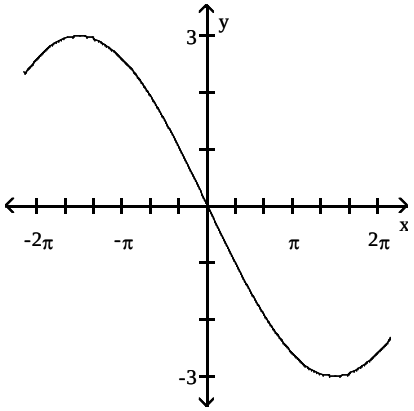
A



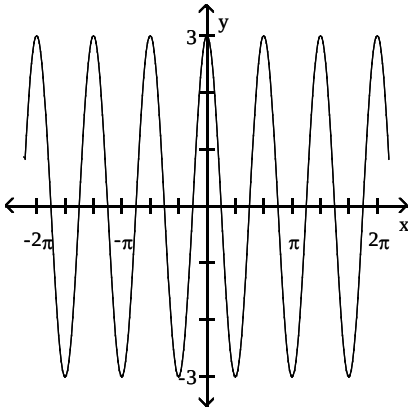
B



C



D



Write the equation of a sine function that has the given characteristics.

13) Amplitude: 5 **13)** _____

Period: 4π

Phase Shift: $-\frac{\pi}{4}$

14) Amplitude: 2
Period: π
Phase Shift: $\frac{7}{2}$

14) _____

15) Amplitude: 5
Period: 6π
Phase Shift: $\frac{\pi}{6}$

15) _____

Find the phase shift of the function.

16) $y = -4 \sin\left(x - \frac{\pi}{2}\right)$

16) _____

17) $y = -2 \sin\left(2x - \frac{\pi}{2}\right)$

17) _____

18) $y = -5 \cos\left(\frac{1}{2}x + \frac{\pi}{2}\right)$

18) _____

19) $y = 2 \cos\left(-2x + \frac{\pi}{2}\right)$

19) _____

Solve the problem.

20) For the equation $y = -\frac{1}{2}\sin(4x + 3\pi)$, identify (i) the amplitude, (ii) the phase shift, and (iii) the period. **20)** _____

GRAPHING. Graph the function. Identify period and phase shift – and amplitude if it applies. Label your graphs with correct units on the x– and y– axis.

Graph the sinusoidal function.

21) $y = 4\cos(\pi x)$

22) $y = 3\sin(4x)$

23) $y = \frac{9}{4} \cos\left(-\frac{1}{3}x\right)$

24) $y = -2 \sin\left(\frac{1}{2}x\right)$

Graph the function.

25) $y = \sec\left(\frac{1}{3}x\right)$

26) $y = \sec(2x)$

27) $y = 6 \csc(3x)$

28) $y = 4 \tan\left(\frac{1}{2}x\right)$

29) $y = \cot(\pi x)$

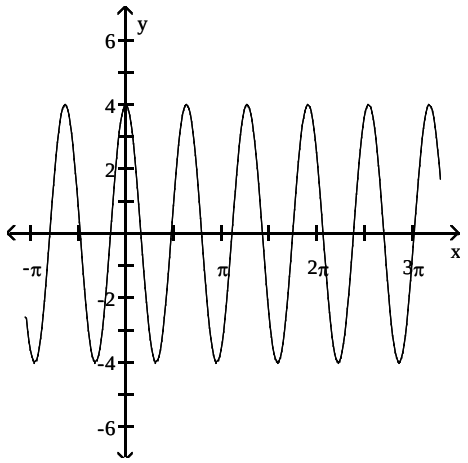
Graph the function. Show at least one period.

30) $y = 4 \sin(3\pi x + 2)$

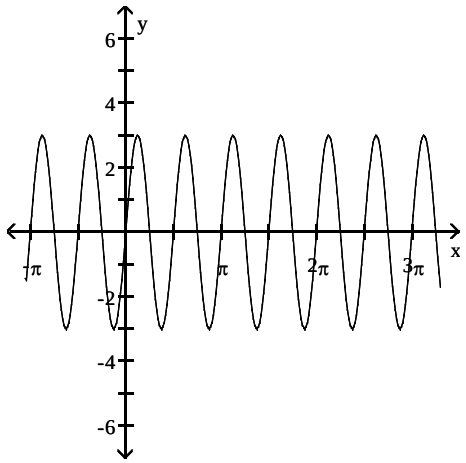
31) $y = 4 \sin(-2x - \pi)$

32) $y = 5 \cos\left(4x + \frac{\pi}{2}\right)$

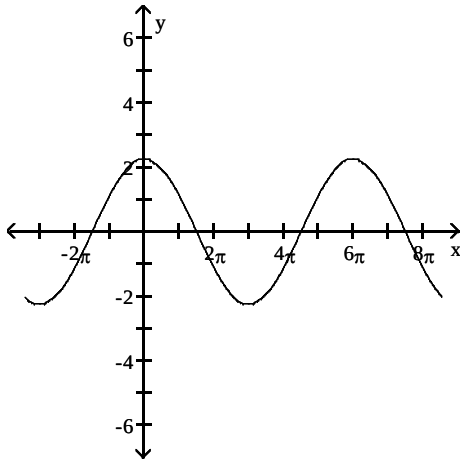
1) D
2) C
3) C
4) 2
5) $\frac{2\pi}{5}$
6) 8π
7) $\frac{3}{4}$
8) $y = 4 \sin\left(\frac{2}{3}x\right)$
9) $0, \pi, 2\pi$
10) 1B, 2D, 3C, 4A
11) 1B, 2D, 3C, 4A
12) 1A, 2C, 3D, 4B
13) $y = 5 \sin\left(\frac{1}{2}x + \frac{1}{8}\pi\right)$
14) $y = 2 \sin(2x - 7)$
15) $y = 5 \sin\left(\frac{1}{3}x - \frac{1}{18}\pi\right)$
16) $\frac{\pi}{2}$ units to the right
17) $\frac{\pi}{4}$ units to the right
18) π units to the left
19) $\frac{\pi}{4}$ units to the right
20) (i) $\frac{1}{2}$ (ii) $-\frac{3\pi}{4}$ (iii) $\frac{\pi}{2}$
21)



22)



23)



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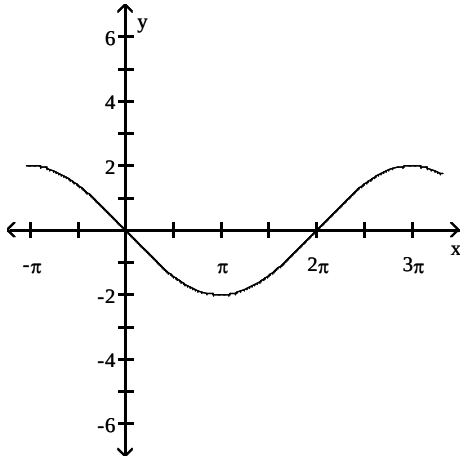

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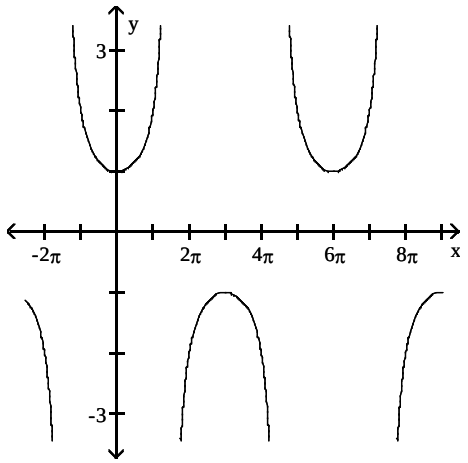
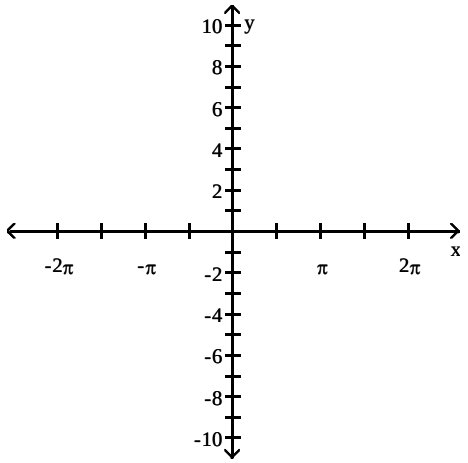
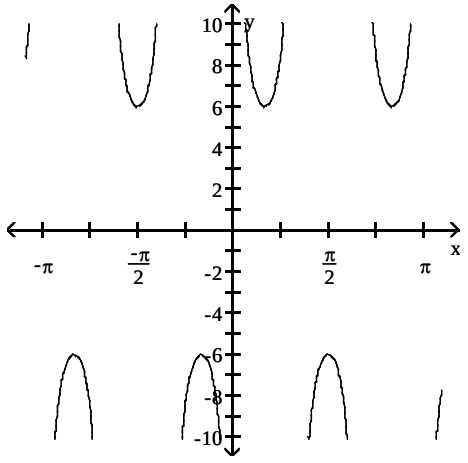

y
3
-3
-2π
2π
4π
6π
8π
x

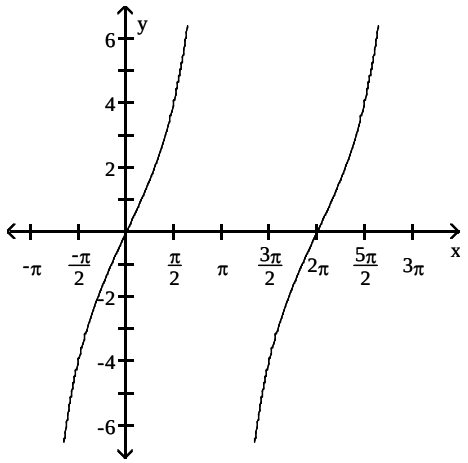
26)


y
10
8
6
4
2
-2
-4
-6
-8
-10
-2π
-π
π
2π
x

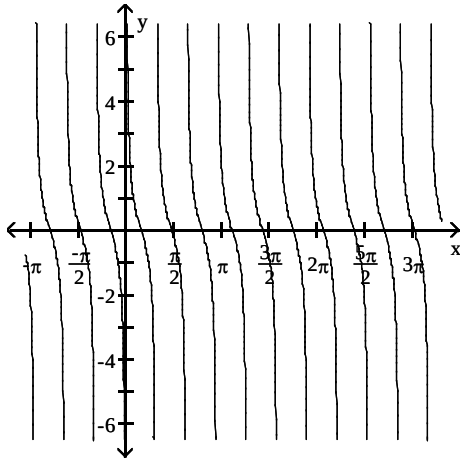
27)


y
10
8
6
4
2
-2
-4
-6
-8
-10
-π
$\frac{-\pi}{2}$
$\frac{\pi}{2}$
π
x

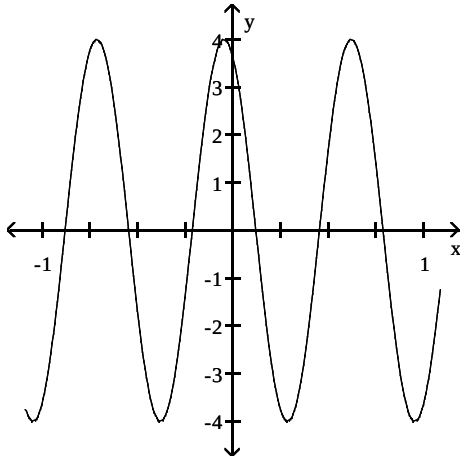
28)


y
6
4
2
-2
-4
-6
x
-π
-π/2
π/2
π
3π/2
2π
5π/2
3π

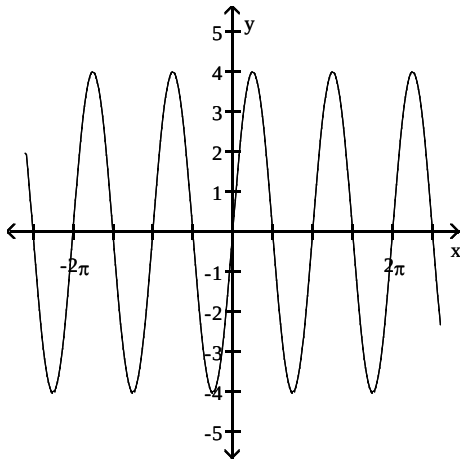
29)


y
6
4
2
-2
-4
-6
x
-π/2
π/2
π
3π/2
2π
5π/2
3π

30)


y
4
3
2
1
-1
-2
-3
-4
x
-1
1

31)



32)