

Trigonometry

Review Test 1

Convert the angle to a decimal in degrees. Round the answer to two decimal places.

1) $22^{\circ}54'35''$

2) $21^{\circ}17'34''$

Convert the angle to $D^{\circ} M' S''$ form. Round the answer to the nearest second.

3) 183.82°

If s denotes the length of the arc of a circle of radius r subtended by a central angle θ , find the missing quantity. Round to one decimal place, if necessary.

4) $r = 12.17$ centimeters, $\theta = 1.8$ radians, $s = ?$

5) $r = \frac{1}{3}$ feet, $s = 5$ feet, $\theta = ?$

Solve the problem.

6) For a circle of radius 4 feet, find the arc length s subtended by a central angle of 60° . Round to the nearest hundredth.

7) The minute hand of a clock is 3 inches long. How far does the tip of the minute hand move in 10 minutes? If necessary, round the answer to two decimal places.

Convert the angle in degrees to radians. Express the answer as multiple of π .

8) 36°

9) 87°

Convert the angle in radians to degrees.

10) $\frac{12\pi}{7}$

11) $\frac{23}{9}\pi$

If A denotes the area of the sector of a circle of radius r formed by the central angle θ , find the missing quantity. If necessary, round the answer to two decimal places.

12) $\theta = \frac{\pi}{6}$ radians, $A = 62$ square meters, $r = ?$

13) $r = 36.8$ feet, $\theta = 15.795^{\circ}$, $A = ?$

Solve the problem.

14) An irrigation sprinkler in a field of lettuce sprays water over a distance of 25 feet as it rotates through an angle of 135° . What area of the field receives water? If necessary, round the answer to two decimal places.

15) An object is traveling around a circle with a radius of 10 meters. If in 15 seconds a central angle of 3 radians is swept out, what is the linear speed of the object?

16) A wheel of radius 8.3 feet is moving forward at 19 feet per second. How fast is the wheel rotating?

Use identities to find the exact value of the indicated trigonometric function of the acute angle θ .

17) $\sin \theta = \frac{\sqrt{5}}{3}$, $\cos \theta = \frac{2}{3}$ Find $\tan \theta$.

18) $\sin \theta = \frac{2\sqrt{2}}{3}$, $\cos \theta = \frac{1}{3}$ Find $\cot \theta$.

19) $\sin \theta = \frac{1}{4}$, $\cos \theta = \frac{\sqrt{15}}{4}$ Find $\csc \theta$.

Use Fundamental Identities to find the exact value of the expression. Do not use a calculator.

20) $\sec^2 25^{\circ} - \tan^2 25^{\circ}$

21) $\tan 55^{\circ} - \frac{\sin 55^{\circ}}{\cos 55^{\circ}}$

Use the definition or identities to find the exact value of the indicated trigonometric function of the acute angle θ .

22) $\sin \theta = \frac{4}{5}$ Find $\csc \theta$.

23) $\cos \theta = \frac{4}{5}$ Find $\cot \theta$.

24) $\tan \theta = \sqrt{3}$ Find $\sin \theta$.

25) $\sec \theta = \frac{5}{3}$ Find $\cot \theta$.

26) $\tan \theta = \frac{7}{\sqrt{15}}$ Find $\sin \theta$ and $\cos \theta$.

Use Fundamental Identities and/or the Complementary Angle Theorem to find the exact value of the expression. Do not use a calculator.

27) $\tan 5^\circ - \frac{\cos 85^\circ}{\cos 5^\circ}$

28) $\cos 30^\circ \sin 60^\circ + \sin 30^\circ \cos 60^\circ$

A point on the terminal side of angle θ is given. Find the exact value of the indicated trigonometric function.

29) (12, 16) Find $\cos \theta$.

30) (-20, 48) Find $\sin \theta$.

31) (-3, -2) Find $\sec \theta$.

32) (4, -2) Find $\sin \theta$.

Use a coterminal angle to find the exact value of the expression. Do not use a calculator.

33) $\tan -330^\circ$

34) $\sin \frac{7\pi}{3}$

Name the quadrant in which the angle θ lies.

35) $\sin \theta > 0, \cos \theta < 0$

36) $\tan \theta < 0, \sin \theta < 0$

Find the reference angle of the given angle.

37) 111°

38) $\frac{7\pi}{6}$

Use the reference angle to find the exact value of the expression. Do not use a calculator.

39) $\tan 570^\circ$

40) $\sin \frac{5\pi}{3}$

41) $\sec \frac{-5\pi}{4}$

Find the exact value of the indicated trigonometric function of θ .

42) $\cos \theta = \frac{2}{5}, \tan \theta < 0$ Find $\sin \theta$.

43) $\sec \theta = \frac{9}{2}, \theta$ in quadrant IV Find $\tan \theta$.

44) $\sin \theta = -\frac{4}{7}, \tan \theta > 0$ Find $\sec \theta$.

45) $\cos \theta = \frac{24}{25}, \frac{3\pi}{2} < \theta < 2\pi$ Find $\cot \theta$.

The point P on the unit circle that corresponds to a real number t is given. Find the indicated trigonometric function.

46) $\left(-\frac{\sqrt{7}}{4}, \frac{3}{4}\right)$ Find $\cos t$.

47) $\left(-\frac{\sqrt{7}}{4}, -\frac{3}{4}\right)$ Find $\cot t$.

Use the fact that the trigonometric functions are periodic to find the exact value of the expression. Do not use a calculator.

48) $\tan 750^\circ$

49) $\sin \frac{16\pi}{3}$

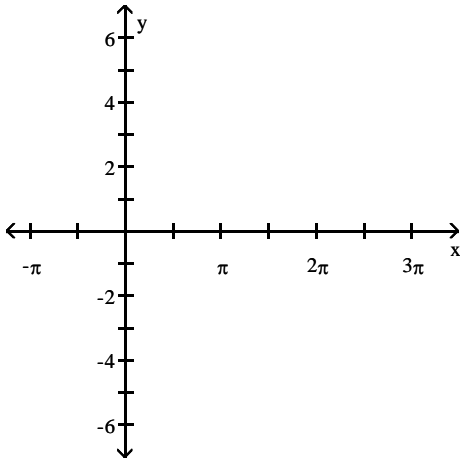
Use the even-odd properties to find the exact value of the expression. Do not use a calculator.

50) $\cos(-30^\circ)$

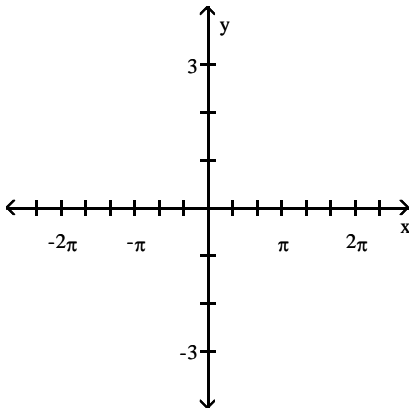
51) $\sin\left(-\frac{\pi}{4}\right)$

Use transformations to graph the function.

52) $y = \sin(\pi x)$



53) $y = -3 \cos(3x)$



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

54) $y = 3 \sin x$ Find the amplitude.

55) $y = \sin(3x)$ Find the period.

56) $y = \cos(3x)$ Find the period.

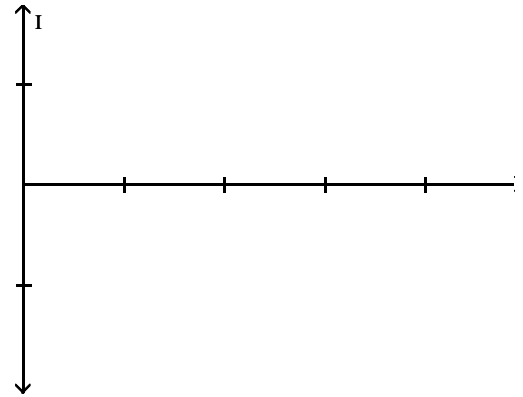
57) $y = 5 \cos\left(\frac{1}{4}x\right)$ Find the amplitude.

Solve the problem.

58) The current I , in amperes, flowing through an ac (alternating current) circuit at time t , in seconds, is

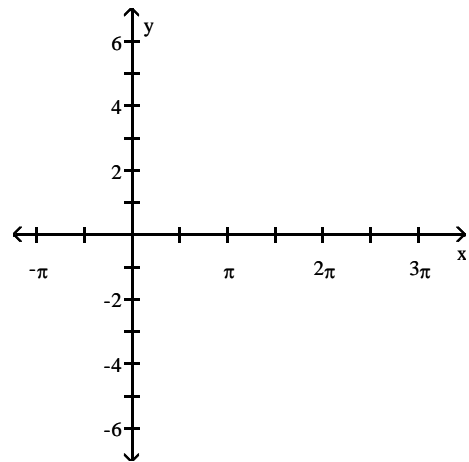
$$I = 30 \sin(50\pi t)$$

What is the amplitude? What is the period? Graph this function over two periods beginning at $t = 0$.

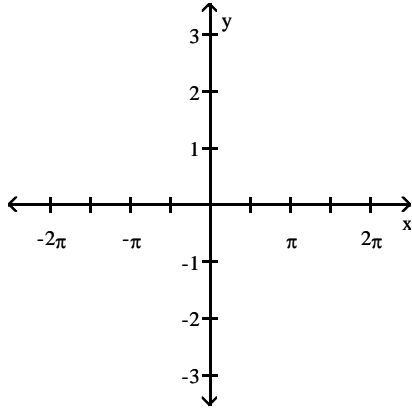


Graph the sinusoidal function using key points.

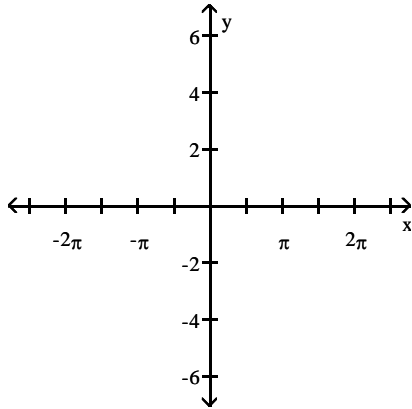
59) $y = 2 \sin(3x)$



60) $y = \sin x - 2$

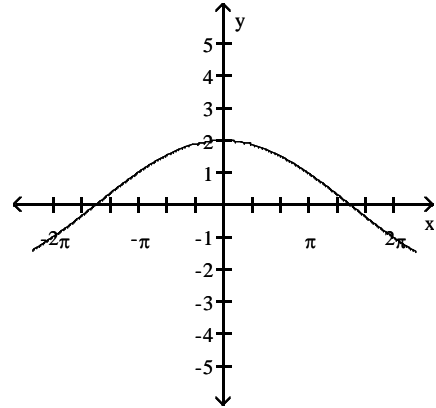


61) $y = -4 \sin\left(\frac{1}{2}x\right) + 2$

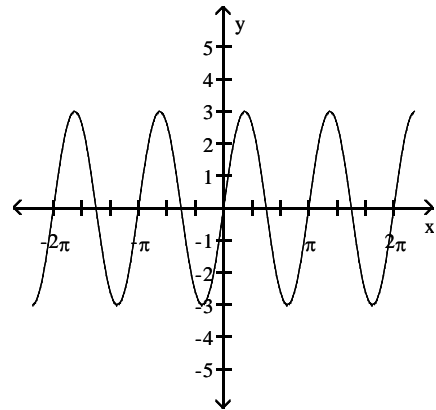


Find an equation for the graph.

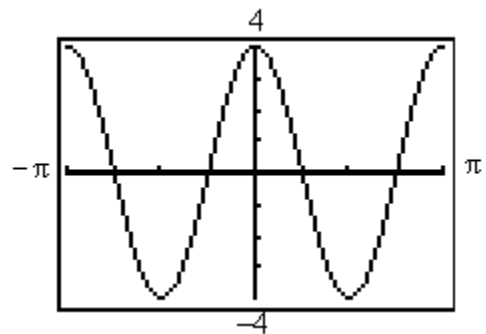
64)



65)



66)



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

62) Amplitude: 3
Period: 4π

63) Amplitude: 3
Period: 6

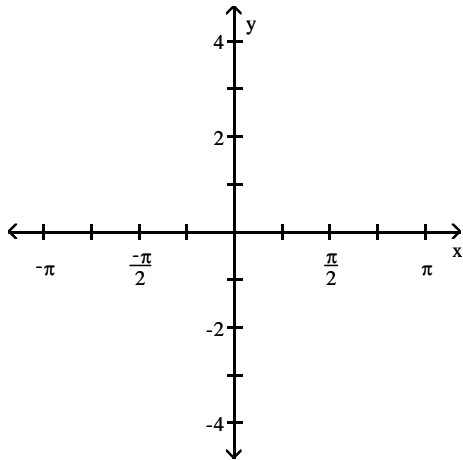
Solve the problem.

67) What is the y-intercept of $y = \cot x$?

68) For what numbers x , $-2\pi \leq x \leq 2\pi$, does the graph of $y = \tan x$ have vertical asymptotes.?

Graph the function.

$$69) y = \frac{1}{2} \tan x$$



Find (i) the amplitude, (ii) the period, and (iii) the phase shift.

$$70) y = -\frac{1}{2} \sin(4x + 3\pi)$$

$$71) y = -\frac{1}{2} \cos(2x - 2\pi)$$

Find the amplitude.

$$72) y = -2 \cos(4x - \pi)$$

Find the period.

$$73) y = 5 \sin\left(8x + \frac{\pi}{2}\right)$$

Find the phase shift.

$$74) y = 5 \sin\left(2x - \frac{\pi}{2}\right)$$

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

$$75) \text{ Amplitude: } 5$$

$$\text{Period: } 3\pi$$

$$\text{Phase Shift: } \frac{\pi}{3}$$

$$76) \text{ Amplitude: } 2$$

$$\text{Period: } 6\pi$$

$$\text{Phase Shift: } -\frac{\pi}{6}$$

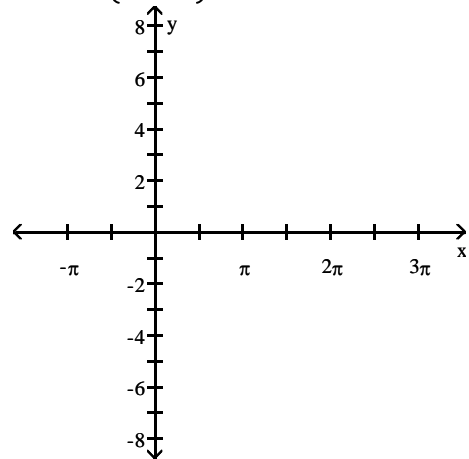
$$77) \text{ Amplitude: } 2$$

$$\text{Period: } \pi$$

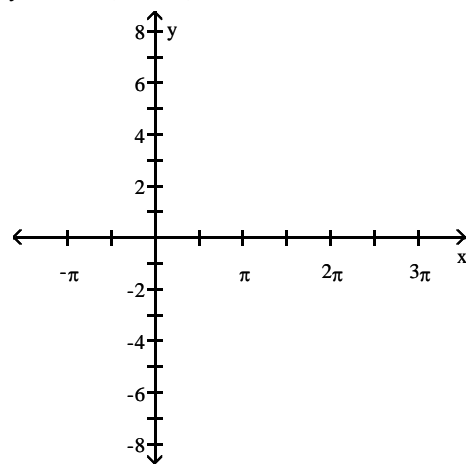
$$\text{Phase Shift: } -3$$

Graph the function. Show at least one period.

$$78) y = 2 \cos\left(4x + \frac{\pi}{2}\right)$$



$$79) y = 2 \sin(\pi x + 4)$$



Solve the problem.

- 80) An experiment in a wind tunnel generates cyclic waves. The following data is collected for 44 seconds:

| Time (in seconds) | Wind speed (in feet per second) |
|----------------------|------------------------------------|
| 0 | 13 |
| 11 | 42 |
| 22 | 71 |
| 33 | 42 |
| 44 | 13 |

Let V represent the wind speed (velocity) in feet per second and let t represent the time in seconds. Write a sine equation that describes the wave.

- 81) A town's average monthly temperature data is represented in the table below:

| Month, x | Average Monthly Temperature, °F |
|--------------|------------------------------------|
| January, 1 | 33.6 |
| February, 2 | 37.2 |
| March, 3 | 46.4 |
| April, 4 | 60.8 |
| May, 5 | 74.7 |
| June, 6 | 83.6 |
| July, 7 | 88.3 |
| August, 8 | 85.6 |
| September, 9 | 85.6 |
| October, 10 | 60.0 |
| November, 11 | 48.2 |
| December, 12 | 37.5 |

Find a sinusoidal function of the form $y = A \sin(\omega x - \phi) + B$ that fits the data.

Answer Key

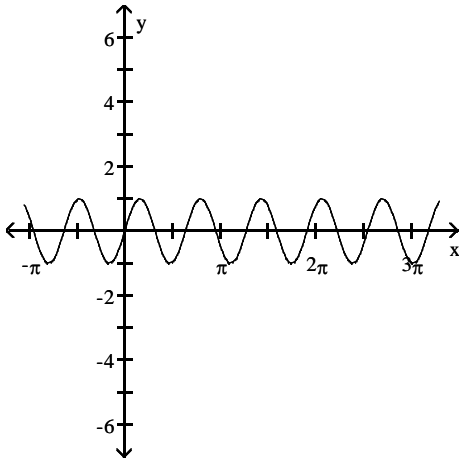
Testname: REVIEW TEST 1

- 1) 22.91°
- 2) 21.29°
- 3) $183^\circ 49' 12''$
- 4) 21.9 cm
- 5) 15 radians
- 6) 4.19 ft
- 7) 3.14 in.
- 8) $\frac{\pi}{5}$
- 9) $\frac{29\pi}{60}$
- 10) 308.57°
- 11) 460°
- 12) 15.39 m
- 13) 186.67 ft^2
- 14) 736.31 ft^2
- 15) 2 m/sec
- 16) 2.3 radians/sec
- 17) $\frac{\sqrt{5}}{2}$
- 18) $\frac{\sqrt{2}}{4}$
- 19) 4
- 20) 1
- 21) 0
- 22) $\frac{5}{4}$
- 23) $\frac{4}{3}$
- 24) $\frac{\sqrt{3}}{2}$
- 25) $\frac{3}{4}$
- 26) $\sin \theta = \frac{7}{8}, \cos \theta = \frac{\sqrt{15}}{8}$
- 27) 0
- 28) 1
- 29) $\frac{3}{5}$
- 30) $\frac{12}{13}$
- 31) $-\frac{\sqrt{13}}{3}$
- 32) $-\frac{\sqrt{5}}{5}$
- 33) $\frac{\sqrt{3}}{3}$
- 34) $\frac{\sqrt{3}}{2}$
- 35) II
- 36) IV
- 37) 69°
- 38) $\frac{\pi}{6}$
- 39) $\frac{\sqrt{3}}{3}$
- 40) $-\frac{\sqrt{3}}{2}$
- 41) $-\sqrt{2}$
- 42) $-\frac{\sqrt{21}}{5}$
- 43) $-\frac{\sqrt{77}}{2}$
- 44) $-\frac{7\sqrt{33}}{33}$
- 45) $-\frac{24}{7}$
- 46) $-\frac{\sqrt{7}}{4}$
- 47) $\frac{\sqrt{7}}{3}$
- 48) $\frac{\sqrt{3}}{3}$
- 49) $-\frac{\sqrt{3}}{2}$
- 50) $\frac{\sqrt{3}}{2}$
- 51) $-\frac{\sqrt{2}}{2}$

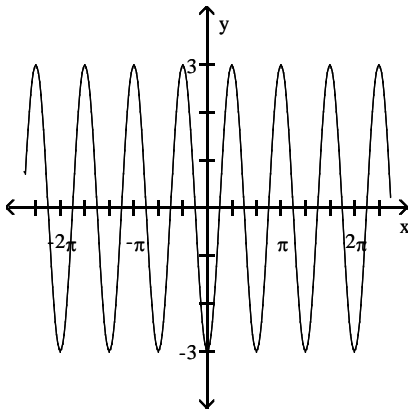
Answer Key

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52)



53)



54) 3

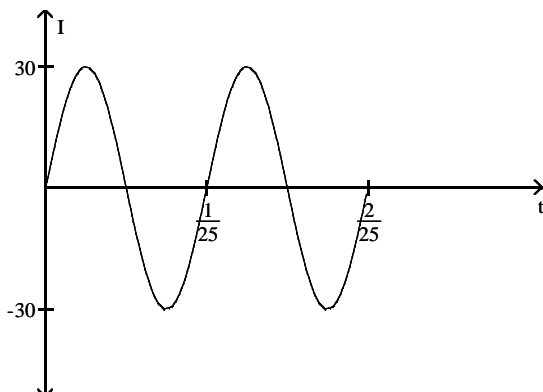
55) $\frac{2\pi}{3}$

56) $\frac{2\pi}{3}$

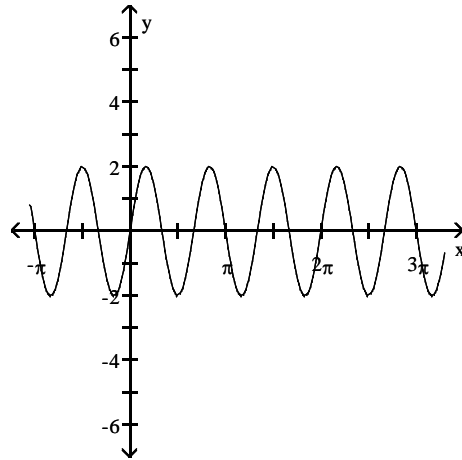
57) 5

58) amplitude = 30, period = $\frac{1}{25}$

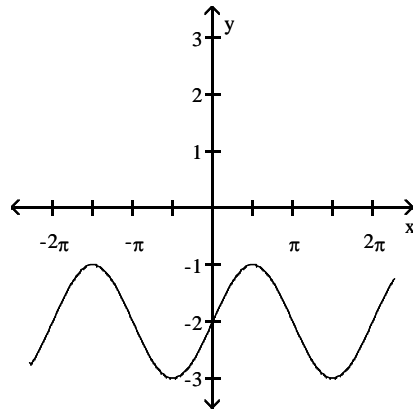
$$I = 30\sin(50\pi t)$$



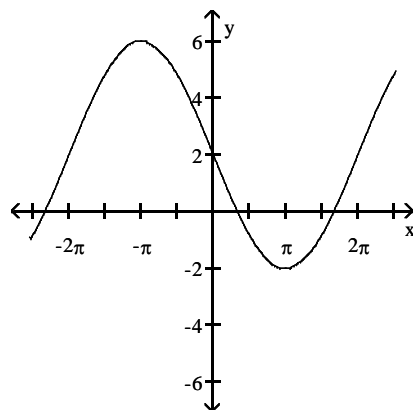
59)



60)



61)



62) $y = 3 \sin\left(\frac{1}{2}x\right)$

63) $y = 3 \sin\left(\frac{1}{3}\pi x\right)$

64) $y = 2 \cos\left(\frac{1}{3}x\right)$

65) $y = 3 \sin(2x)$

66) $y = 4 \cos(2x)$

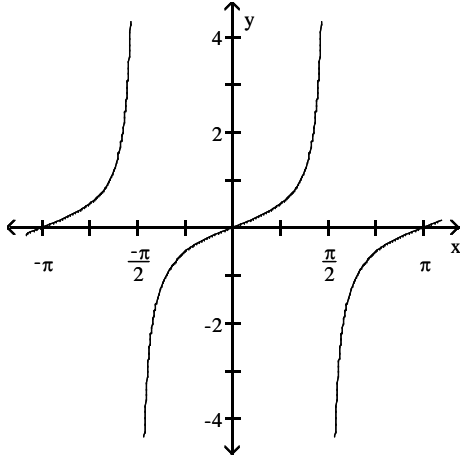
67) none

Answer Key

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68) $-\frac{3\pi}{2}, -\frac{\pi}{2}, \frac{\pi}{2}, \frac{3\pi}{2}$

69)



70) (i) $\frac{1}{2}$ (ii) $\frac{\pi}{2}$ (iii) $-\frac{3\pi}{4}$

71) (i) $\frac{1}{2}$ (ii) π (iii) π

72) 2

73) $\frac{\pi}{4}$

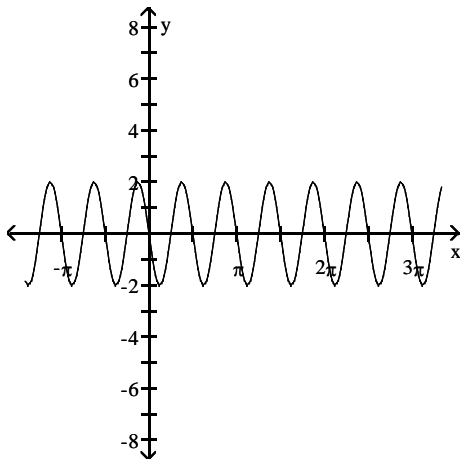
74) $\frac{\pi}{4}$ units to the right

75) $y = 5 \sin\left(\frac{2}{3}x - \frac{2}{9}\pi\right)$

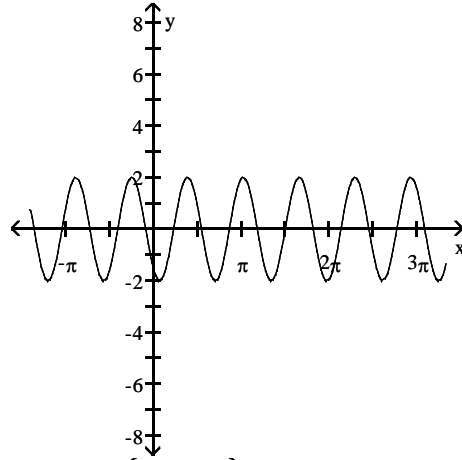
76) $y = 2 \sin\left(\frac{1}{3}x + \frac{1}{18}\pi\right)$

77) $y = 2 \sin(2x + 6)$

78)



79)



80) $V = 29 \sin\left(\frac{\pi}{22}t - \frac{\pi}{2}\right) + 42$

81) $y = 27.35 \sin\left(\frac{\pi}{6}x - \frac{2\pi}{3}\right) + 60.95$