Exam

Name_____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Determine if the function is even, odd, or neither.

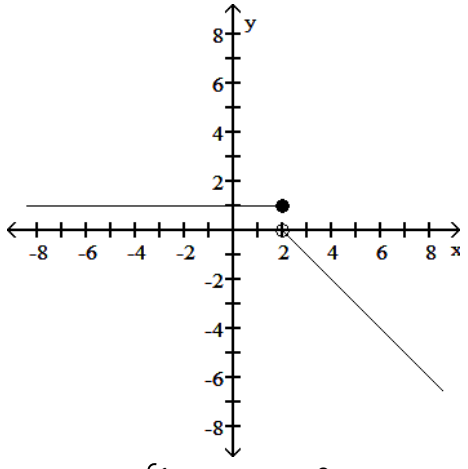
1) $h(t) = \sqrt{t^2 + 3}$ 1) _____

A) Even B) Odd C) Neither

Answer: A
Diff: 0 Type: BI

Find a formula for the function graphed.

2) 2) _____



A) $f(x) = \begin{cases} 1, & x < 2 \\ 2 - x, & x > 2 \end{cases}$

B) $f(x) = \begin{cases} 1, & x < 2 \\ x - 2, & x \geq 2 \end{cases}$

C) $f(x) = \begin{cases} 1, & x < 0 \\ 2 - x, & x \geq 0 \end{cases}$

D) $f(x) = \begin{cases} 1, & x \leq 2 \\ 2 - x, & x > 2 \end{cases}$

Answer: D
Diff: 0 Type: BI

Assume that f is an even function, g is an odd function, and both f and g are defined on the entire real line. State whether the combination of functions (where defined) is even or odd.

3) $f \circ f$ 3) _____

A) Even B) Odd

Answer: A
Diff: 0 Type: BI

Solve for the angle θ, where $0 \le \theta \le 2\pi$

4) $\sin^2\theta = \frac{1}{4}$ 4) _____

A) $\theta = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$

B) $\theta = \frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$

C) $\theta = \frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}$

D) $\theta = 0, \pi, 2\pi$

Answer: A
Diff: 0 Type: BI

One of sin x, cos x, and tan x is given. Find the other two if x lies in the specified interval.

5) $\sin x = -\frac{\sqrt{5}}{3}, \quad x \text{ in } \left[-\frac{\pi}{2}, 0\right]$ 5) _____

A) $\cos x = -\frac{2}{3}, \tan x = \frac{\sqrt{5}}{2}$

B) $\cos x = -\frac{2}{3}, \tan x = -\frac{\sqrt{5}}{2}$

C) $\cos x = \frac{2}{3}, \tan x = \frac{\sqrt{5}}{2}$

D) $\cos x = \frac{2}{3}, \tan x = -\frac{\sqrt{5}}{2}$

Answer: D
Diff: 0 Type: BI

Find the domain and range for the indicated function.

6) $f(x) = \sqrt{x+3}, \quad g(x) = \sqrt{x-3}; \quad f \cdot g$ 6) _____

A) D: $x \ge 3$
R: $y \ge 0$

B) D: $x \ge 3$
R: $-\infty < y < \infty$

C) D: $x \ge 3$
R: $y > 0$

D) D: $x > 3$
R: $y \ge 0$

Answer: A
Diff: 0 Type: BI

Find the domain and range of the function.

7) $g(z) = \frac{-3}{\sqrt{z+1}}$ 7) _____

A) D: $[0,\infty)$, R: $(-\infty,\infty)$

B) D: $(-\infty,-1)$, R: $(0,\infty)$

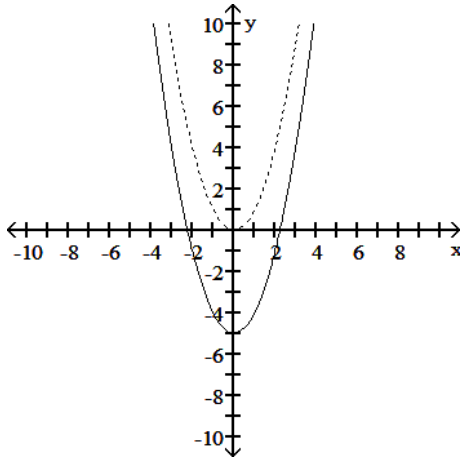
C) D: $[1,\infty)$, R: $(-\infty,\infty)$

D) D: $(-1,\infty)$, R: $(-\infty,0)$

Answer: D
Diff: 0 Type: BI

Solve the problem.

8) The accompanying figure shows the graph of $y = x^2$ shifted to a new position. Write the equation for the new graph. 8) _____



A) $y = (x + 5)^2$ B) $y = x^2 - 5$ C) $y = (x - 5)^2$ D) $y = x^2 + 5$

Answer: B
Diff: 0 Type: BI

Use the appropriate addition formula to find the exact value of the expression.

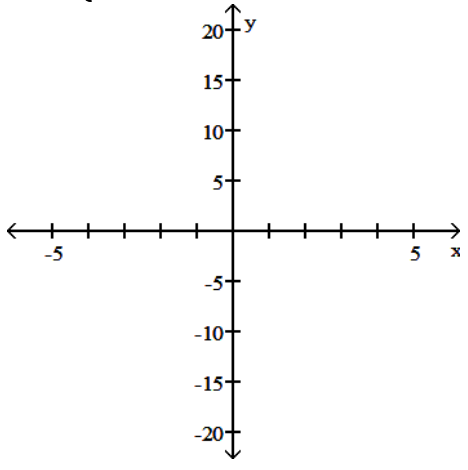
9) $\cos\left(\frac{\pi}{12}\right)$ 9) _____

A) $-\frac{\sqrt{6}+\sqrt{2}}{4}$ B) $\frac{\sqrt{6}-\sqrt{2}}{4}$ C) $\frac{\sqrt{2}-\sqrt{6}}{4}$ D) $\frac{\sqrt{6}+\sqrt{2}}{4}$

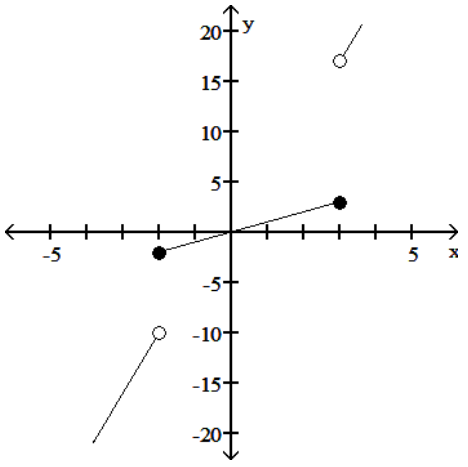
Answer: D
Diff: 0 Type: BI

Graph the function.

10) $f(x) = \begin{cases} 5x + 2, & x < -2 \\ x, & -2 \le x \le 3 \\ 4x - 1, & x > 3 \end{cases}$ 10) _____



A)



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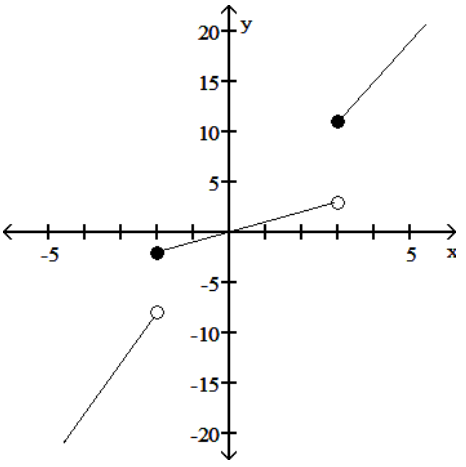

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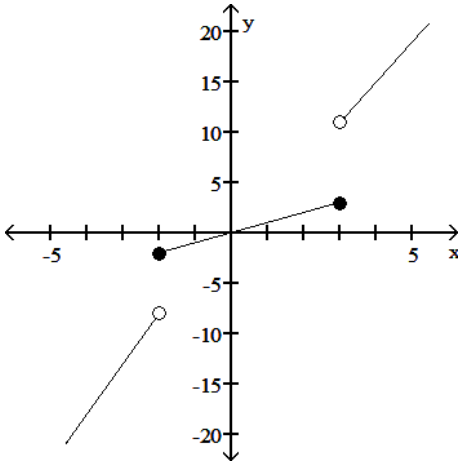
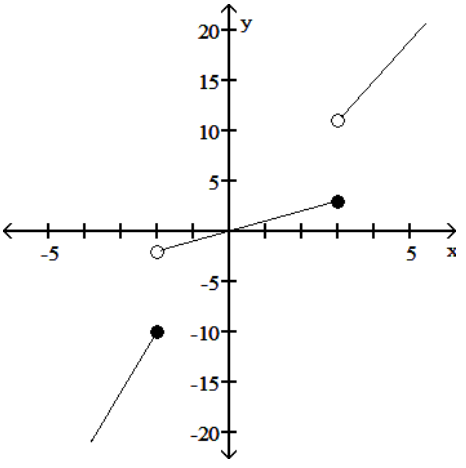
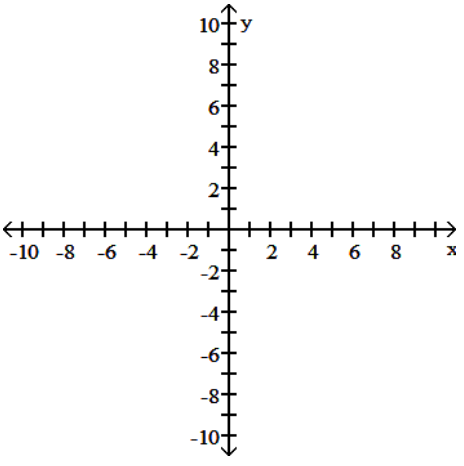


D)

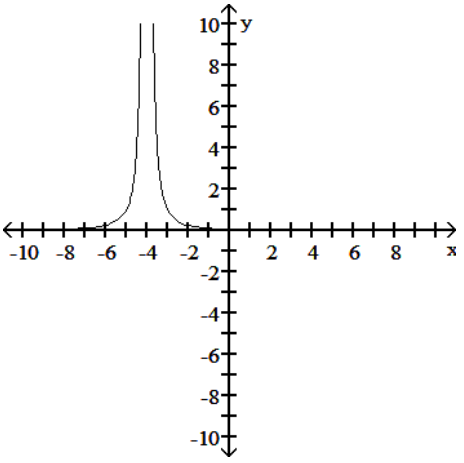


Answer: C
Diff: 0 Type: BI

11) $y = \frac{1}{x^2} + 4$ 11) _____



A)



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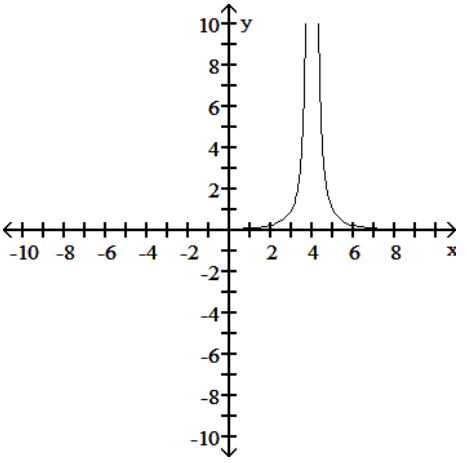

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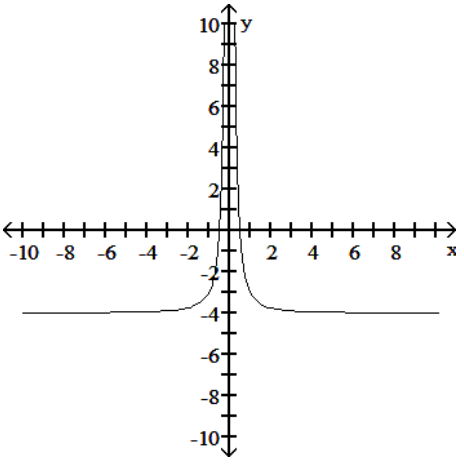
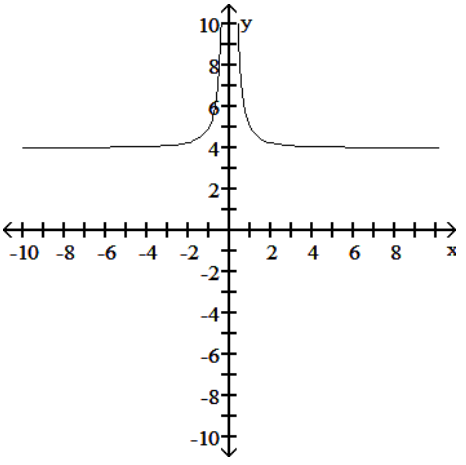


D)



Answer: D
Diff: 0 Type: BI

Find the domain and range for the indicated function.

12) $f(x) = \sqrt{x + 5}$, $g(x) = \sqrt{x - 5}$; g - f 12) _____

A) D: $x \geq -5$
R: $y \geq -\sqrt{10}$

B) D: $x \geq 5$
R: $y \geq \sqrt{10}$

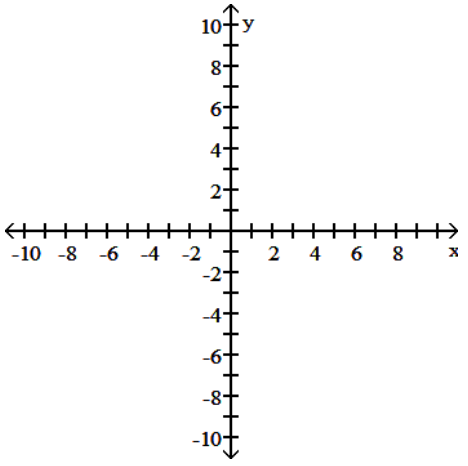
C) D: $x \geq 5$
R: $y \geq -\sqrt{10}$

D) D: $x \geq 5$
R: $y \geq 0$

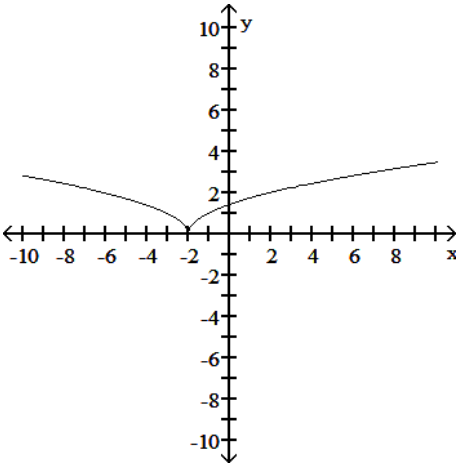
Answer: C
Diff: 0 Type: BI

Graph the function.

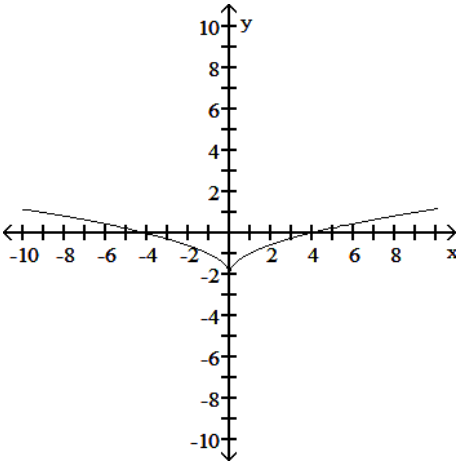
13) $y = \sqrt{|x|} - 2$ 13) _____



A)



B)



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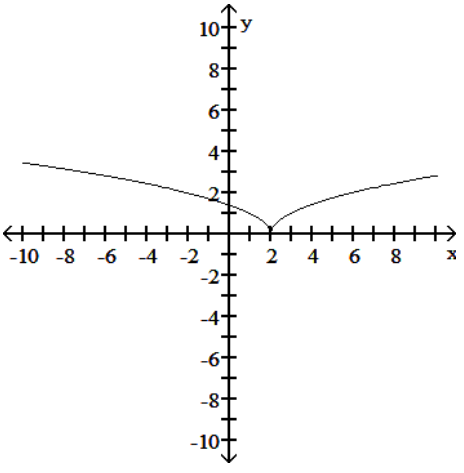
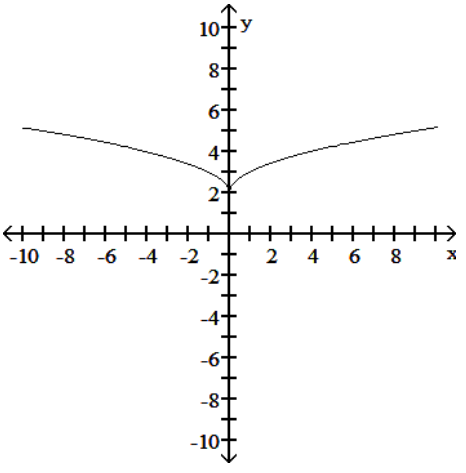


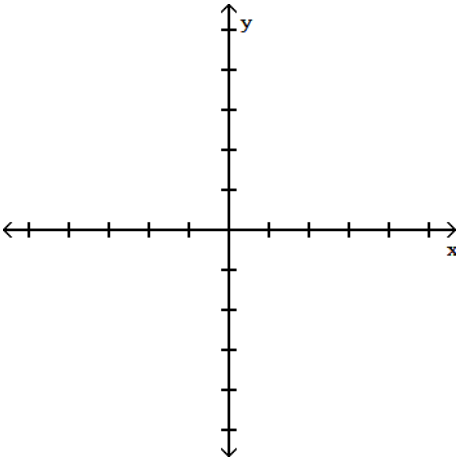
D)



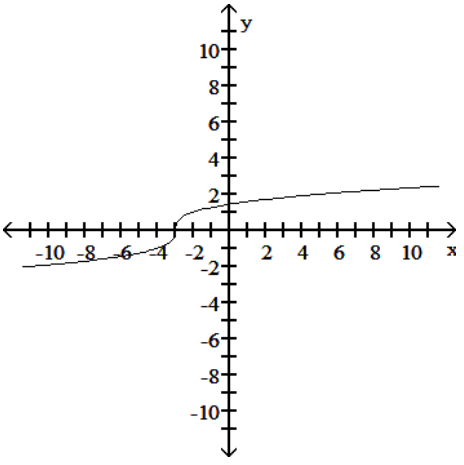
Answer: B
Diff: 0 Type: BI

Determine an appropriate viewing window for the given function and use it to display its graph.

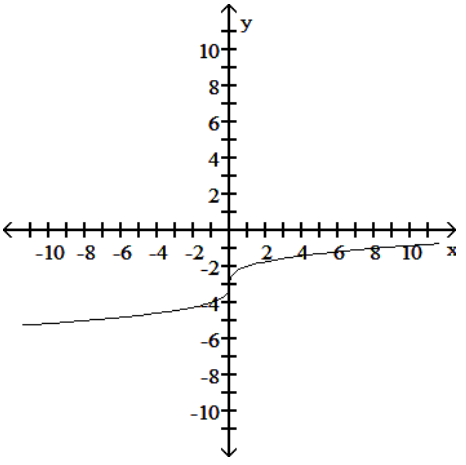
14) $f(x) = \sqrt[3]{x - 3}$ 14) _____



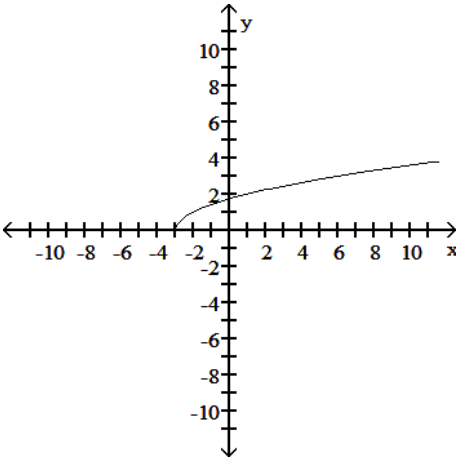
A)



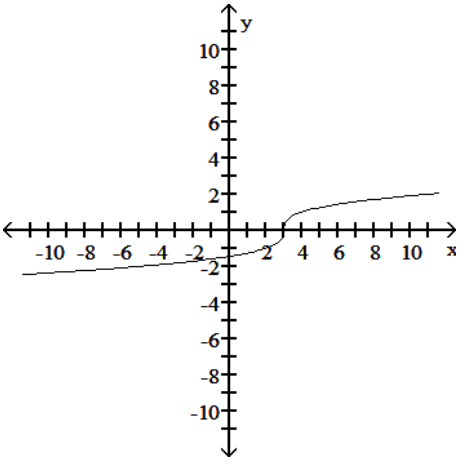
B)



C)

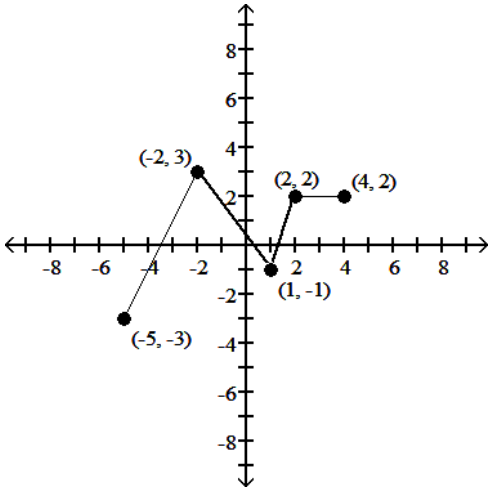


D)

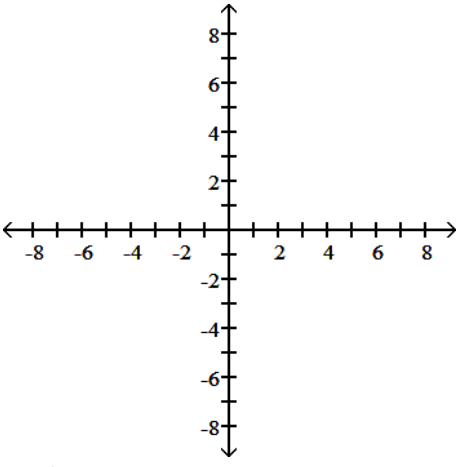


Answer: D
Diff: 0 Type: BI

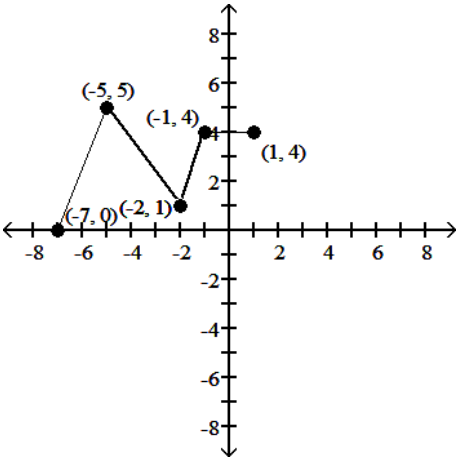
Using the graph below, find the domain and range of the given function, and sketch the graph.



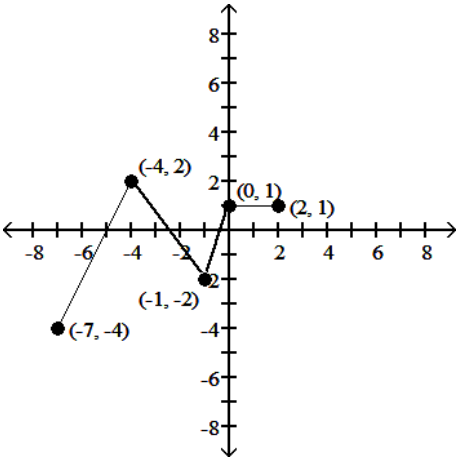
15) y = - f(x) 15) _____



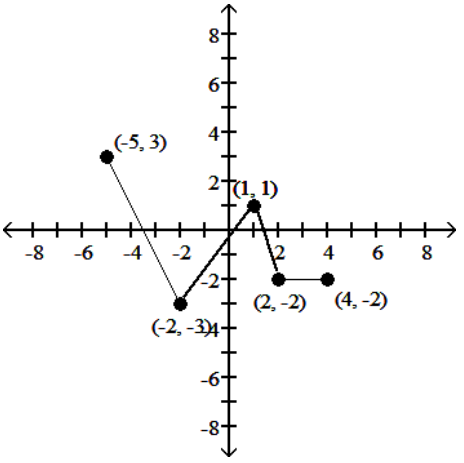
A) D: [-7.5, 1]; R: [-1, 5]



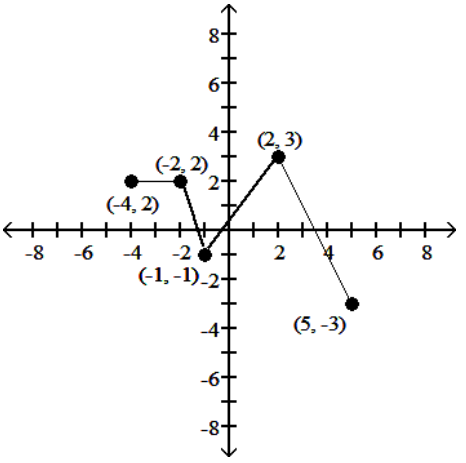
B) D: [-7, 2]; R: [-4, 2]



C) D: [-5, 4]; R: [-3, 3]



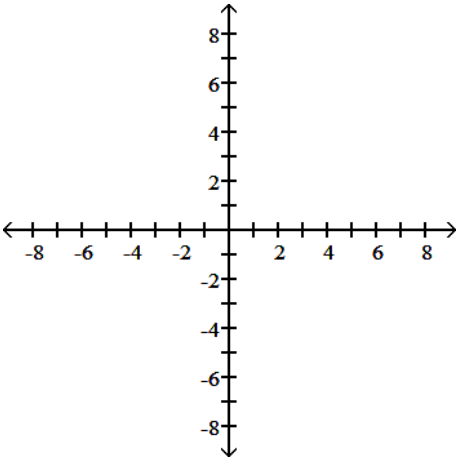
D) D: [-4, 5]; R: [-3, 3]



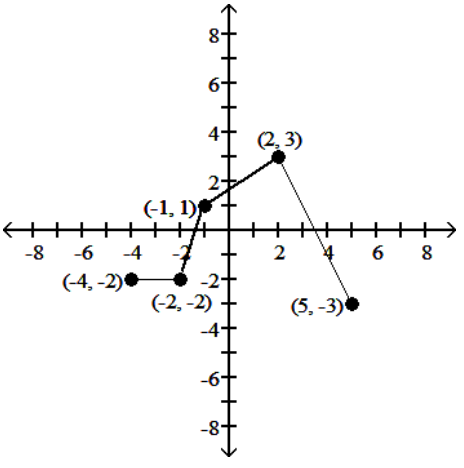
Answer: C
Diff: 0 Type: BI

16) y = f(-x)

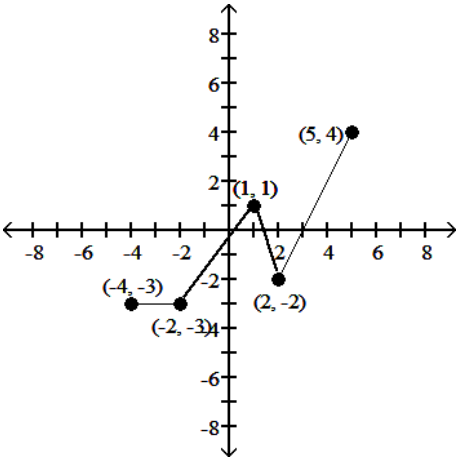
16) _____



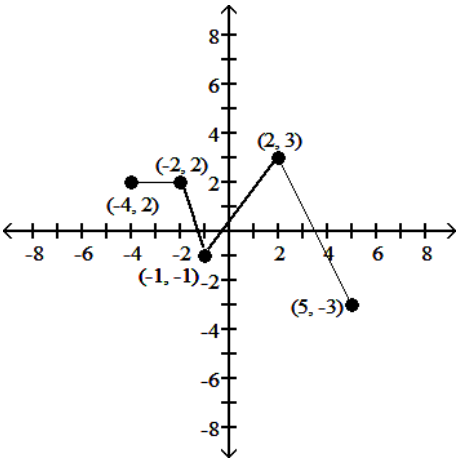
A) D: [-4, 5]; R: [-3, 3]



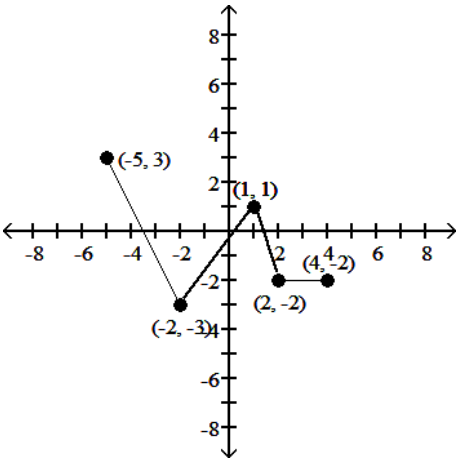
B) D: [-4, 5]; R: [-3, 4]



C) D: [-4, 5]; R: [-3, 3]



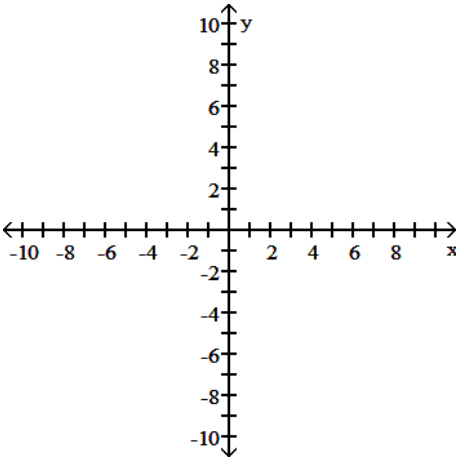
D) D: [-5, 4]; R: [-3, 3]



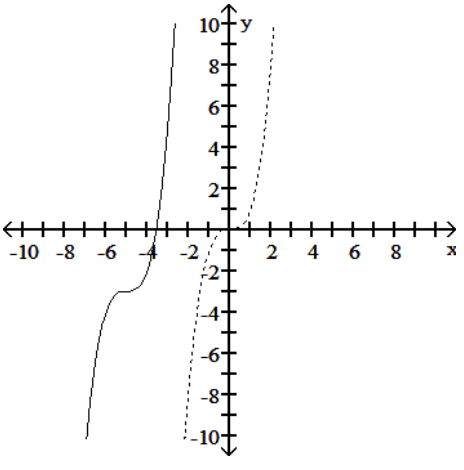
Answer: C
Diff: 0 Type: BI

The problem tells how many units and in what direction the graph of the given equation is to be shifted. Give an equation for the shifted graph. Then sketch the original graph with a dashed line and the shifted graph with a solid line.

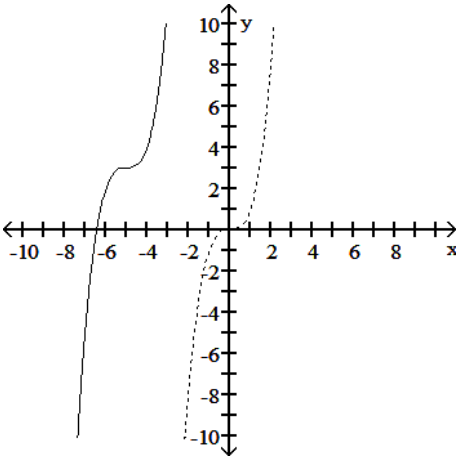
17) $y = x^3$ Down 3, left 5 17) _____



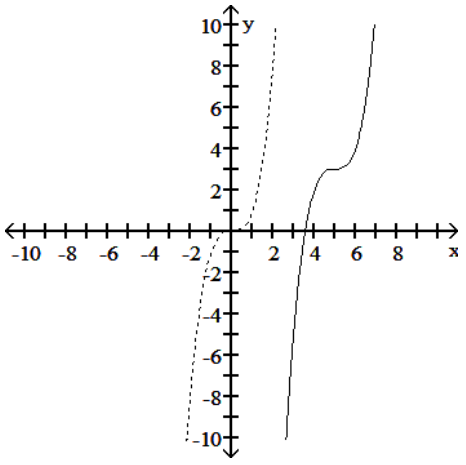
A) $y + 3 = (x + 5)^3$



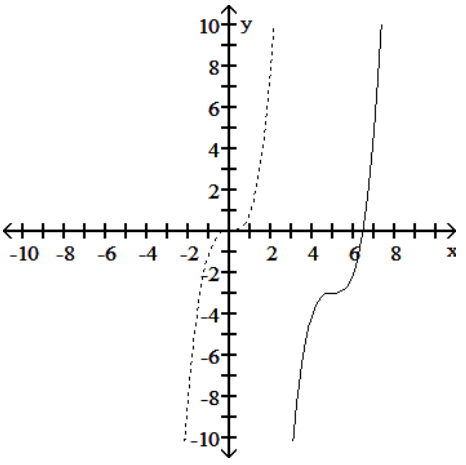
B) $y - 3 = (x + 5)^3$



C) $y - 3 = (x - 5)^3$



D) $y + 3 = (x - 5)^3$



Answer: A
Diff: 0 Type: BI

Use a graphing calculator or computer to determine which of the given viewing windows displays the most appropriate graph of the specified function.

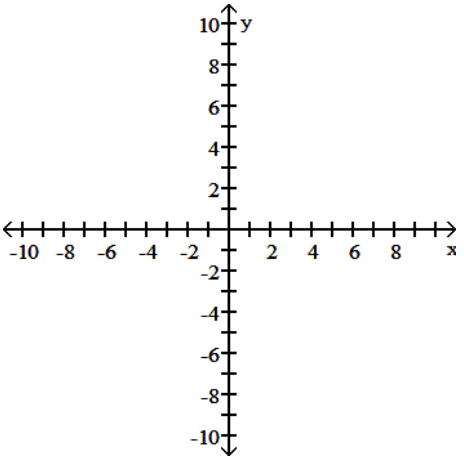
18) $f(x) = x^{2/3}(7 - x)$ 18) _____

A) [-2, 2] by [-15, 15]
B) [-4, 0] by [-5, 5]
C) [-4, 10] by [-10, 10]
D) [0, 10] by [-10, 10]

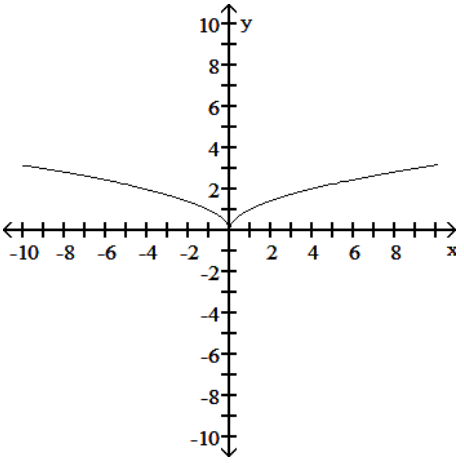
Answer: C
Diff: 0 Type: MC

Find the domain and graph the function.

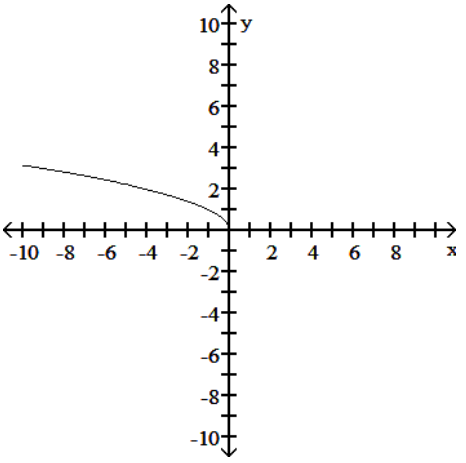
19) $F(x) = \sqrt{-x}$ 19) _____



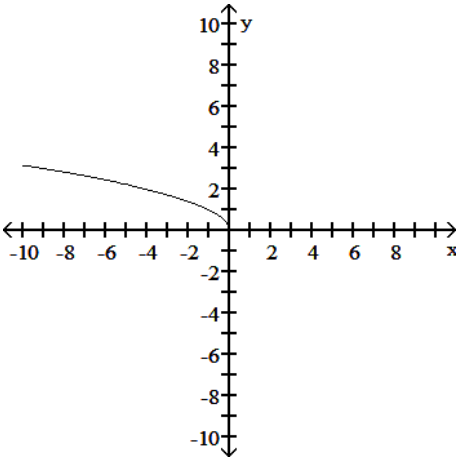
A) D: $(-\infty, \infty)$



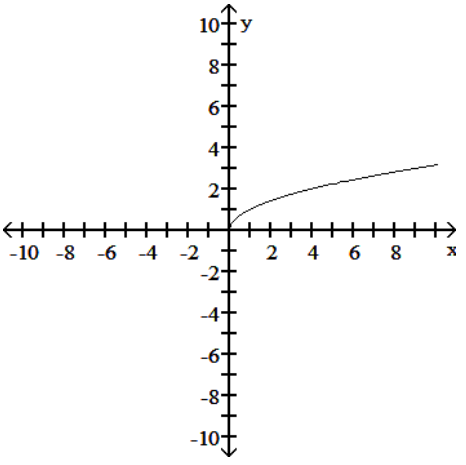
B) D: $(-\infty, 0)$



C) D: $(-\infty, 0]$



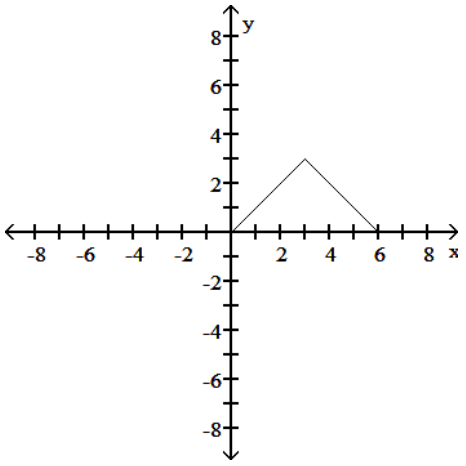
D) D: $[0, \infty)$



Answer: C
Diff: 0 Type: BI

Find a formula for the function graphed.

20) 20) _____



A) $f(x) = \begin{cases} 6 - x, & 0 \le x \le 3 \\ x, & 3 < x \le 6 \end{cases}$

B) $f(x) = \begin{cases} x + 6, & 0 \le x \le 3 \\ -x, & 3 < x \le 6 \end{cases}$

C) $f(x) = \begin{cases} -x, & 0 \le x \le 3 \\ x + 6, & 3 < x \le 6 \end{cases}$

D) $f(x) = \begin{cases} x, & 0 \le x \le 3 \\ 6 - x, & 3 < x \le 6 \end{cases}$

Answer: D
Diff: 0 Type: BI

Find the exact value of the trigonometric function. Do not use a calculator or tables.

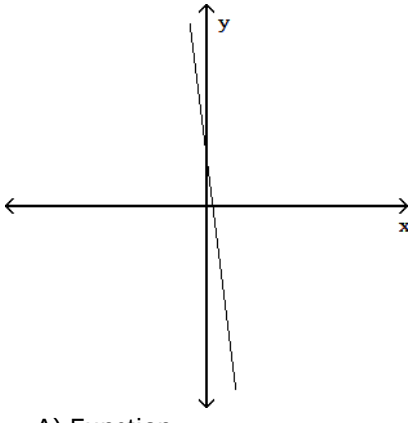
21) $\sin\left(\frac{5\pi}{4}\right)$ 21) _____

A) $-\frac{\sqrt{3}}{2}$ B) $\frac{\sqrt{2}}{2}$ C) $\frac{\sqrt{3}}{2}$ D) $-\frac{\sqrt{2}}{2}$

Answer: D
Diff: 0 Type: BI

Determine whether or not the graph is a graph of a function of x.

22) 22) _____



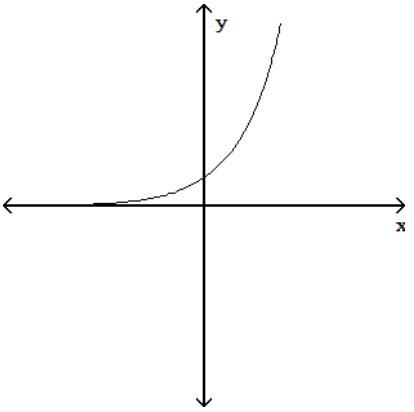
A) Function B) Not a function

Answer: A
Diff: 0 Type: BI

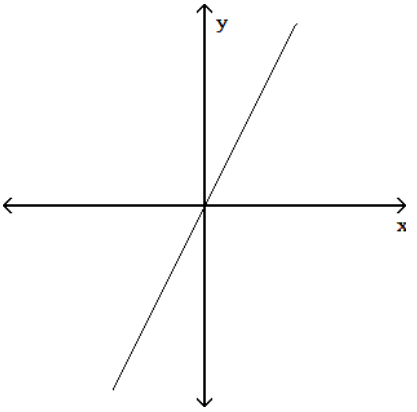
Match the equation with its graph.

23) y = 2x 23) _____

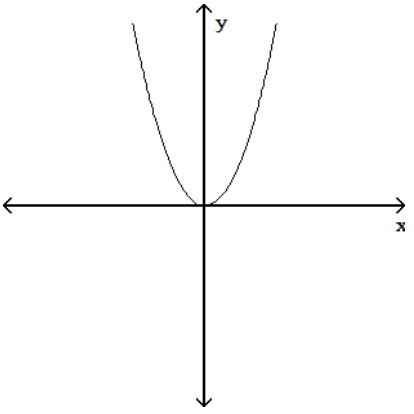
A)



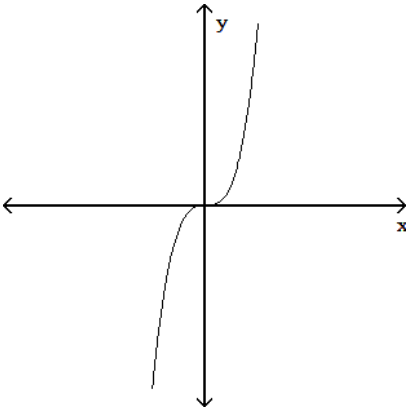
B)



C)



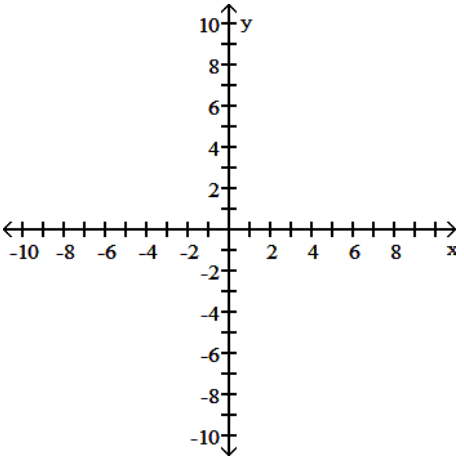
D)



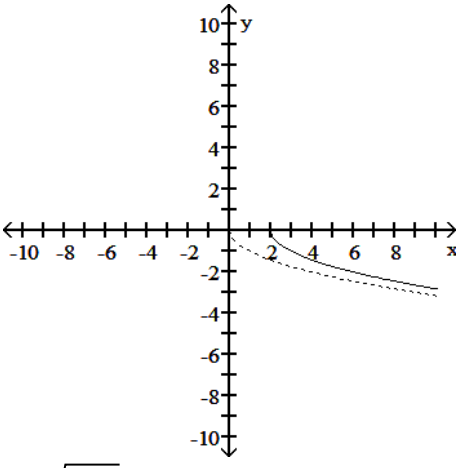
Answer: B
Diff: 0 Type: MC

The problem tells how many units and in what direction the graph of the given equation is to be shifted. Give an equation for the shifted graph. Then sketch the original graph with a dashed line and the shifted graph with a solid line.

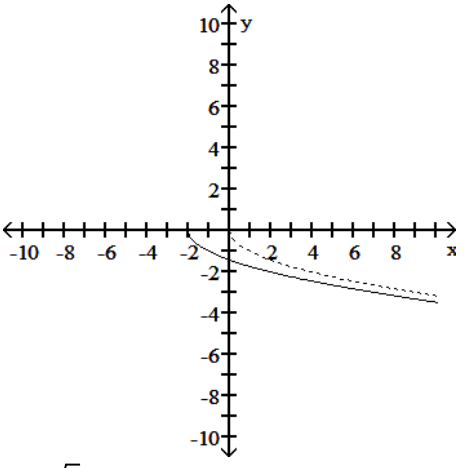
24) $y = -\sqrt{x}$ Left 2 24) _____



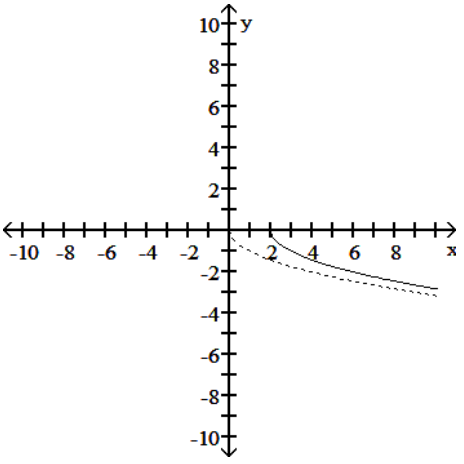
A) $y = \sqrt{x} - 2$



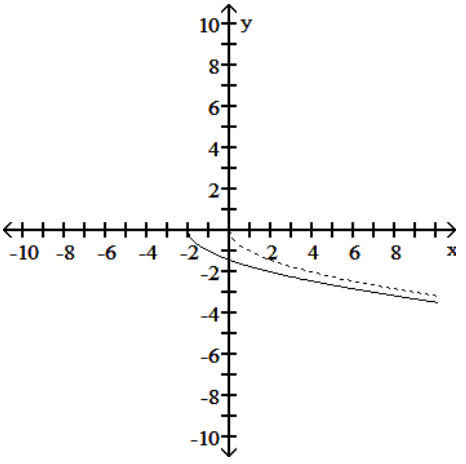
B) $y = \sqrt{x + 2}$



C) $y = \sqrt{x - 2}$



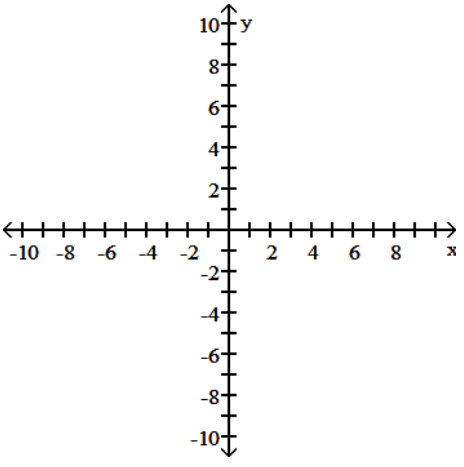
D) $y = \sqrt{x} + 2$



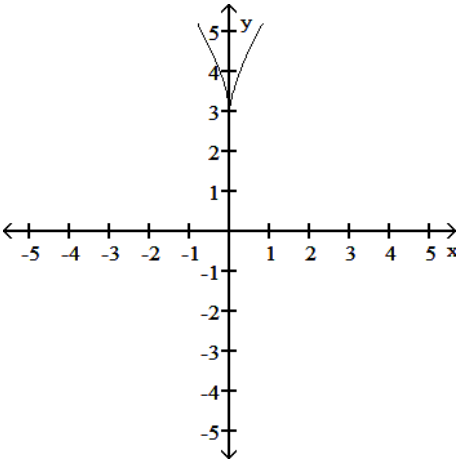
Answer: B
Diff: 0 Type: BI

Graph the function.

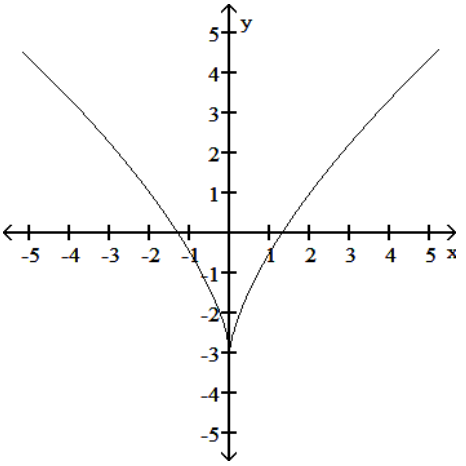
25) $y = (-4x)^{2/3} + 3$ 25) _____



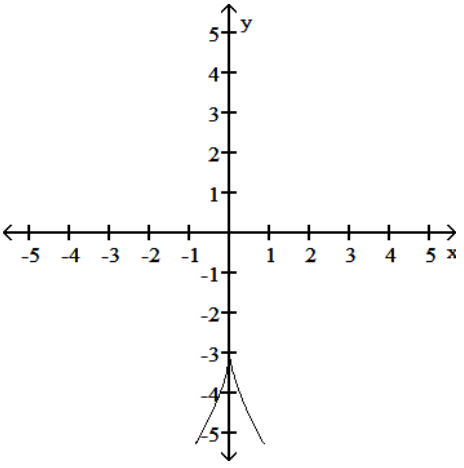
A)



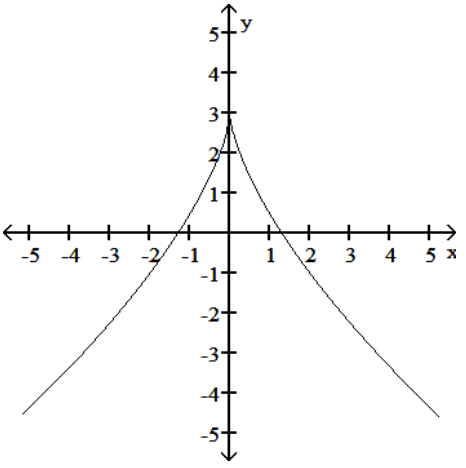
B)



C)



D)



Answer: A
Diff: 0 Type: BI

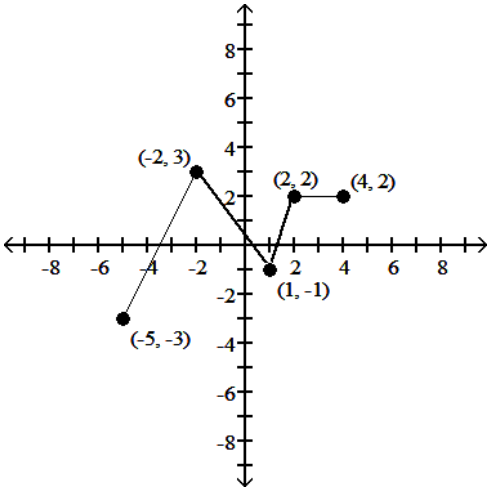
Find the domain and range of the function.

26) $f(x) = -5 + \sqrt{x}$ 26) _____

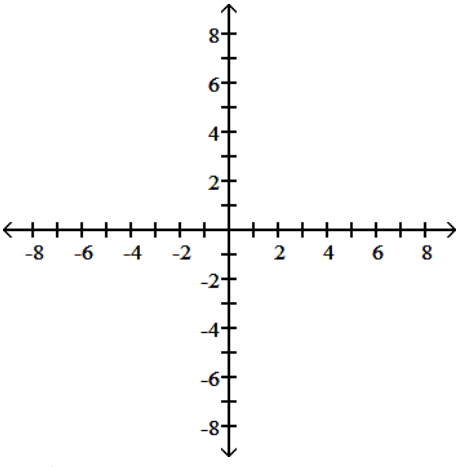
A) D: $(-\infty,0]$, R: $(-\infty,-5]$
B) D: $[0,\infty)$, R: $[-5,\infty)$
C) D: $[0,\infty)$, R: $(-\infty, \infty)$
D) D: $(-\infty, \infty)$, R: $[-5,\infty)$

Answer: B
Diff: 0 Type: BI

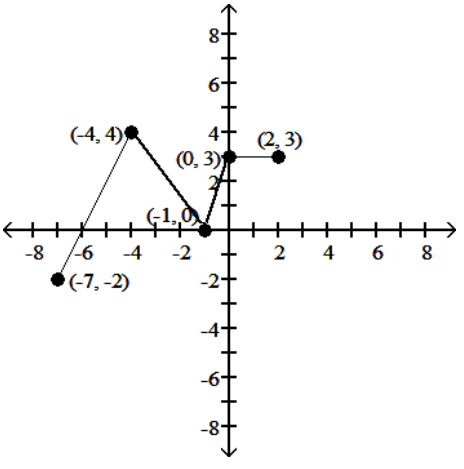
Using the graph below, find the domain and range of the given function, and sketch the graph.



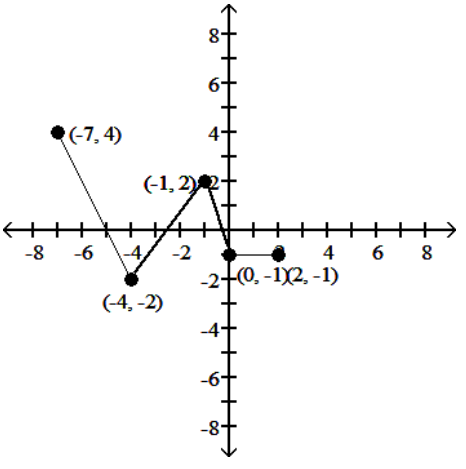
27) $y = f(-x - 2) + 1$ 27) _____



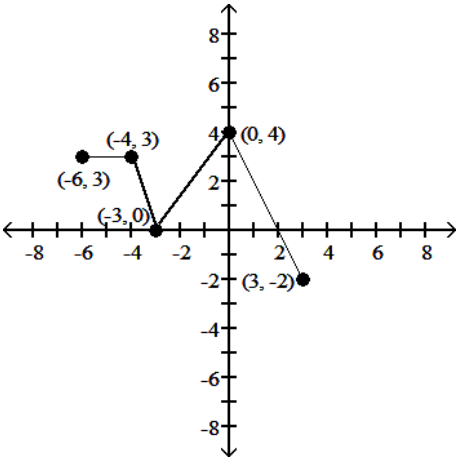
A) D: [-7, 2]; R: [-2, 4]



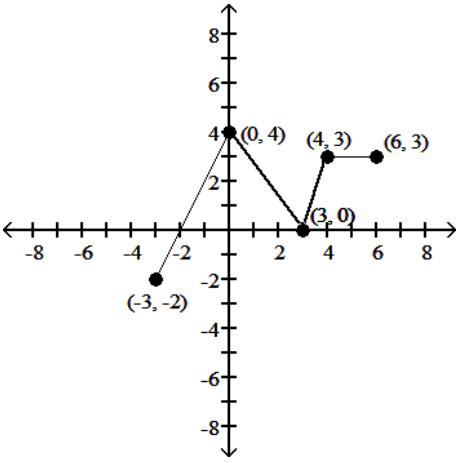
B) D: [-7, 2]; R: [-2, 4]



C) D: [-6, 3]; R: [-2, 4]



D) D: [-3, 6]; R: [-2, 4]



Answer: C
Diff: 0 Type: BI

Solve for the angle θ, where $0 \le \theta \le 2\pi$

28) $\cos^2\theta = \frac{3}{4}$ 28) _____

A) $\theta = \frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}$

B) $\theta = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$

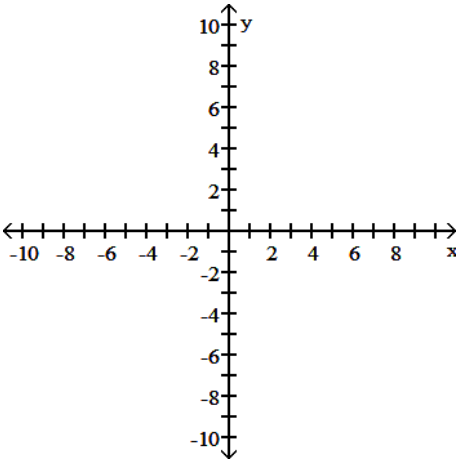
C) $\theta = \frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$

D) $\theta = 0, \pi, 2\pi$

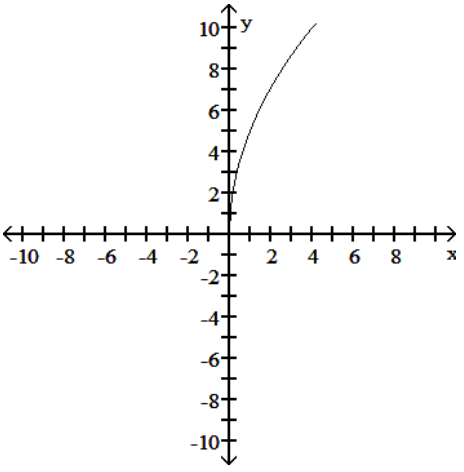
Answer: B
Diff: 0 Type: BI

Graph the function. Determine the symmetry, if any, of the function.

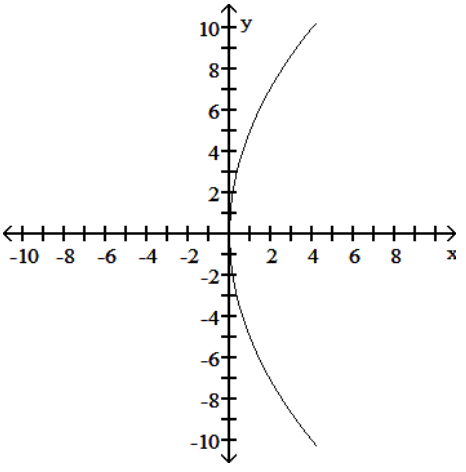
29) $y = -5\sqrt{x}$ 29) _____



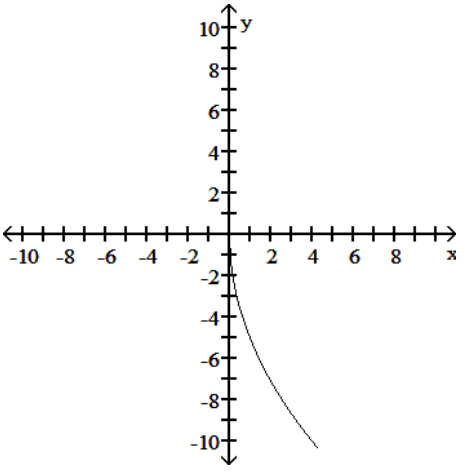
A) No symmetry



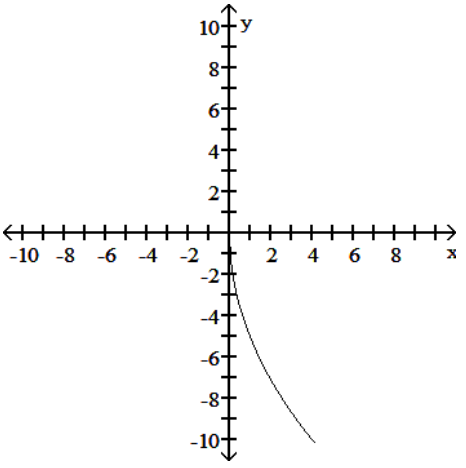
B) Symmetric about the x-axis



C) Symmetric about the x-axis



D) No symmetry



Answer: D
Diff: 0 Type: BI

For

$$f(x) = A \sin\left[\frac{2\pi}{B}(x - C)\right] + D,$$

identify either A, B, C, or D as indicated for the sine function.

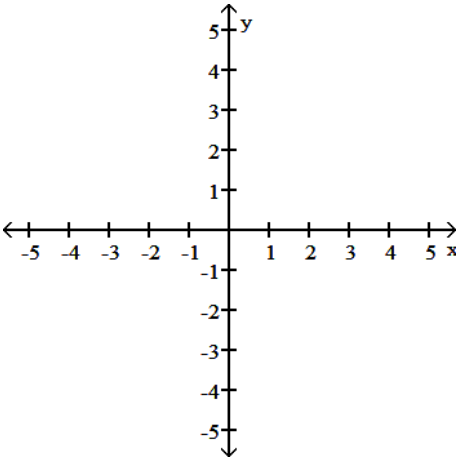
30) $y = \frac{1}{2}\cos(-3\theta - 2\pi)$ Find C. 30) _____

A) $-\frac{2}{3}\pi$ B) $\frac{\pi}{8}$ C) $-\frac{\pi}{8}$ D) $\frac{4}{3}\pi$

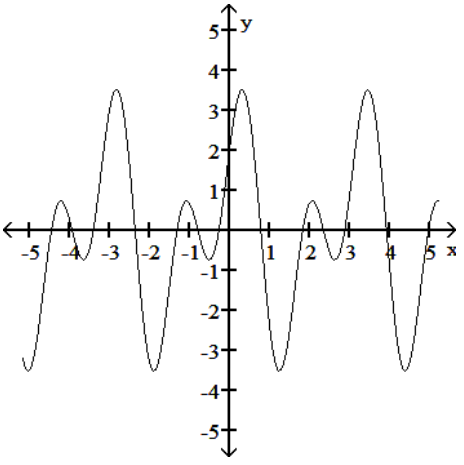
Answer: A
Diff: 0 Type: BI

Graph the function.

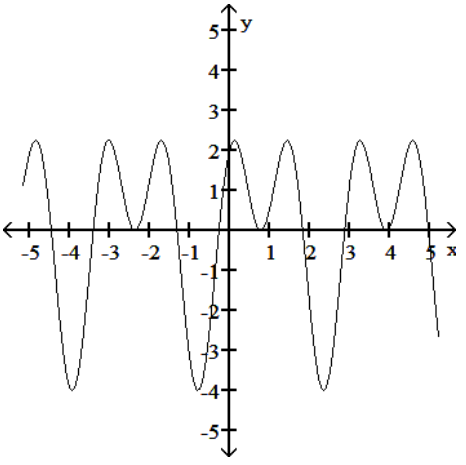
31) Graph the function f(x) = sin 4x + cos 2x. 31) _____



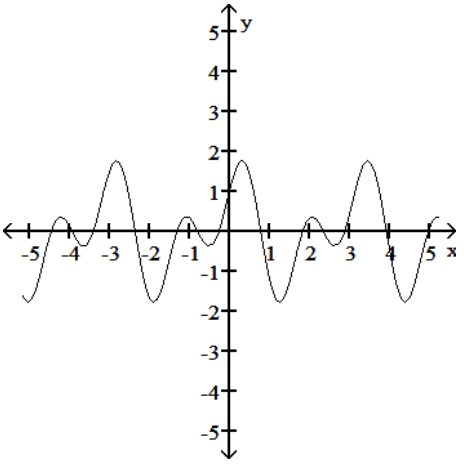
A)



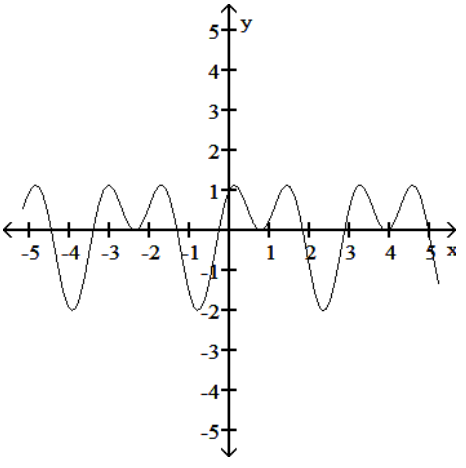
B)



C)



D)



Answer: C
Diff: 0 Type: BI

Use the appropriate addition formula to find the exact value of the expression.

32) $\tan\left(-\frac{7\pi}{12}\right)$ 32) _____

A) $\frac{2-\sqrt{3}}{4}$ B) $-2-\sqrt{3}$ C) $2+\sqrt{3}$ D) $\frac{2+\sqrt{3}}{4}$

Answer: C
Diff: 0 Type: BI

Provide an appropriate response.

33) Graph the functions $f(x)=\frac{x}{2}$ and $g(x)=2+\frac{6}{x}$ together to identify the values of x for which $\frac{x}{2} > 2+\frac{6}{x}$. 33) _____

Confirm your findings algebraically.

A) $(6, \infty)$ B) $(-\infty, -2) \cup (0, 6)$ C) $(-2, 6)$ D) $(-2, 0) \cup (6, \infty)$

Answer: D
Diff: 0 Type: BI

Solve the problem.

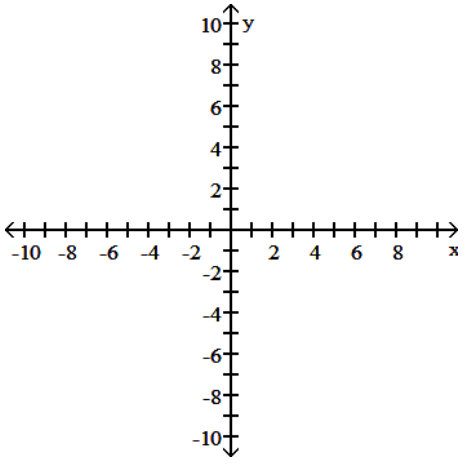
34) You want to make an angle measuring 150° by marking an arc on the perimeter of a disk with a diameter of 8 inches and drawing lines from the ends of the arc to the disk's center. To the nearest tenth of an inch, how long should the arc be? 34) _____

A) 5.2 in. B) 20.9 in. C) 10.5 in. D) 41.9 in.

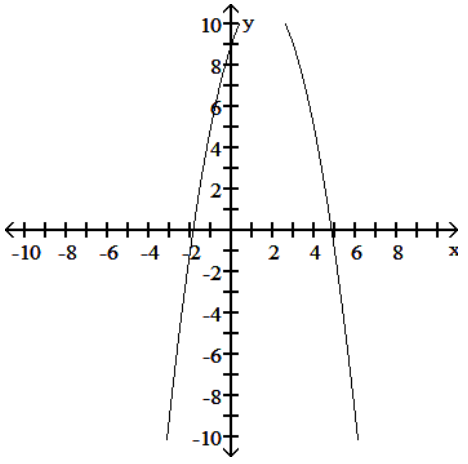
Answer: C
Diff: 0 Type: BI

Find the domain and graph the function.

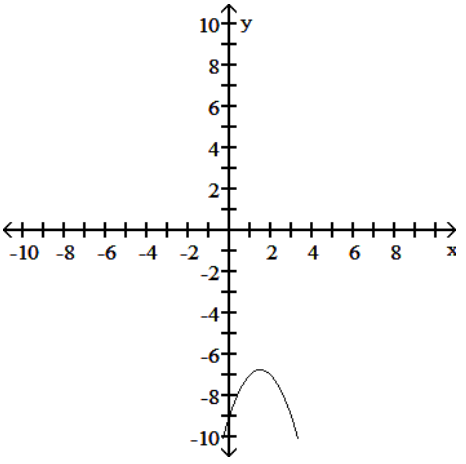
35) $g(x) = -9 + 3x - x^2$ 35) _____



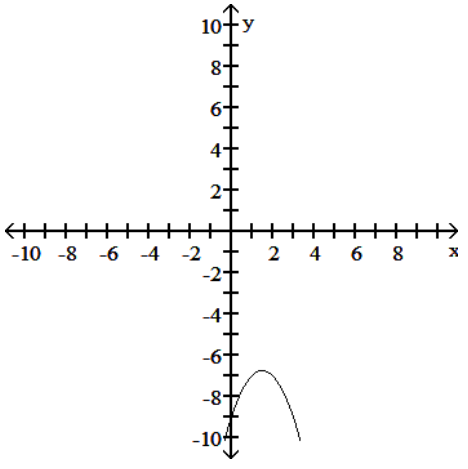
A) D: $(-\infty, \infty)$



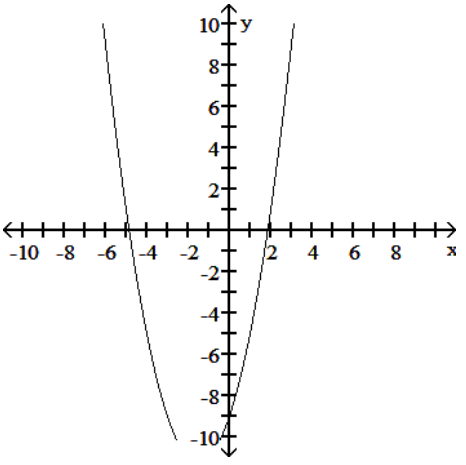
B) D: $(-\infty, \infty)$



C) D: $(-\infty, -\frac{27}{4}]$



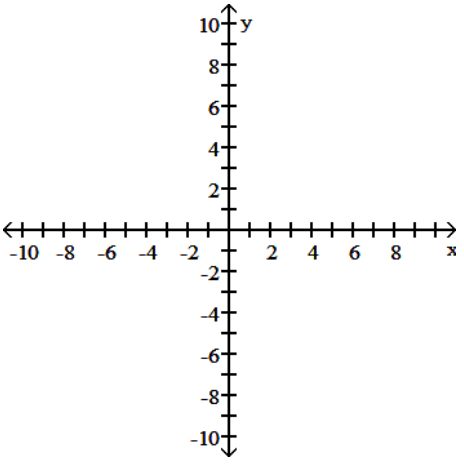
D) D: $(-\infty, \infty)$



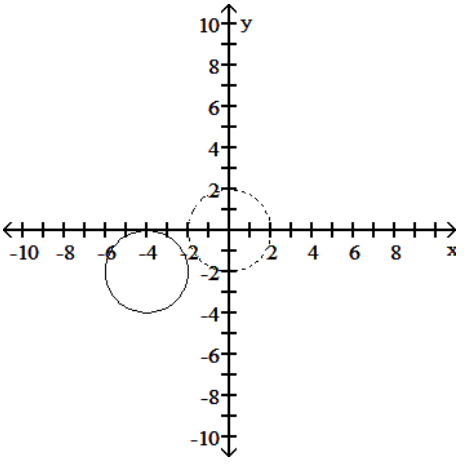
Answer: B
Diff: 0 Type: BI

The problem tells how many units and in what direction the graph of the given equation is to be shifted. Give an equation for the shifted graph. Then sketch the original graph with a dashed line and the shifted graph with a solid line.

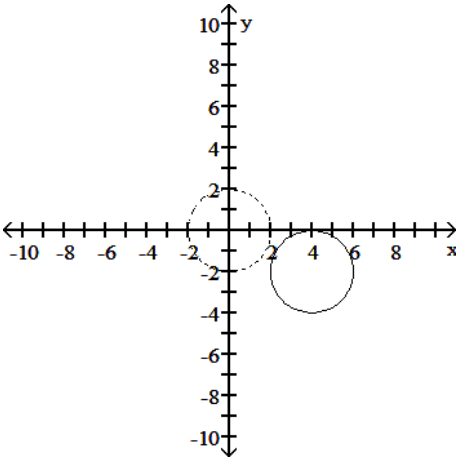
36) $x^2 + y^2 = 4$ Up 2, right 4 36) _____



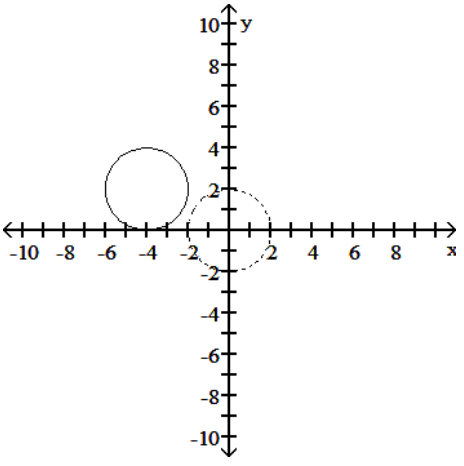
A) $(x + 4)^2 + (y + 2)^2 = 4$



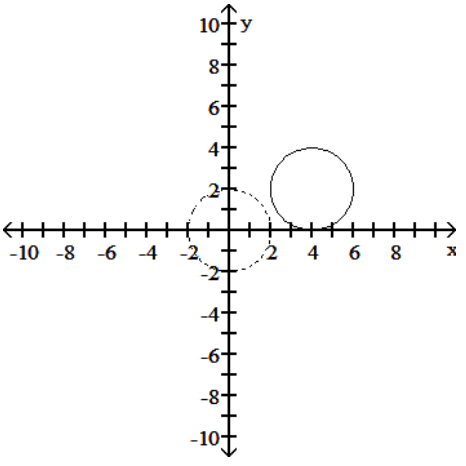
B) $(x - 4)^2 + (y + 2)^2 = 4$



C) $(x + 4)^2 + (y - 2)^2 = 4$



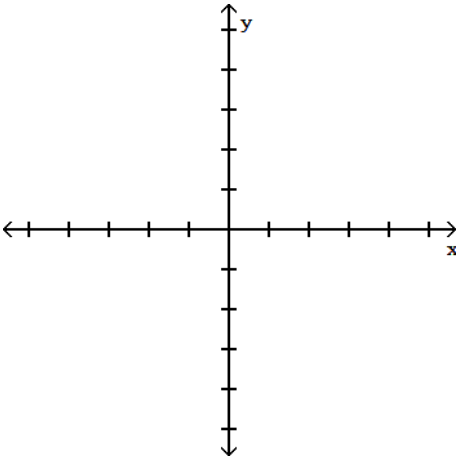
D) $(x - 4)^2 + (y - 2)^2 = 4$



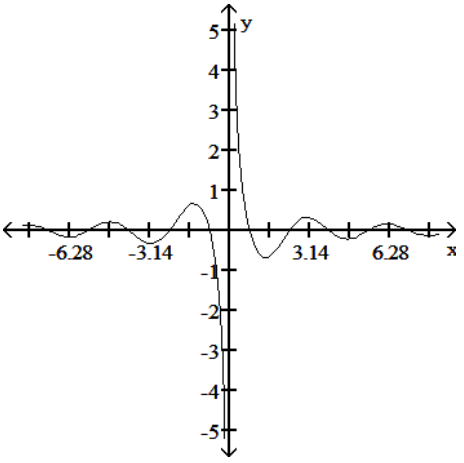
Answer: D
Diff: 0 Type: BI

Determine an appropriate viewing window for the given function and use it to display its graph.

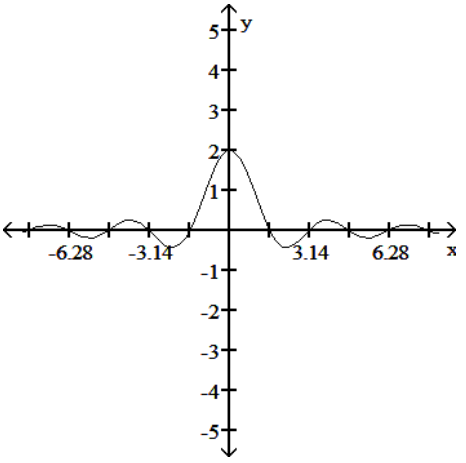
37) $f(x) = \dfrac{\sin 2x}{x}$ 37) _____



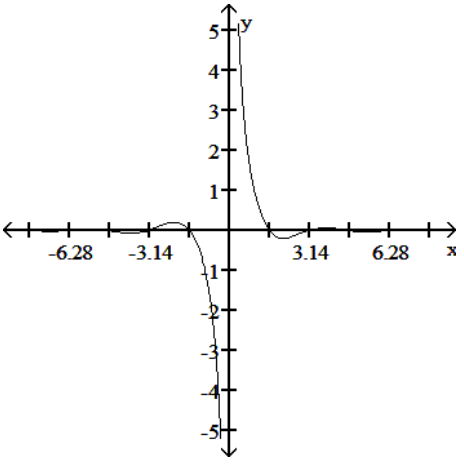
A)



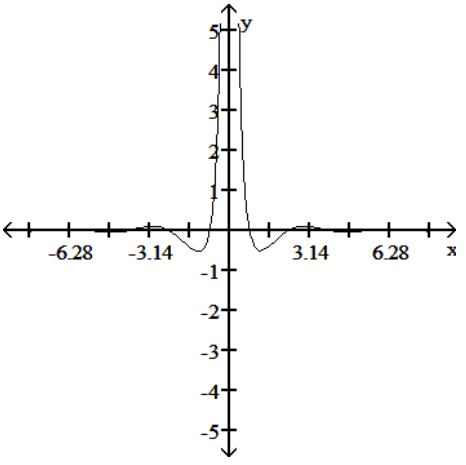
B)



C)



D)



Answer: B
Diff: 0 Type: BI

Determine if the function is even, odd, or neither.

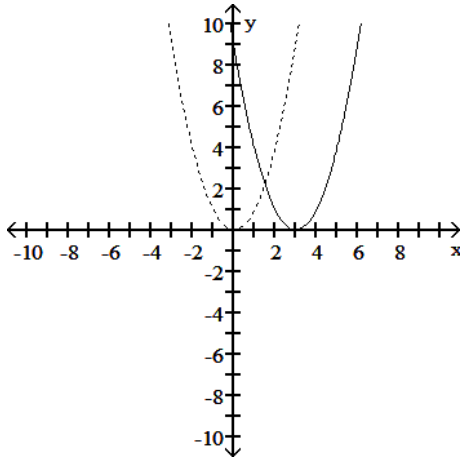
38) $f(x) = \frac{3}{x^2 + 8}$ 38) _____

A) Even B) Odd C) Neither

Answer: A
Diff: 0 Type: BI

Solve the problem.

39) The accompanying figure shows the graph of $y = x^2$ shifted to a new position. Write the equation for the new graph. 39) _____



A) $y = x^2 + 3$ B) $y = (x + 3)^2$ C) $y = (x - 3)^2$ D) $y = x^2 - 3$

Answer: C
Diff: 0 Type: BI

Express the given function as a composite of functions f and g such that $y = f(g(x))$.

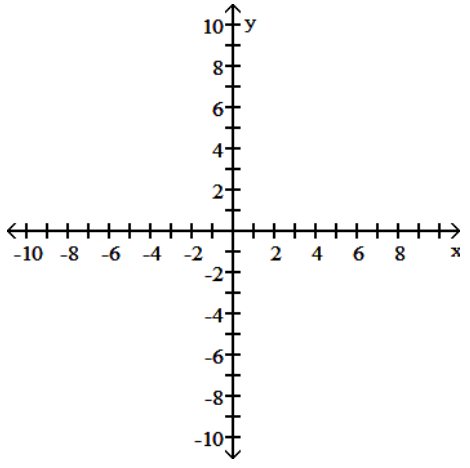
40) $y = |3x + 9|$ 40) _____

A) $f(x) = x$, $g(x) = 3x + 9$ B) $f(x) = |-x|$, $g(x) = 3x - 9$
C) $f(x) = -|x|$, $g(x) = 3x + 9$ D) $f(x) = |x|$, $g(x) = 3x + 9$

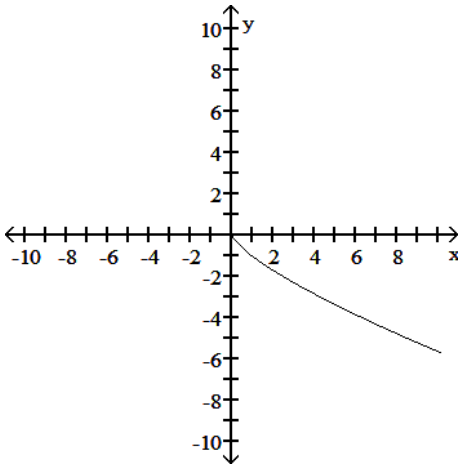
Answer: D
Diff: 0 Type: BI

Graph the function. Determine the symmetry, if any, of the function.

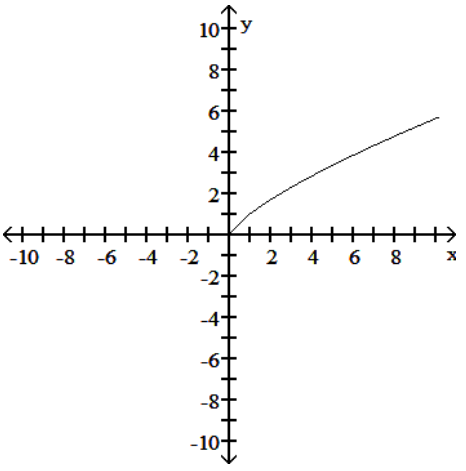
41) $y = -x^{4/3}$ 41) _____



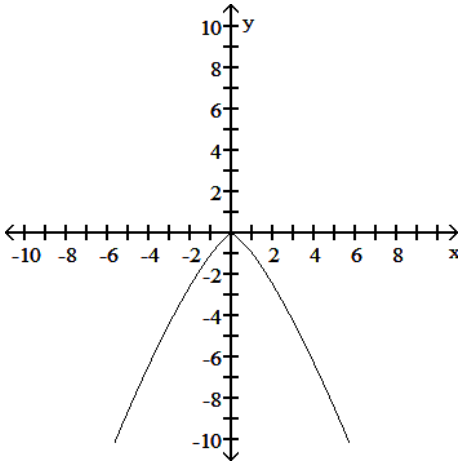
A) No symmetry



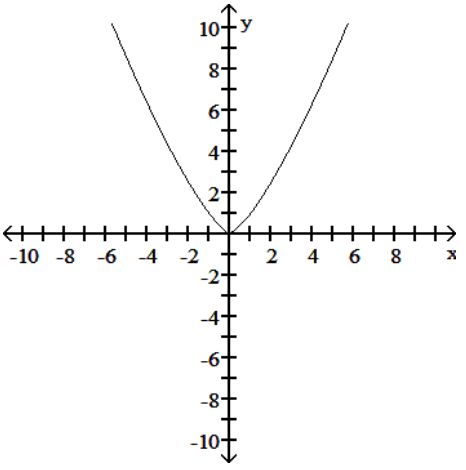
B) No symmetry



C) Symmetric about the y-axis



D) Symmetric about the y-axis



Answer: C
Diff: 0 Type: BI

Find the formula for the function.

42) Express the perimeter of a square as a function of the square's side length x. 42) _____

A) $p = 6x$ B) $p = x^3$ C) $p = \frac{3x}{2}$ D) $p = 4x$

Answer: D
Diff: 0 Type: BI

Solve the problem.

43) If $f(x) = 4x^2 + 5x + 7$ and $g(x) = 5x - 6$, find $g(f(x))$. 43) _____

A) $4x^2 + 5x + 1$ B) $20x^2 + 25x + 41$ C) $4x^2 + 25x + 29$ D) $20x^2 + 25x + 29$

Answer: D
Diff: 0 Type: BI

Find the domain and range for the indicated function.

44) $f(x) = 5, \quad g(x) = 5 + \sqrt{x}; \quad g/f$ 44) _____

A) D: $x \geq -5$, R: $y \geq 0$
B) D: $x \geq 0$, R: $y \leq 1$
C) D: $x \geq 0$, R: $y \leq 5$
D) D: $x \geq 0$, R: $y \geq 1$

Answer: D
Diff: 0 Type: BI

For

$$f(x) = A \sin\left[\frac{2\pi}{B}(x - C)\right] + D,$$

identify either A, B, C, or D as indicated for the sine function.

45) $y = 2 + 2\sin(2\theta + 2\pi)$ Find D. 45) _____

A) -2
B) 1
C) π
D) 2

Answer: D
Diff: 0 Type: BI

Solve the problem.

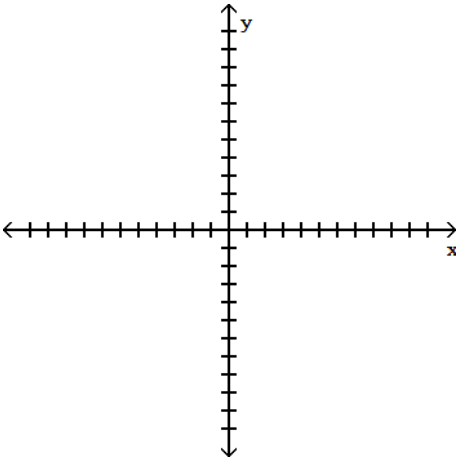
46) The variable s is proportional to t, and s = 25 when t = 100. Determine t when s = 50. 46) _____

A) 200
B) 190
C) 250
D) 4

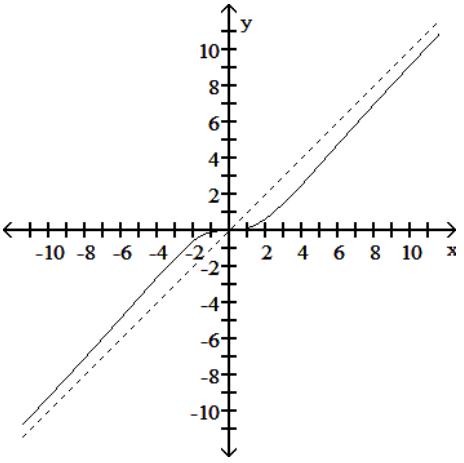
Answer: A
Diff: 0 Type: BI

Determine an appropriate viewing window for the given function and use it to display its graph.

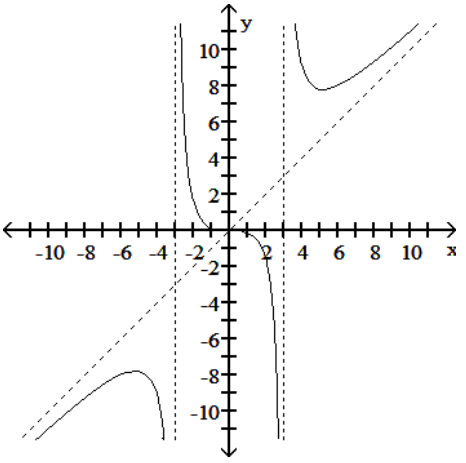
47) $f(x) = \dfrac{x^3}{x^2 + 9}$ 47) _____



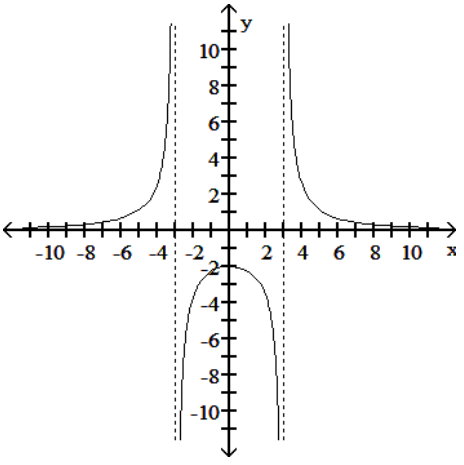
A)



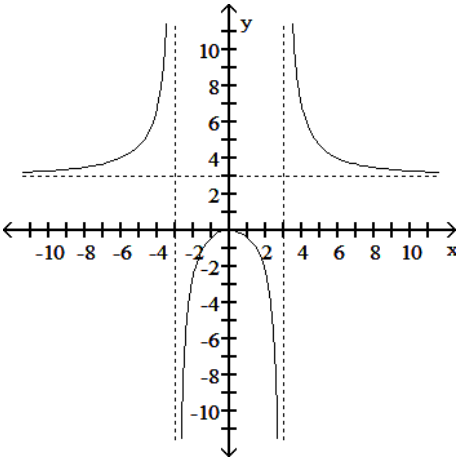
B)



C)



D)



Answer: A
Diff: 0 Type: BI

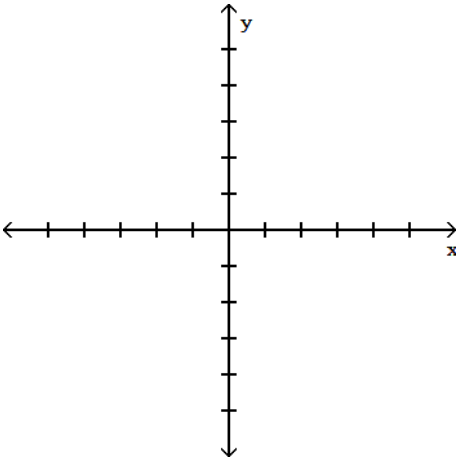
Provide an appropriate response.

48) For what values of x is $\lfloor x \rfloor = -2$? 48) _____

A) $-2 < x \le -1$ B) $-3 \le x < -2$ C) $-2 \le x < -1$ D) $-3 < x \le -2$

Answer: C
Diff: 0 Type: BI

49) Graph the equation $|x + y| = 1$ and decide whether or not the graph represents a function of x. 49) _____



A) Function B) Not a Function

Answer: B
Diff: 0 Type: BI

One of sin x, cos x, and tan x is given. Find the other two if x lies in the specified interval.

50) $\cos x = \frac{5}{13}$, x in $\left[-\frac{\pi}{2}, 0\right]$ 50) _____

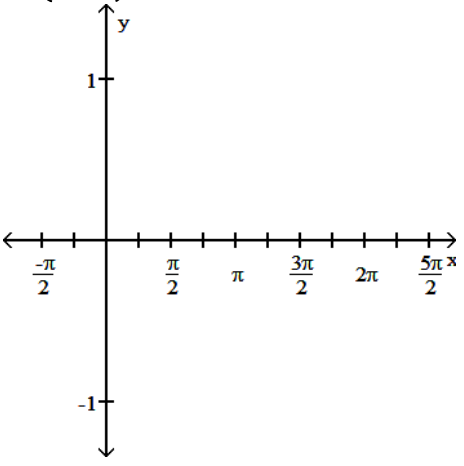
A) $\sin x = \frac{12}{13}$, $\tan x = -\frac{5}{12}$ B) $\sin x = -\frac{12}{13}$, $\tan x = -\frac{12}{5}$

C) $\sin x = -\frac{12}{13}$, $\tan x = -\frac{5}{12}$ D) $\sin x = \frac{12}{13}$, $\tan x = \frac{12}{5}$

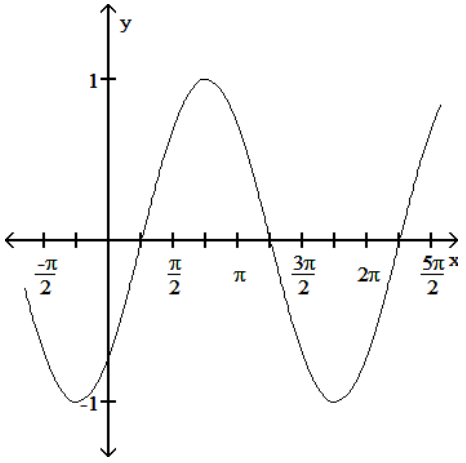
Answer: B
Diff: 0 Type: BI

State the period of the function and graph.

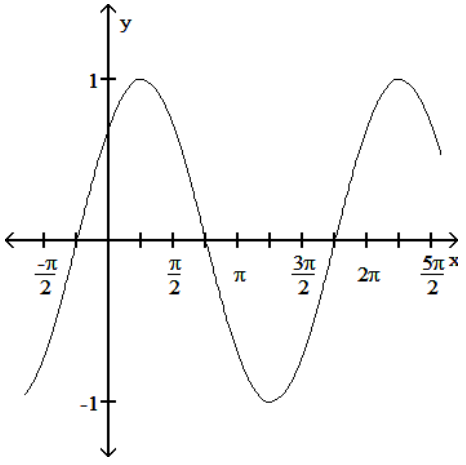
51) $\sin\left(x - \frac{\pi}{4}\right)$ 51) _____



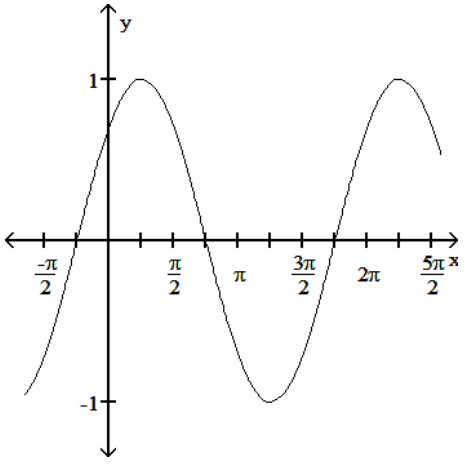
A) Period 2π



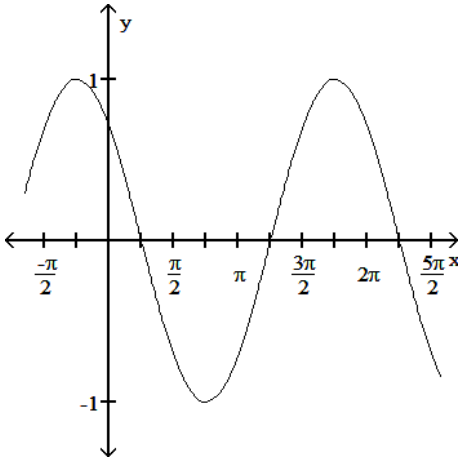
B) Period 2π



C) Period 2π



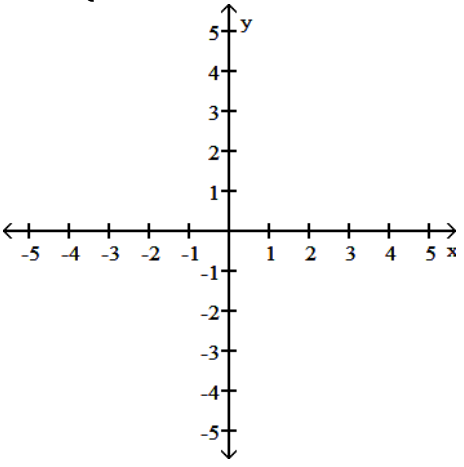
D) Period 2π



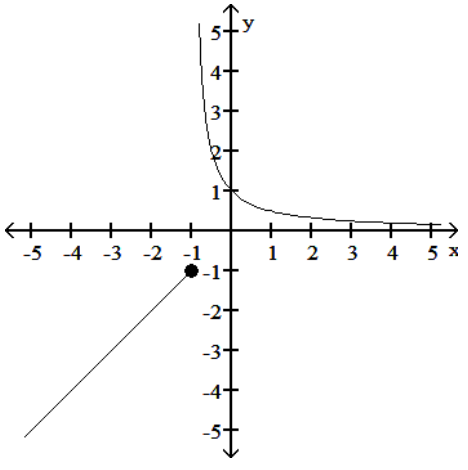
Answer: A
Diff: 0 Type: BI

Graph the function.

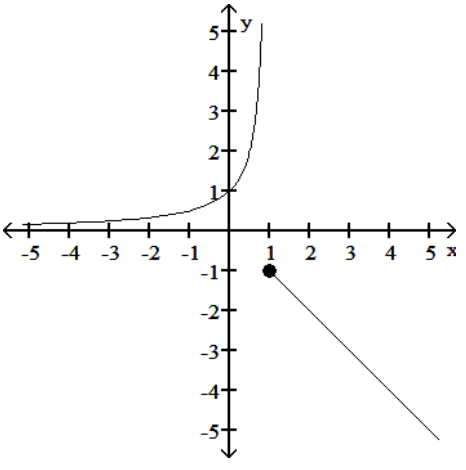
52) $g(x) = \begin{cases} \frac{1}{x+1}, & x < -1 \\ x, & x \geq -1 \end{cases}$ 52) _____



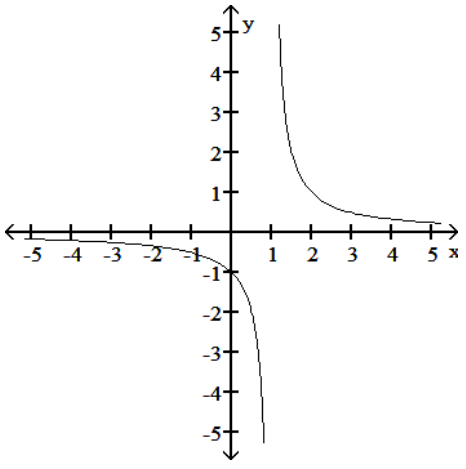
A)



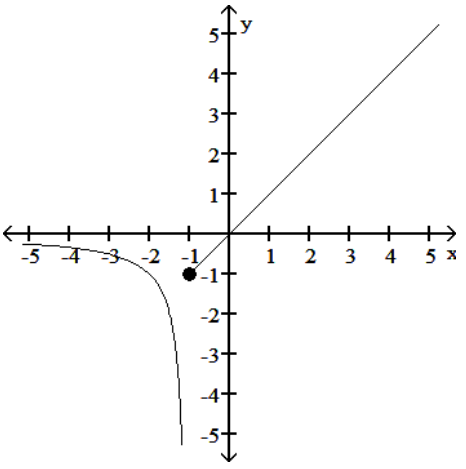
B)



C)



D)



Answer: D
Diff: 0 Type: BI

One of sin x, cos x, and tan x is given. Find the other two if x lies in the specified interval.

53) tan x = 1, x in $\left[\pi, \frac{3\pi}{2}\right]$ 53) _____

A) sin x = $\frac{\sqrt{2}}{2}$, cos x = $\frac{\sqrt{2}}{2}$

B) sin x = - $\frac{\sqrt{2}}{2}$, cos x = - $\frac{\sqrt{2}}{2}$

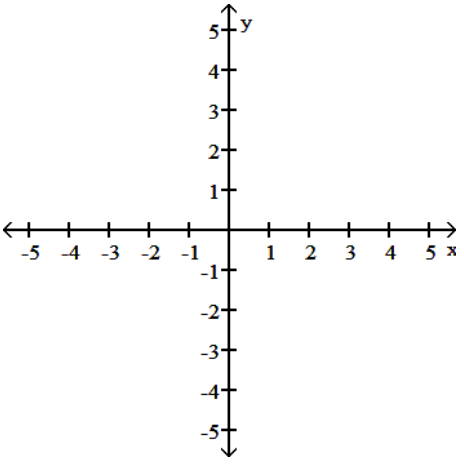
C) sin x = - $\frac{\sqrt{2}}{2}$, cos x = $\frac{\sqrt{2}}{2}$

D) sin x = $\frac{\sqrt{2}}{2}$, cos x = - $\frac{\sqrt{2}}{2}$

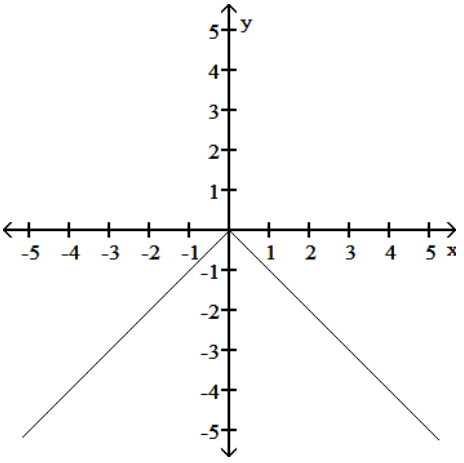
Answer: B
Diff: 0 Type: BI

Graph the function. Specify the intervals over which the function is increasing and the intervals where it is decreasing.

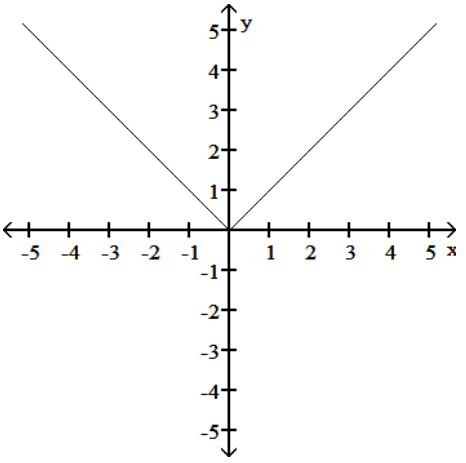
54) y = - |x| 54) _____



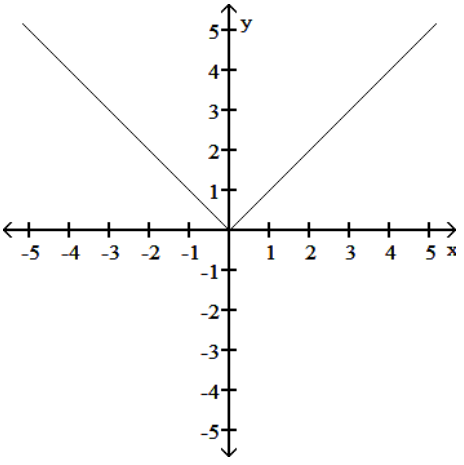
A) Increasing $-\infty < x \le 0$
Decreasing $0 \le x < \infty$



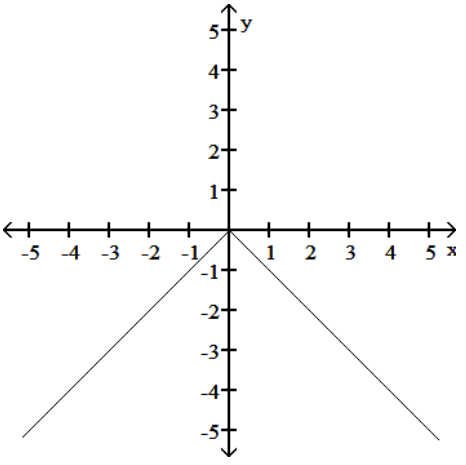
B) Decreasing $-\infty < x \le 0$
Increasing $0 \le x < \infty$



C) Increasing $-\infty < x < \infty$



D) Decreasing $-\infty < x < \infty$



Answer: A
Diff: 0 Type: BI

Use the appropriate addition formula to find the exact value of the expression.

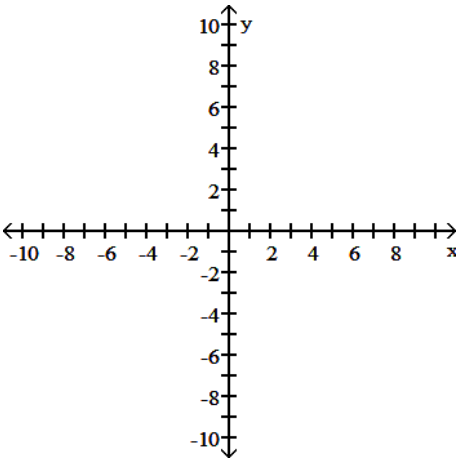
55) $\cos\left(-\frac{7\pi}{12}\right)$ 55) _____

A) $\sqrt{2} - \sqrt{6}$ B) $\frac{\sqrt{2} - \sqrt{6}}{4}$ C) $\frac{\sqrt{6} - \sqrt{2}}{4}$ D) $\sqrt{6} + \sqrt{2}$

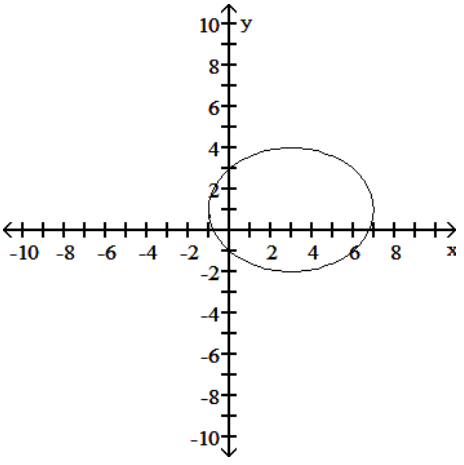
Answer: B
Diff: 0 Type: BI

The equation of an ellipse is given. Put the equation in standard form and sketch the ellipse.

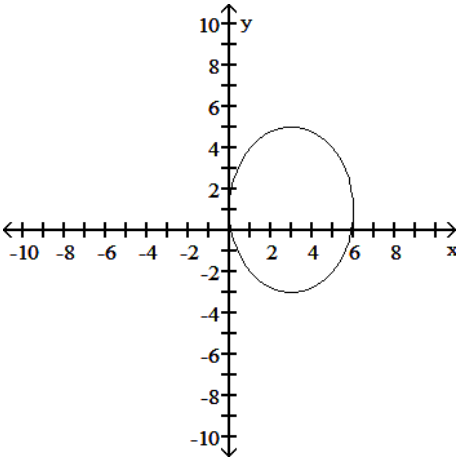
56) $16(x - 3)^2 + 9(y - 1)^2 = 144$ 56) _____



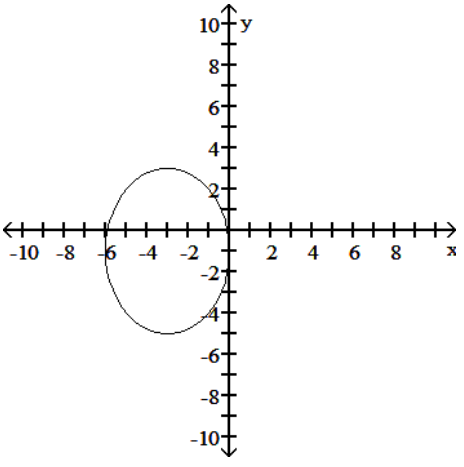
A) $\frac{(x - 3)^2}{16} + \frac{(y - 1)^2}{9} = 1$



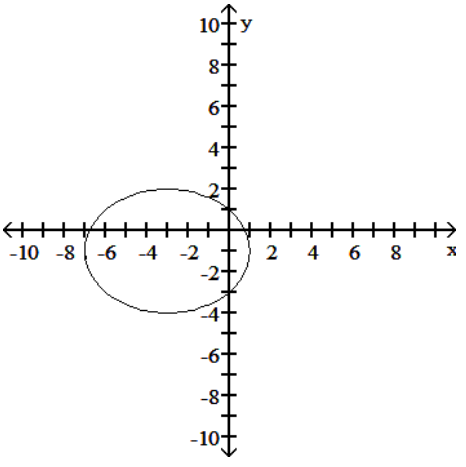
B) $\frac{(x - 3)^2}{9} + \frac{(y - 1)^2}{16} = 1$



C) $\frac{(x - 3)^2}{9} + \frac{(y - 1)^2}{16} = 1$



D) $\frac{(x - 3)^2}{16} + \frac{(y - 1)^2}{9} = 1$



Answer: B
Diff: 0 Type: BI

Find the exact value of the trigonometric function. Do not use a calculator or tables.

57) $\cos\left(\frac{\pi}{6}\right)$ 57) _____

A) $\frac{\sqrt{3}}{2}$ B) $\frac{\sqrt{2}}{2}$ C) $\frac{2\sqrt{3}}{3}$ D) $\sqrt{3}$

Answer: A
Diff: 0 Type: BI

Express the given quantity in terms of sin x or cos x.

58) $\sin\left(\frac{3\pi}{2} + x\right)$ 58) _____

A) cos x B) -cos x C) -cos x - sin x D) sin x - cos x

Answer: B
Diff: 0 Type: BI

Express the given function as a composite of functions f and g such that y = f(g(x)).

59) $y = (4x + 3)^7$ 59) _____

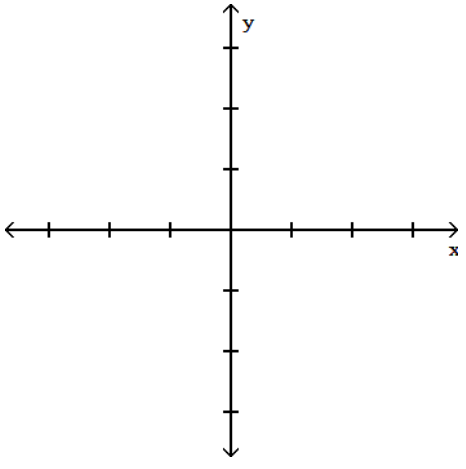
A) $f(x) = x^7$, $g(x) = 4x + 3$ B) $f(x) = (4x)^7$, $g(x) = 3$

C) $f(x) = 4x + 3$, $g(x) = x^7$ D) $f(x) = 4x^7$, $g(x) = x + 3$

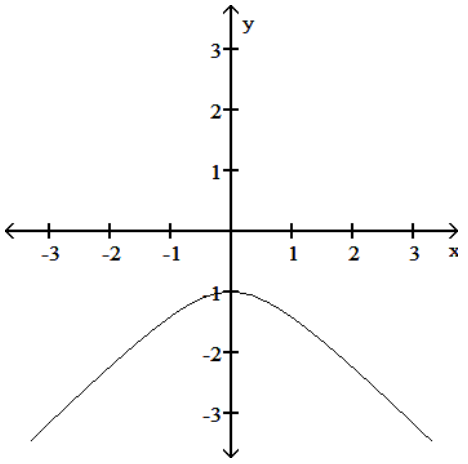
Answer: A
Diff: 0 Type: BI

Graph the function.

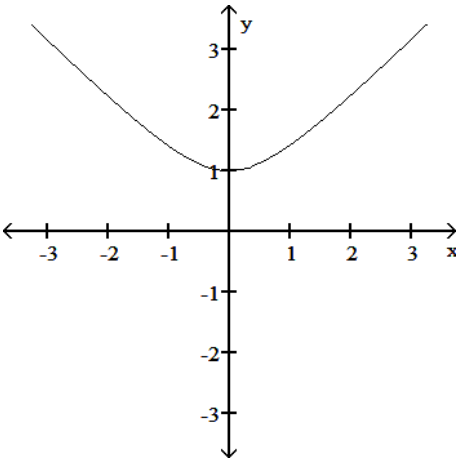
60) Graph the lower branch of the hyperbola $y^2 - 4x^2 = 1$. 60) _____



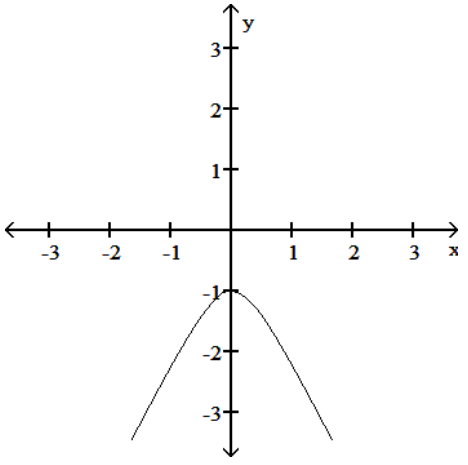
A)



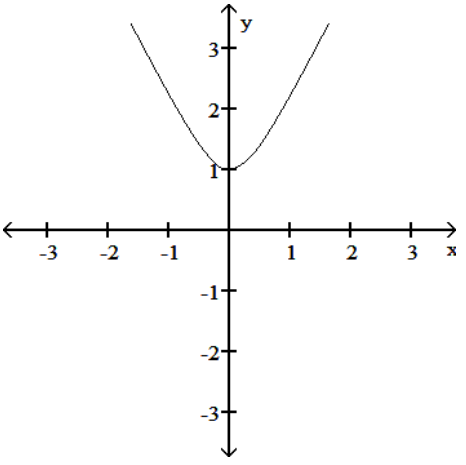
B)



C)



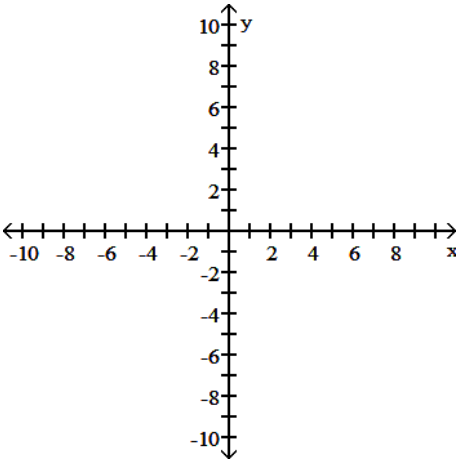
D)



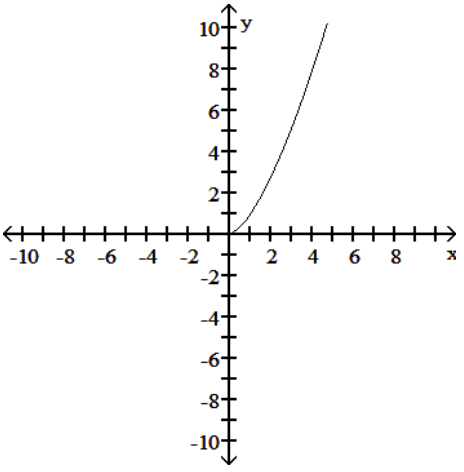
Answer: C
Diff: 0 Type: BI

Graph the function. Specify the intervals over which the function is increasing and the intervals where it is decreasing.

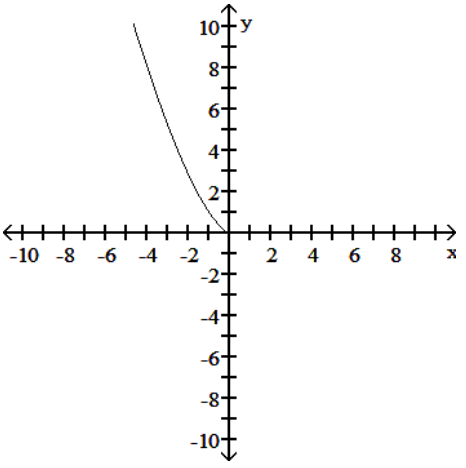
61) $y = (-x)^{3/2}$ 61) _____



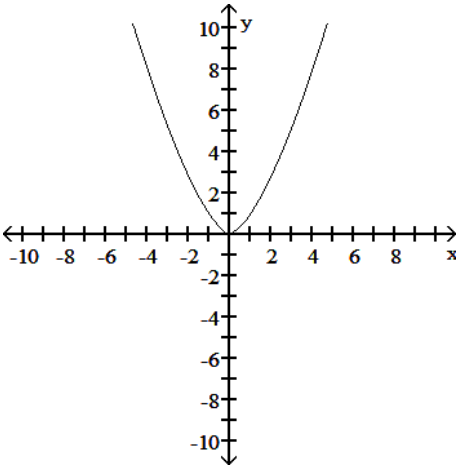
A) Increasing $0 \le x < \infty$



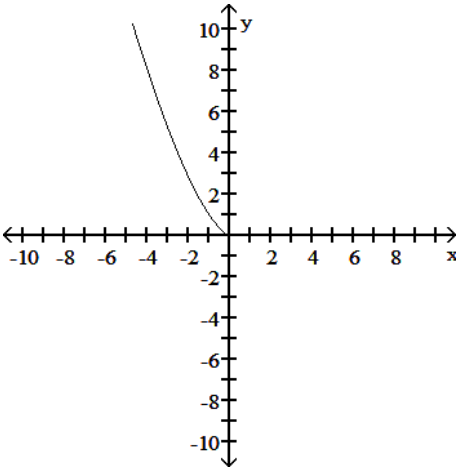
B) Decreasing $-\infty < x \le 0$



C) Decreasing $-\infty < x \le 0$
Increasing $0 \le x < \infty$



D) Decreasing $-\infty < x < \infty$



Answer: B
Diff: 0 Type: BI

Find the domain and range for the indicated function.

62) $f(x) = \sqrt{x + 11}$, $g(x) = \sqrt{x - 11}$; $f + g$ 62) _____

A) D: $x \ge -11$
R: $y \ge 0$

B) D: $x \ge -11$
R: $y \ge \sqrt{22}$

C) D: $x \ge 11$
R: $y \ge \sqrt{22}$

D) D: $x \ge 11$
R: $y \ge 0$

Answer: C
Diff: 0 Type: BI

Find the exact value of the trigonometric function. Do not use a calculator or tables.

63) $\cos\left(\frac{7\pi}{6}\right)$ 63) _____

A) $-\frac{\sqrt{3}}{2}$

B) $\frac{2\sqrt{3}}{3}$

C) $-\frac{1}{2}$

D) $\frac{\sqrt{3}}{2}$

Answer: A
Diff: 0 Type: BI

64) $\tan\left(\frac{5\pi}{4}\right)$ 64) _____

A) 1 B) $\frac{\sqrt{2}}{2}$ C) $\sqrt{3}$ D) -1

Answer: A
Diff: 0 Type: BI

Solve the problem.

65) If $f(x) = \sqrt{x}$, $g(x) = \frac{x}{4}$, and $h(x) = 4x + 16$, find $h(g(f(x)))$. 65) _____

A) $\sqrt{x + 4}$ B) $\sqrt{x} + 16$ C) $\sqrt{x} + 4$ D) $4\sqrt{x} + 16$

Answer: B
Diff: 0 Type: BI

Find the function value.

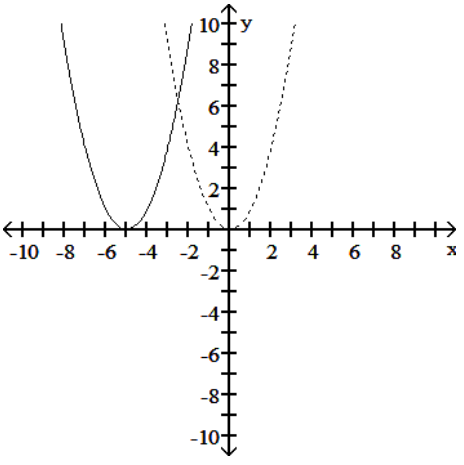
66) $\sin^2 \frac{\pi}{6}$ 66) _____

A) $\frac{3}{4}$ B) $\frac{2 - \sqrt{3}}{4}$ C) $2 - \sqrt{3}$ D) $\frac{1}{4}$

Answer: D
Diff: 0 Type: BI

Solve the problem.

67) The accompanying figure shows the graph of $y = x^2$ shifted to a new position. Write the equation for the new graph. 67) _____



A) $y = (x - 5)^2$ B) $y = x^2 + 5$ C) $y = x^2 - 5$ D) $y = (x + 5)^2$

Answer: D
Diff: 0 Type: BI

One of sin x, cos x, and tan x is given. Find the other two if x lies in the specified interval.

68) $\tan x = -\frac{12}{5}$, x in $\left[\frac{\pi}{2}, \pi\right]$ 68) _____

A) $\sin x = \frac{12}{13}$, $\cos x = -\frac{5}{13}$

B) $\sin x = \frac{5}{13}$, $\cos x = -\frac{12}{13}$

C) $\sin x = \frac{12}{13}$, $\cos x = \frac{5}{13}$

D) $\sin x = -\frac{12}{13}$, $\cos x = \frac{5}{13}$

Answer: A
Diff: 0 Type: BI

Use a graphing calculator or computer to determine which of the given viewing windows displays the most appropriate graph of the specified function.

69) $f(x) = x^2 + \frac{1}{10}\cos 80x$ 69) _____

A) [-0.1, 0.1] by [-0.1, 0.1]

B) [-0.6, 0.6] by [-0.1, 0.6]

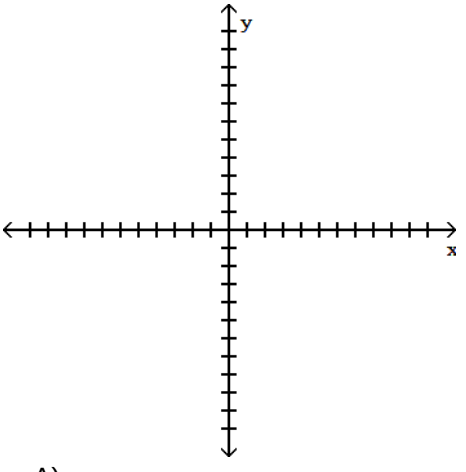
C) [-10, 10] by [-10, 10]

D) [-2, 2] by [-1, 1]

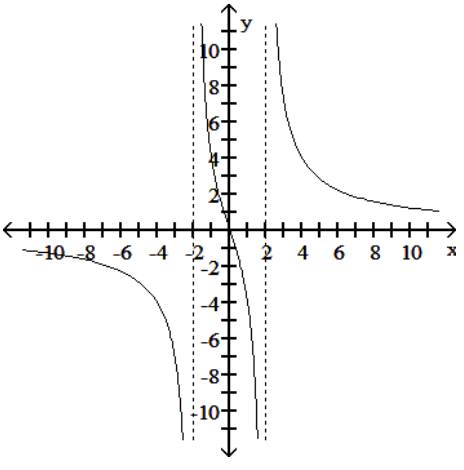
Answer: B
Diff: 0 Type: MC

Determine an appropriate viewing window for the given function and use it to display its graph.

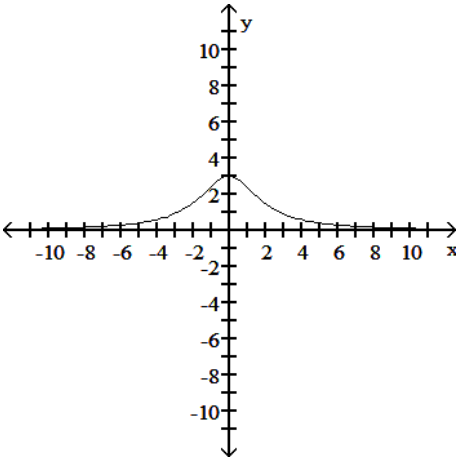
70) $f(x) = \frac{2x^2}{x^2 - 4}$ 70) _____



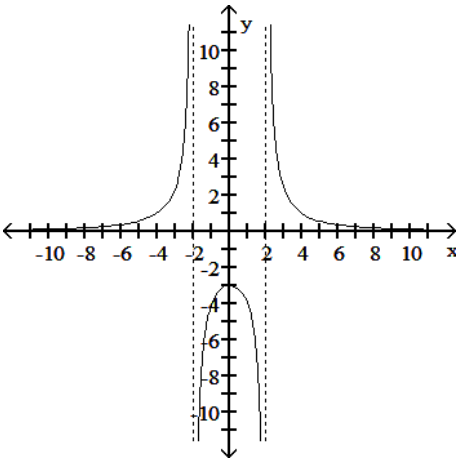
A)



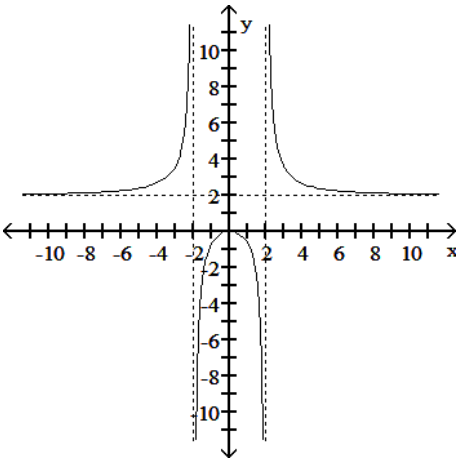
B)



C)



D)



Answer: D
Diff: 0 Type: BI

Find the requested information using the law of cosines and/or the law of sines. Round to three decimal places.

71) A triangle has sides a = 5 and b = 3 and angle C = 30°. Find the length of side c. 71) _____

A) 4.359 B) 2.832 C) 8.019 D) 4.584

Answer: B
Diff: 0 Type: BI

Determine if the function is even, odd, or neither.

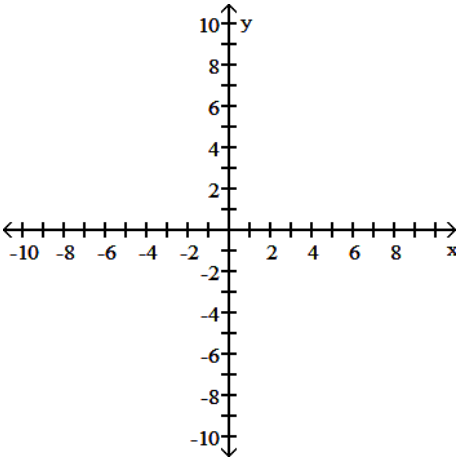
72) $f(x) = 7x^4 + 6x + 5$ 72) _____

A) Even B) Odd C) Neither

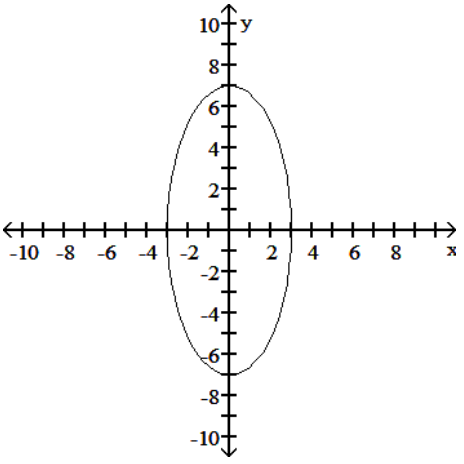
Answer: C
Diff: 0 Type: BI

The equation of an ellipse is given. Put the equation in standard form and sketch the ellipse.

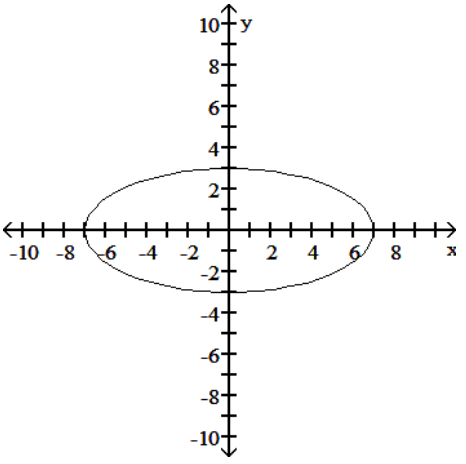
73) $9x^2 + 49y^2 = 441$ 73) _____



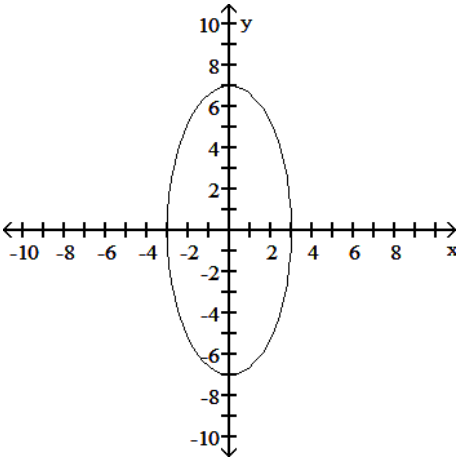
A) $\frac{x^2}{9} + \frac{y^2}{49} = 1$



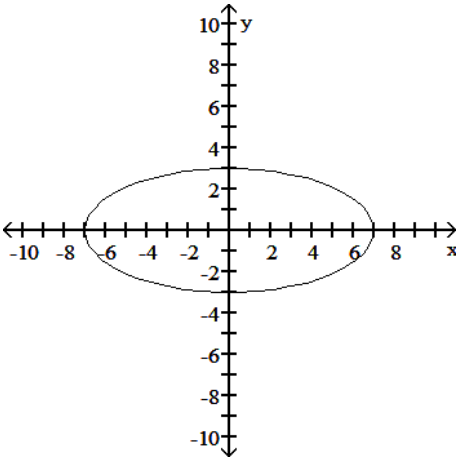
B) $\frac{x^2}{9} + \frac{y^2}{49} = 1$



C) $\frac{x^2}{49} + \frac{y^2}{9} = 1$



D) $\frac{x^2}{49} + \frac{y^2}{9} = 1$



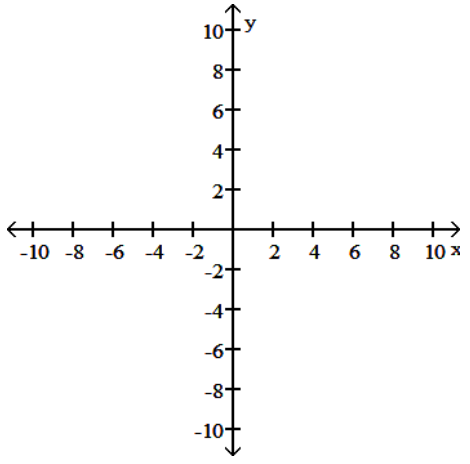
Answer: D

Diff: 0 Type: BI

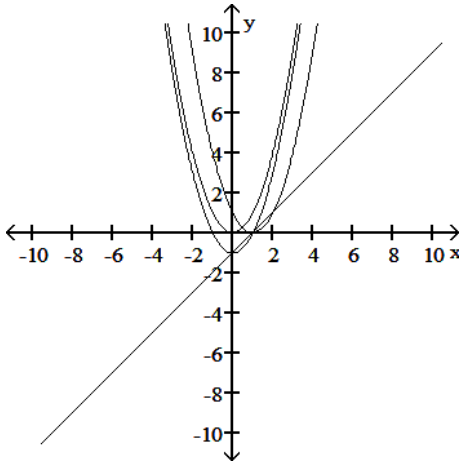
SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Solve the problem.

74) Let f(x) = x - 1 and g(x) = x^2. Graph f and g together with f ∘ g and g ∘ f. 74) _____



Answer:



Diff: 0 Type: SA

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

The problem tells by what factor and direction the graph of the given function is to be stretched or compressed. Give an equation for the stretched or compressed graph.

75) $y = x^2 + 1$ compressed vertically by a factor of 2 75) _____

A) $y = \frac{x^2}{2} + 1$ B) $y = 4x^2 + 1$ C) $y = 2x^2 + 2$ D) $y = \frac{x^2}{2} + \frac{1}{2}$

Answer: D
Diff: 0 Type: BI

76) $y = x^2 + 3$ stretched horizontally by a factor of 3 76) _____

A) $y = \frac{x^2}{3} + 3$ B) $y = 9x^2 + 3$ C) $y = 3x^2 + 9$ D) $y = \frac{x^2}{9} + 3$

Answer: D
Diff: 0 Type: BI

Provide an appropriate response.

77) Consider the function $y = \sqrt{1 - \frac{1}{x}}$. Can x be negative? 77) _____

A) Yes B) No

Answer: A
Diff: 0 Type: BI

Determine if the function is even, odd, or neither.

78) $f(x) = 3x^2 - 2$ 78) _____

A) Even B) Odd C) Neither

Answer: A
Diff: 0 Type: BI

Find the requested information using the law of cosines and/or the law of sines. Round to three decimal places.

79) A triangle has side c = 2 and angles $A = \frac{\pi}{4}$ and $B = \frac{\pi}{6}$. Find the length b of the side opposite B. 79) _____

A) 0.518 B) 0.259 C) 1.035 D) 1.464

Answer: C
Diff: 0 Type: BI

Use a graphing calculator or computer to determine which of the given viewing windows displays the most appropriate graph of the specified function.

80) $f(x) = \sqrt{7 + 6x - x^2}$ 80) _____

A) [-10, 20] by [-50, 50] B) [-10, 10] by [-10, 5]
C) [-4, 5] by [-5, 5] D) [-4, 5] by [-15, 25]

Answer: D
Diff: 0 Type: MC

For

$$f(x) = A \sin\left[\frac{2\pi}{B}(x - C)\right] + D,$$

identify either A, B, C, or D as indicated for the sine function.

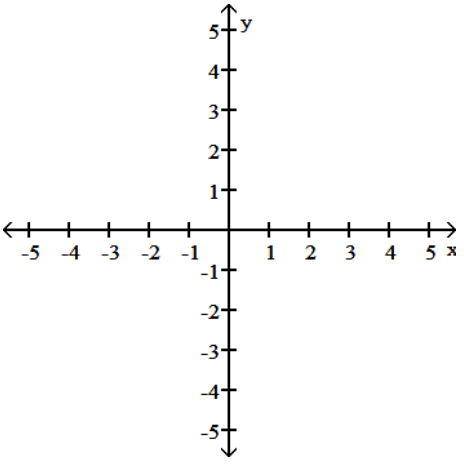
81) $y = -2 \sin(\theta - 2\pi)$ Find A. 81) _____

A) 2π B) 1 C) -4 D) - 2

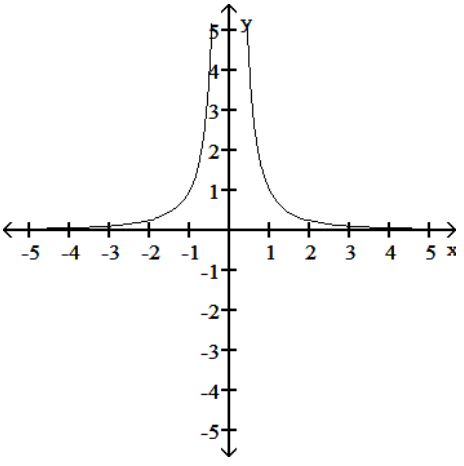
Answer: D
Diff: 0 Type: BI

Graph the function. Specify the intervals over which the function is increasing and the intervals where it is decreasing.

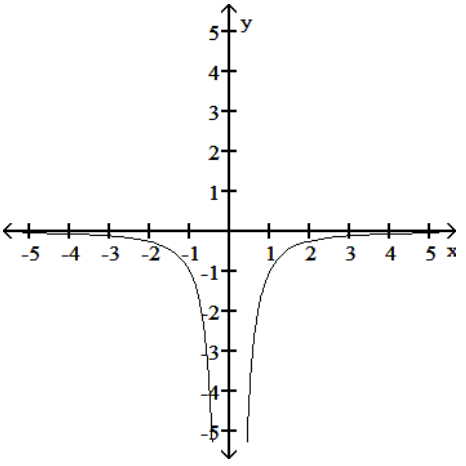
82) $y = -\frac{1}{x^2}$ 82) _____



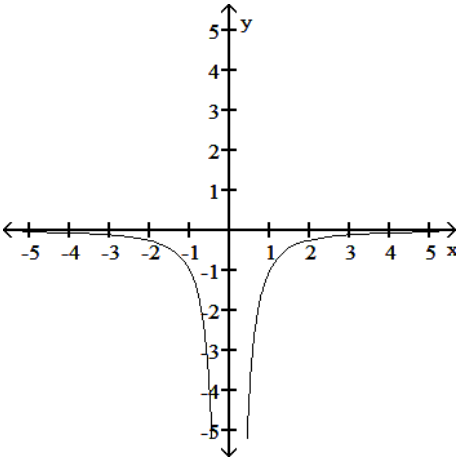
A) Increasing $-\infty < x < 0$
Decreasing $0 < x < \infty$



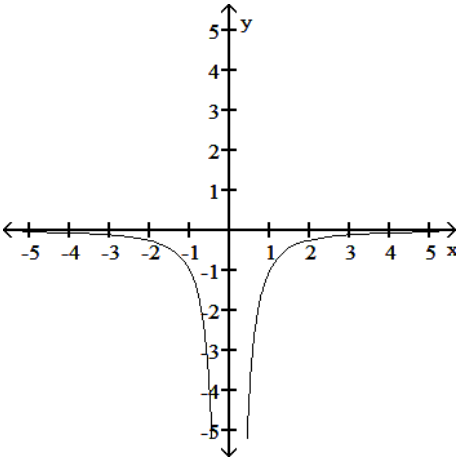
B) Decreasing $-\infty < x < 0$ and $0 < x < \infty$



C) Decreasing $-\infty < x < 0$
Increasing $0 < x < \infty$



D) Increasing $-\infty < x < 0$ and $0 < x < \infty$



Answer: C
Diff: 0 Type: BI

Use a graphing calculator or computer to determine which of the given viewing windows displays the most appropriate graph of the specified function.

83) $f(x) = \frac{10}{x^2 - 5}$ 83) _____

A) [-2, 2] by [-10, 10]
B) [-5, 0] by [-10, 10]
C) [0, 5] by [-10, 10]
D) [-5, 5] by [-10, 10]

Answer: D
Diff: 0 Type: MC

Determine if the function is even, odd, or neither.

84) $f(x) = (x - 2)(x - 1)$ 84) _____

A) Even B) Odd C) Neither

Answer: C
Diff: 0 Type: BI

Solve the problem.

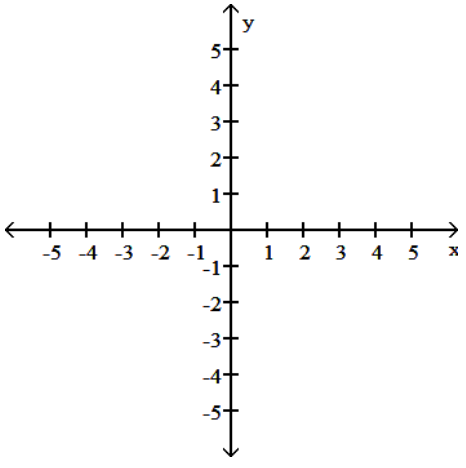
85) If you roll a 1-m-diameter wheel forward 36 centimeters over level ground, through what angle (to the nearest degree) will the wheel turn? 85) _____

A) 1° B) 21° C) 72° D) 41°

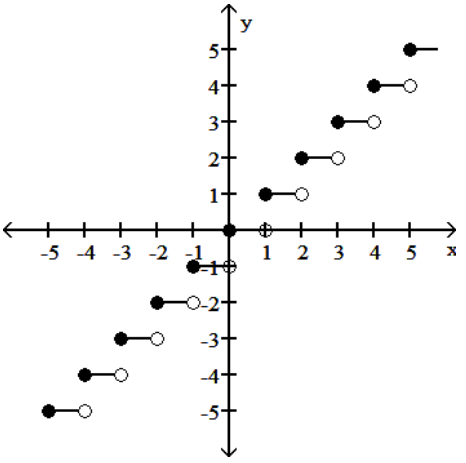
Answer: D
Diff: 0 Type: BI

Provide an appropriate response.

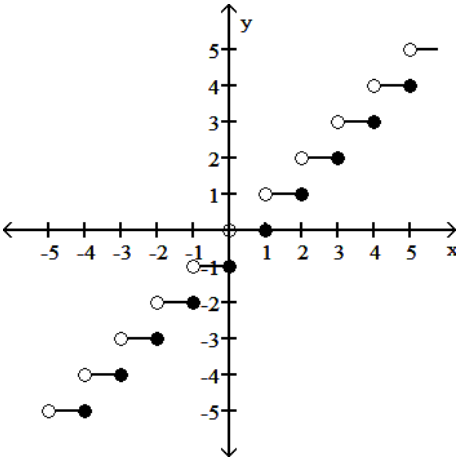
86) Graph the function $f(x) = \lceil x \rceil$. 86) _____



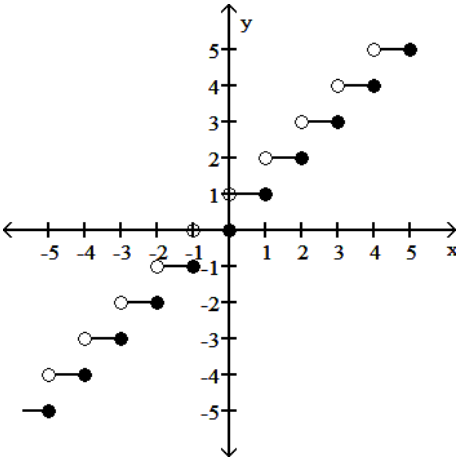
A)



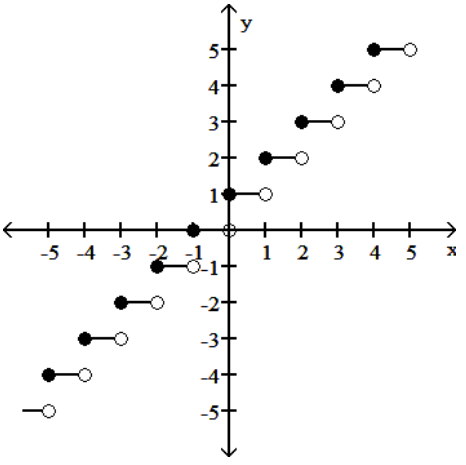
B)



C)



D)



Answer: C
Diff: 0 Type: BI

The problem tells by what factor and direction the graph of the given function is to be stretched or compressed. Give an equation for the stretched or compressed graph.

87) $y = \sqrt{x + 1}$ compressed vertically by a factor of 7 87) _____

A) $y = \frac{\sqrt{x + 1}}{7}$ B) $y = \sqrt{7x + 7}$ C) $y = 7\sqrt{x + 1}$ D) $y = \sqrt{7x + 1}$

Answer: A
Diff: 0 Type: BI

Solve the problem.

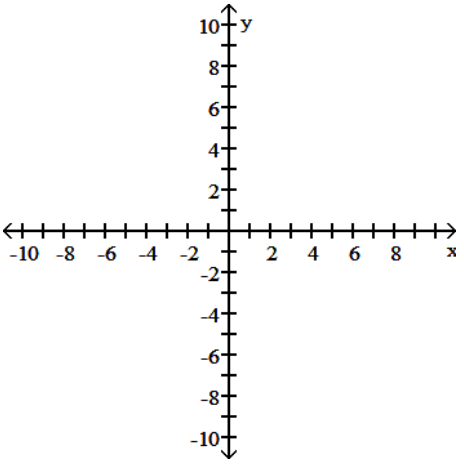
88) If $f(x) = \sqrt{x + 8}$ and $g(x) = 8x - 12$, find $f(g(x))$. 88) _____

A) $2\sqrt{2x - 1}$ B) $2\sqrt{2x + 1}$ C) $8\sqrt{x - 4}$ D) $8\sqrt{x + 8} - 12$

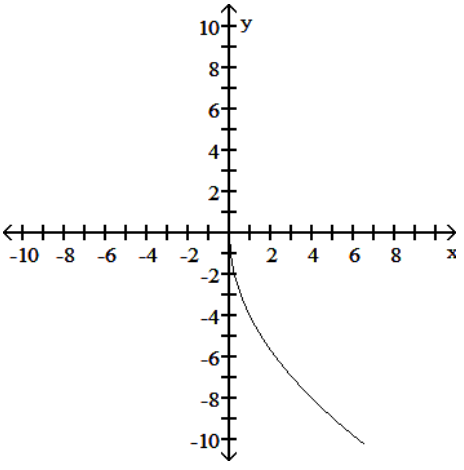
Answer: A
Diff: 0 Type: BI

Graph the function. Specify the intervals over which the function is increasing and the intervals where it is decreasing.

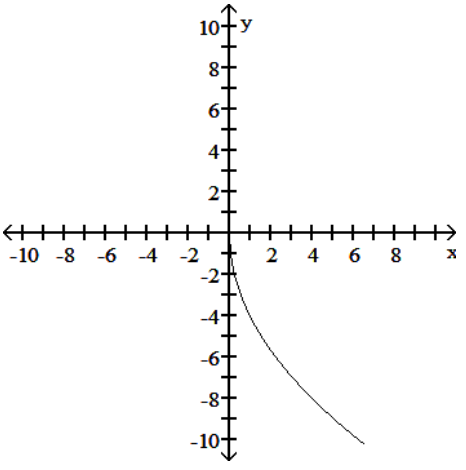
89) $y = -4\sqrt{x}$ 89) _____



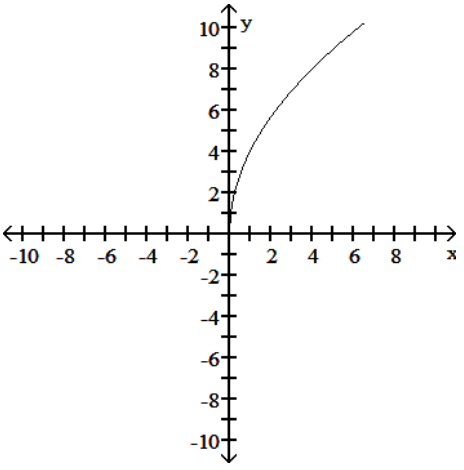
A) Decreasing $-\infty < x < \infty$



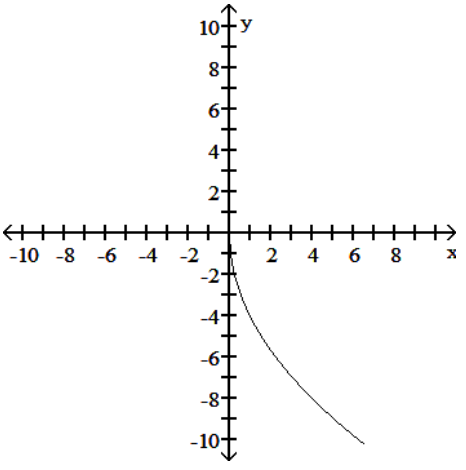
B) Decreasing $0 \le x < \infty$



C) Increasing $0 \le x < \infty$



D) Increasing $0 \le x < \infty$



Answer: B
Diff: 0 Type: BI

Find the formula for the function.

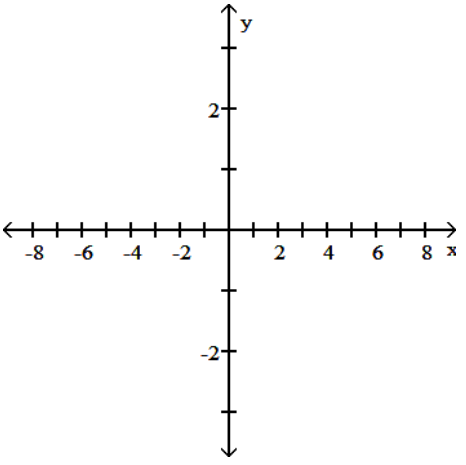
90) Express the volume of a sphere as a function of its radius r. 90) _____

A) $V = \frac{3}{4}\pi r^3$ B) $V = \frac{2}{3}\pi r^2$ C) $V = \pi r^3$ D) $V = \frac{4}{3}\pi r^3$

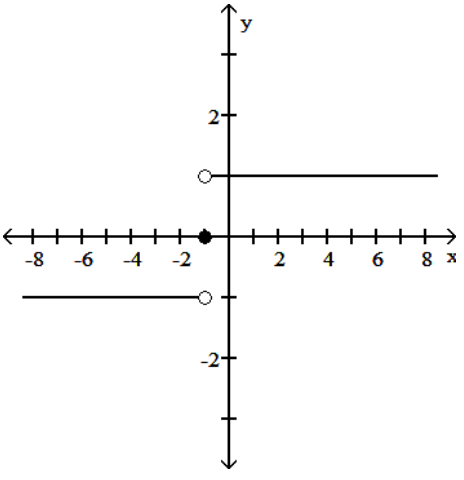
Answer: D
Diff: 0 Type: BI

Find the domain and graph the function.

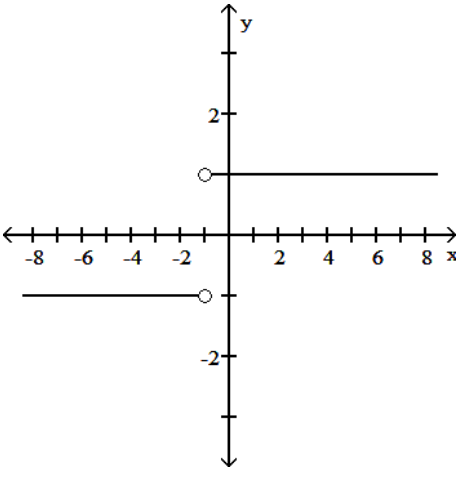
91) $F(t) = \frac{|t+1|}{t+1}$ 91) _____



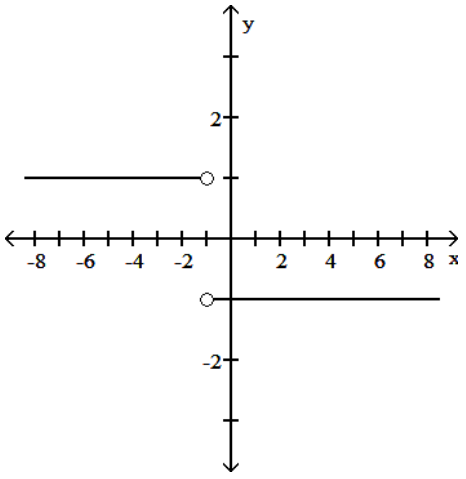
A) D: $(-\infty, \infty)$



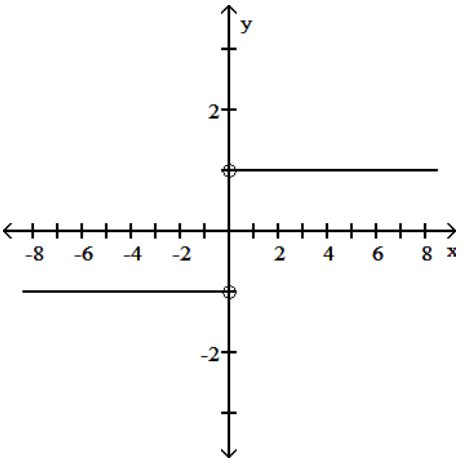
B) D: $(-\infty, -1) \cup (-1, \infty)$



C) D: $(-\infty, -1) \cup (-1>, \infty)$



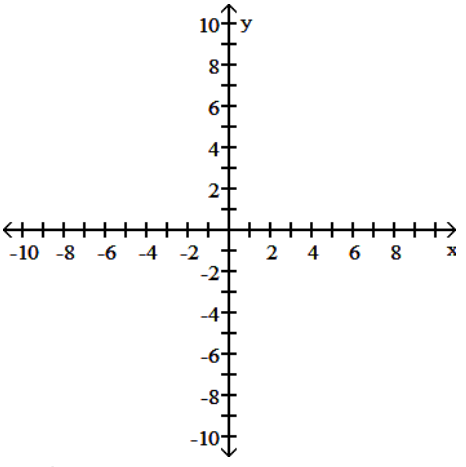
D) D: $(-\infty, 0) \cup (0, \infty)$



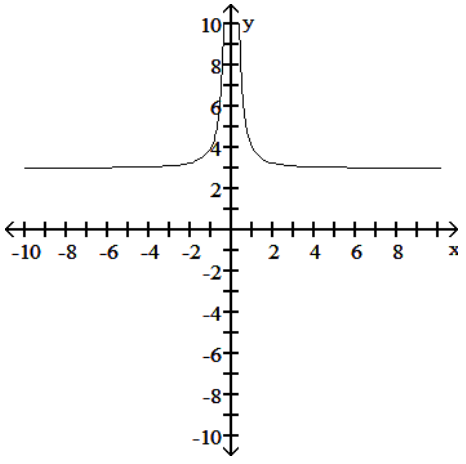
Answer: B
Diff: 0 Type: BI

Graph the function.

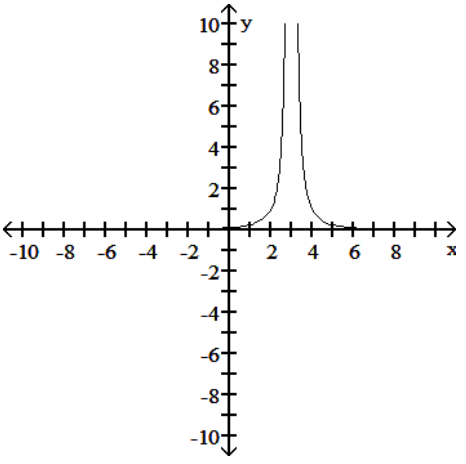
92) $y = \dfrac{1}{(x - 3)^2}$ 92) _____



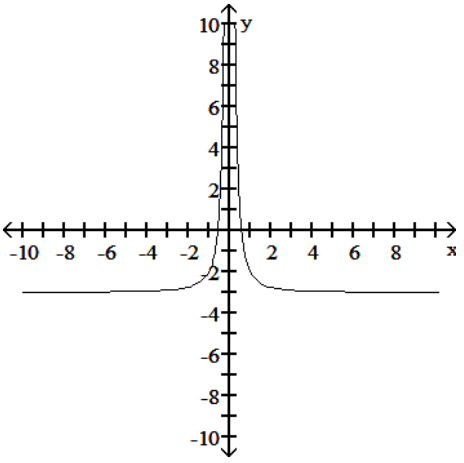
A)



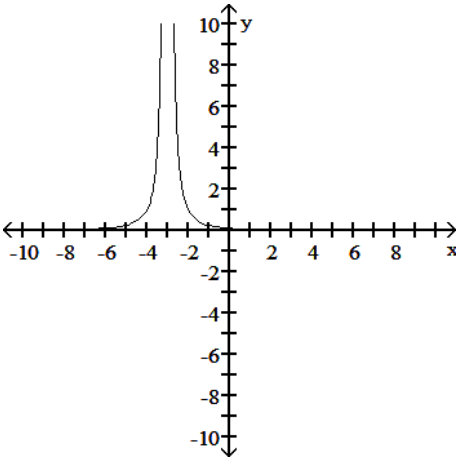
B)



C)

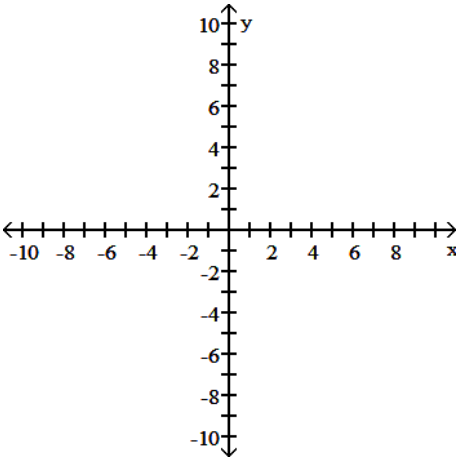


D)

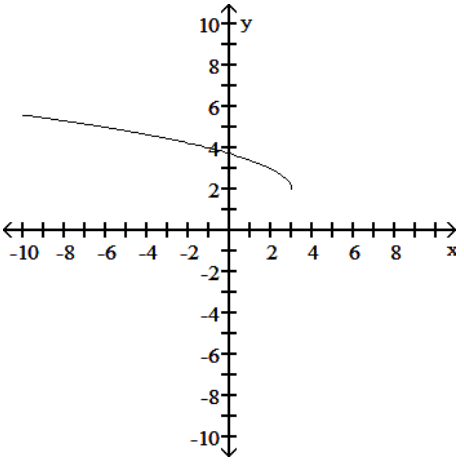


Answer: B
Diff: 0 Type: BI

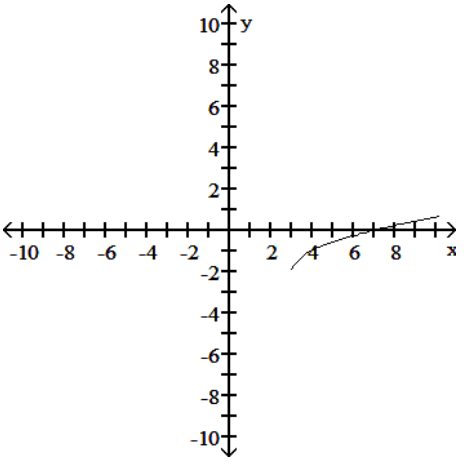
93) $y = \sqrt{x - 3} - 2$ 93) _____



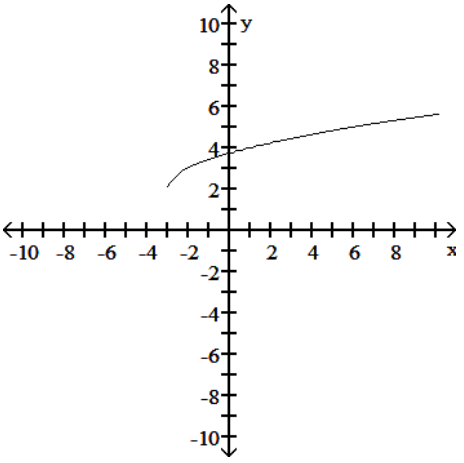
A)



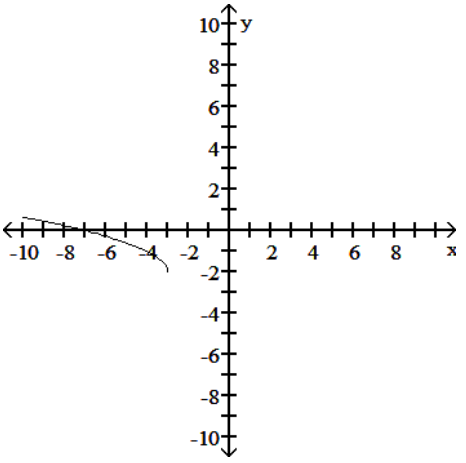
B)



C)



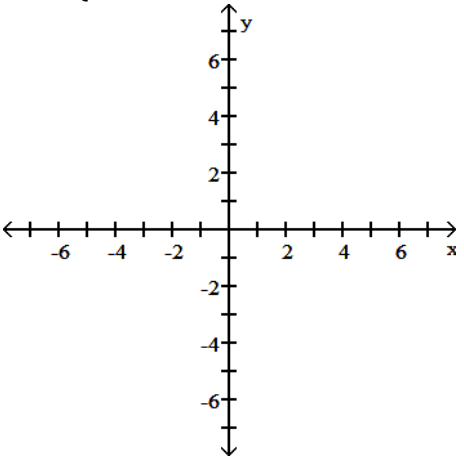
D)



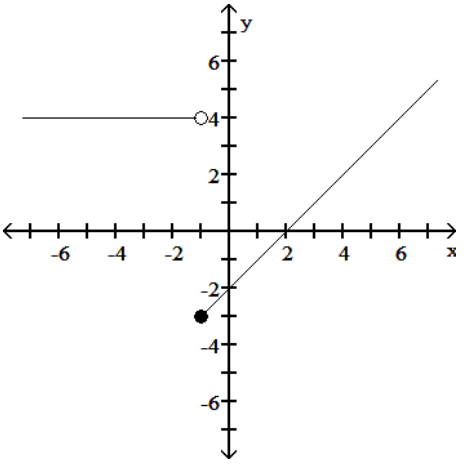
Answer: B
Diff: 0 Type: BI

94) $f(x) = \begin{cases} -2 - x, & x < 1 \\ 4, & x \geq 1 \end{cases}$

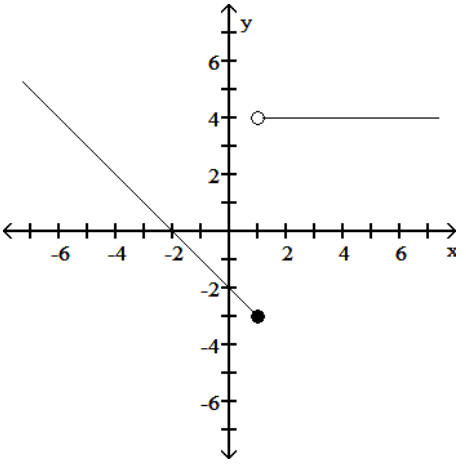
94) _____



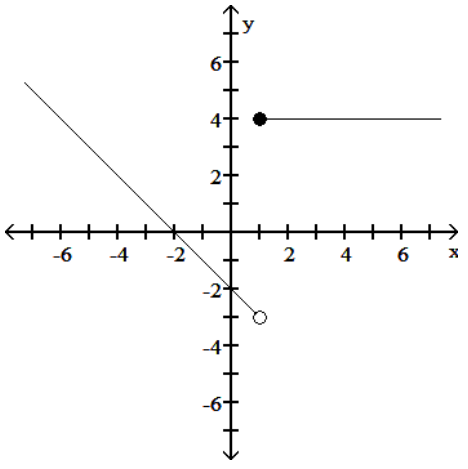
A)



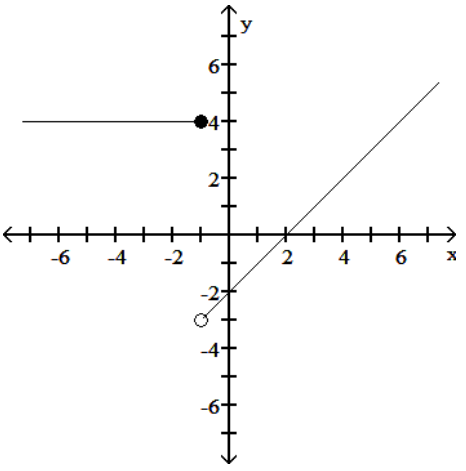
B)



C)



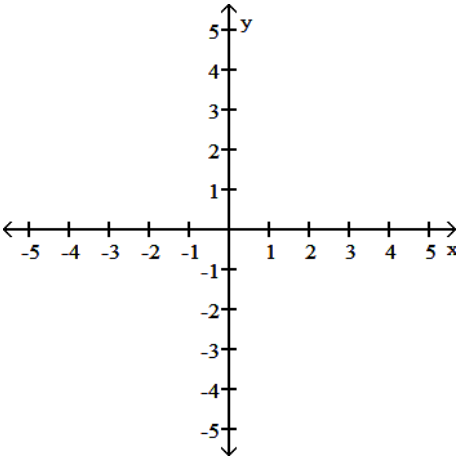
D)



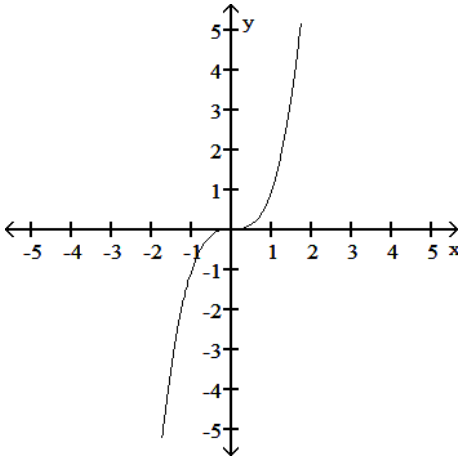
Answer: C
Diff: 0 Type: BI

Graph the function. Specify the intervals over which the function is increasing and the intervals where it is decreasing.

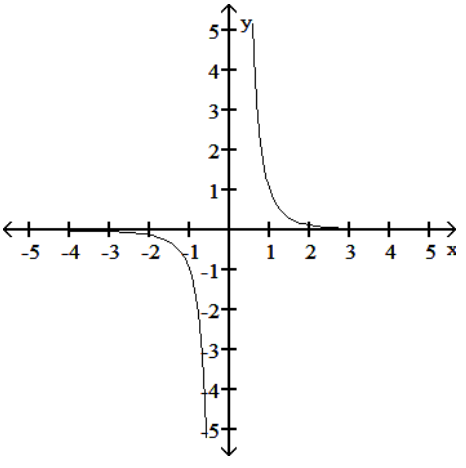
95) $y = \frac{1}{x^3}$ 95) _____



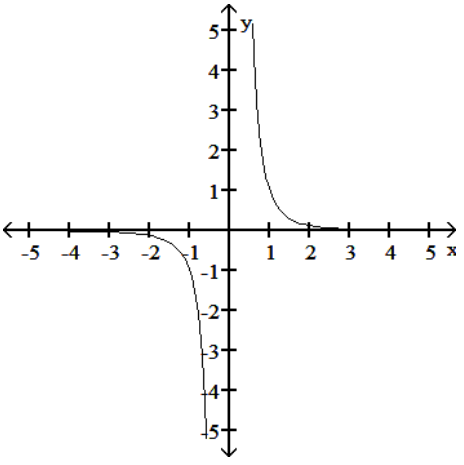
A) Increasing $-\infty < x < \infty$



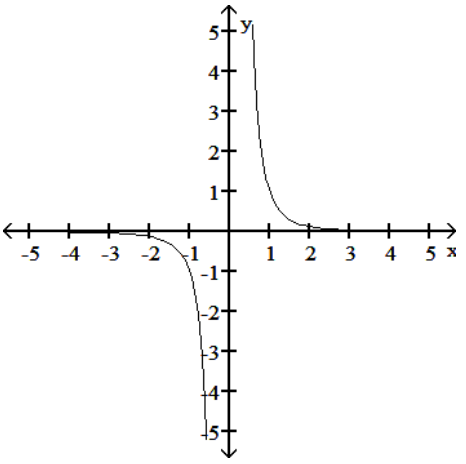
B) Decreasing $-\infty < x < 0$ and $0 < x < \infty$



C) Decreasing $-\infty < x < 0$;
Increasing $0 < x < \infty$



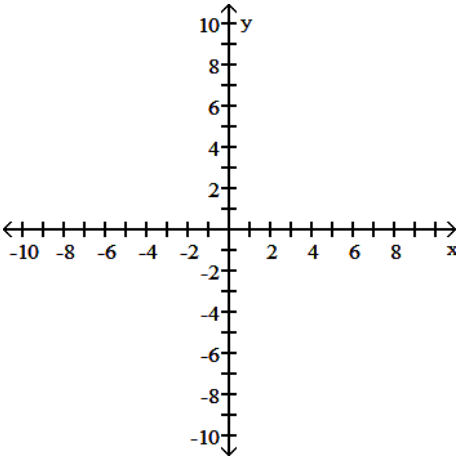
D) Increasing $-\infty < x < 0$ and $0 < x < \infty$



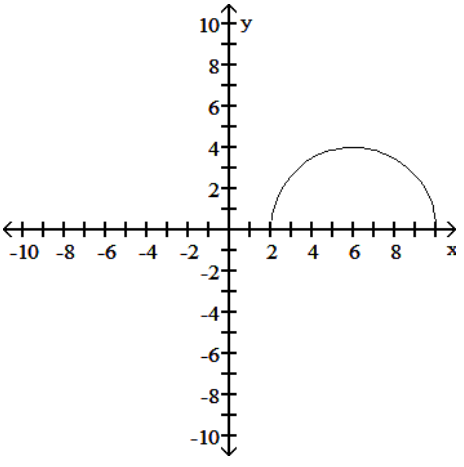
Answer: B
Diff: 0 Type: BI

Graph the function.

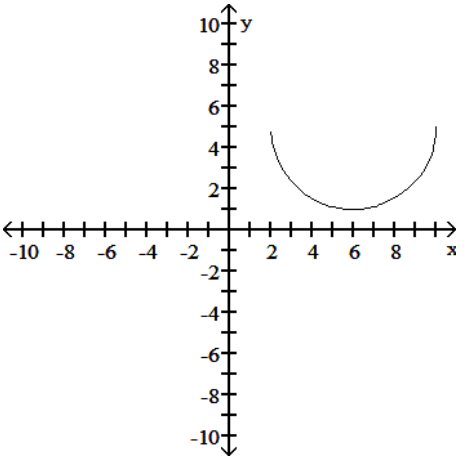
96) Graph the upper half of the circle defined by the equation $x^2 + y^2 - 12x - 10y + 45 = 0$. 96) _____



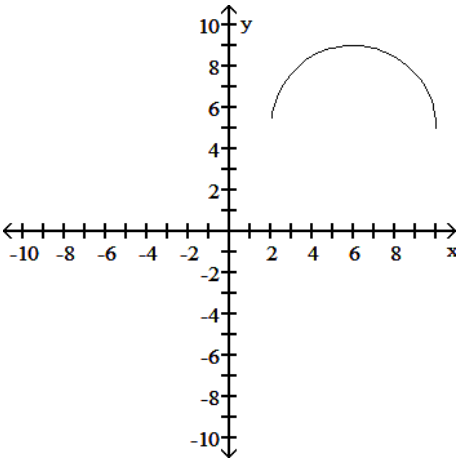
A)



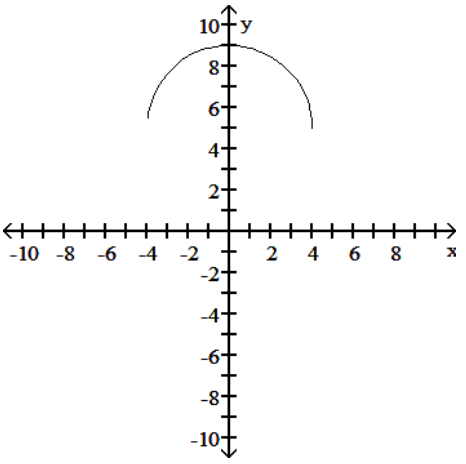
B)



C)



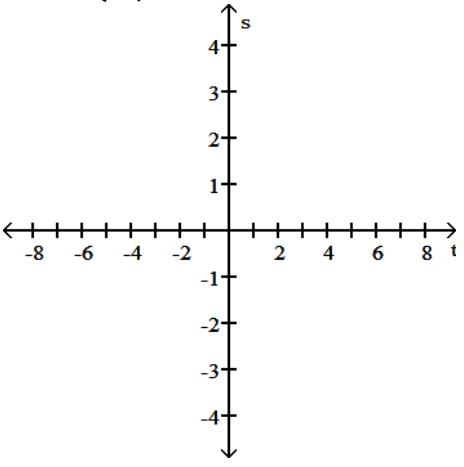
D)



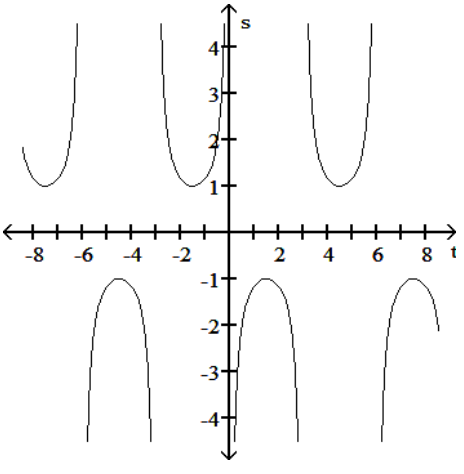
Answer: C
Diff: 0 Type: BI

Graph the function in the ts-plane (t-axis horizontal, s-axis vertical). State the period and symmetry of the function.

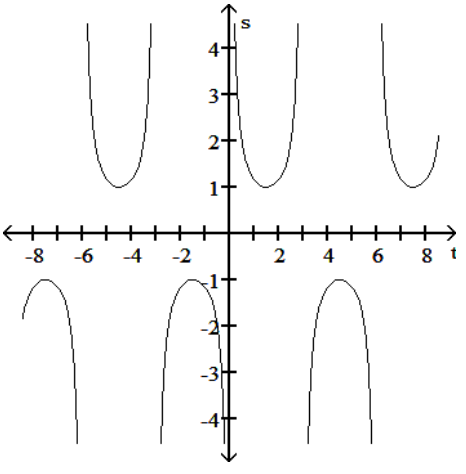
97) $s = -\csc\left(\frac{\pi t}{3}\right)$ 97) _____



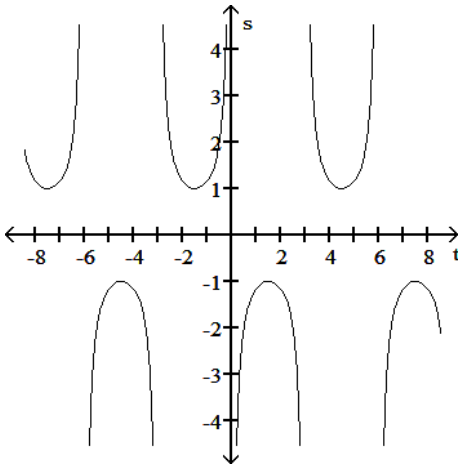
A) Period 6, symmetric about the origin



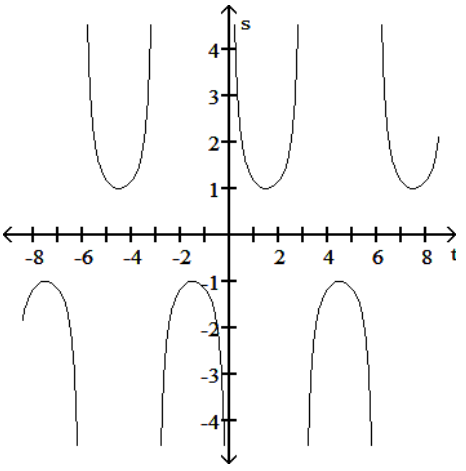
B) Period 6, symmetric about the origin



C) Period 6, symmetric about the s-axis



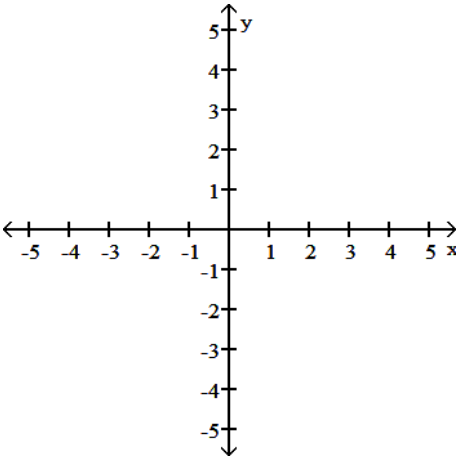
D) Period 6, symmetric about the s-axis



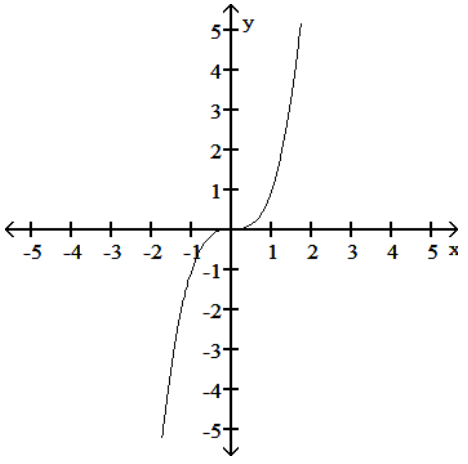
Answer: A
Diff: 0 Type: BI

Graph the function. Determine the symmetry, if any, of the function.

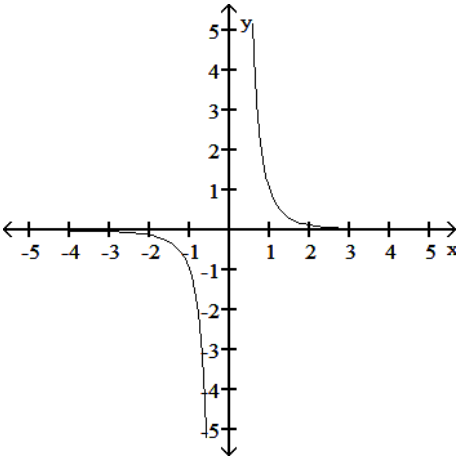
98) $y = \frac{1}{x^3}$ 98) _____



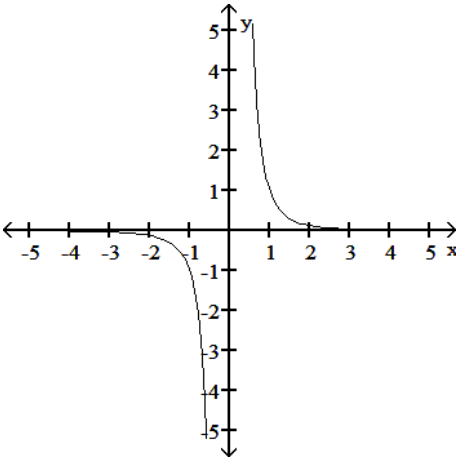
A) Symmetric about the origin



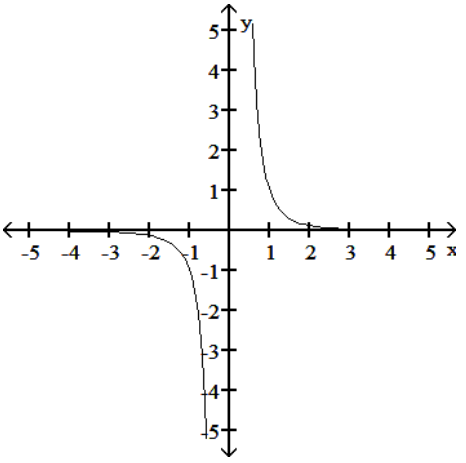
B) Symmetric about the origin



C) Symmetric about the y-axis

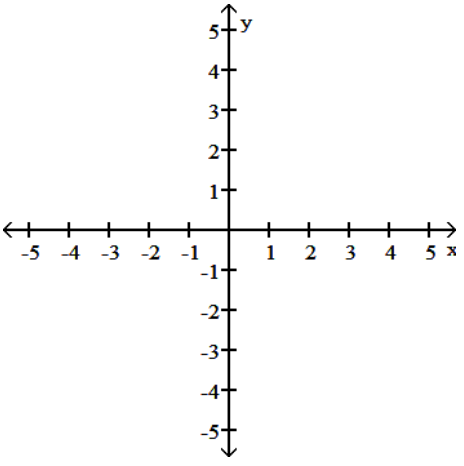


D) No symmetry

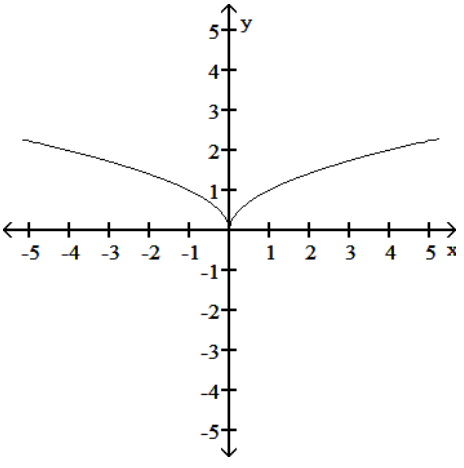


Answer: B
Diff: 0 Type: BI

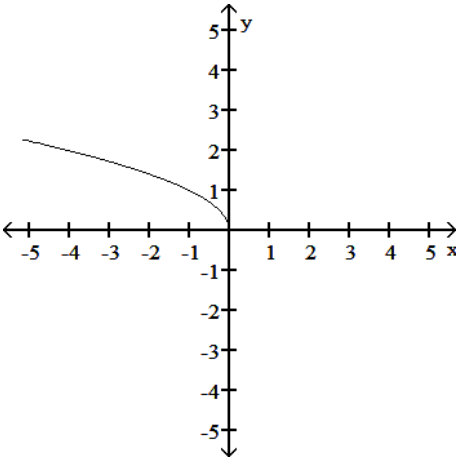
99) $y = \sqrt{-x}$ 99) _____



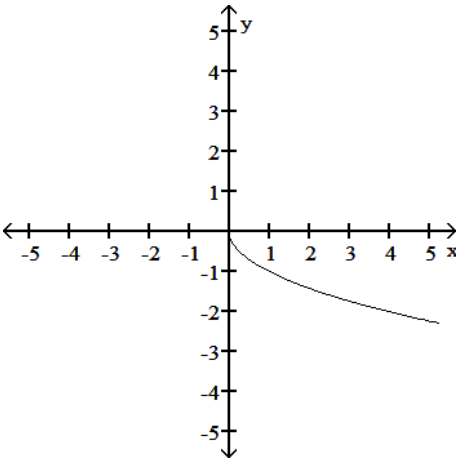
A) Symmetric about the y-axis



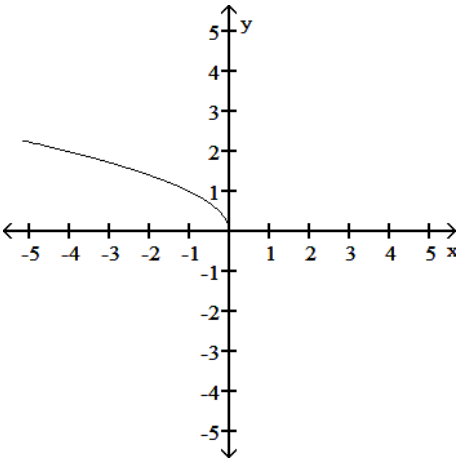
B) No symmetry



C) No symmetry



D) Symmetric about the y-axis



Answer: B
Diff: 0 Type: BI

Express the given function as a composite of functions f and g such that y = f(g(x)).

100) $y = \frac{1}{x^2 - 4}$ 100) _____

A) $f(x) = \frac{1}{x^2}$, $g(x) = x - 4$

B) $f(x) = \frac{1}{x}$, $g(x) = x^2 - 4$

C) $f(x) = \frac{1}{4}$, $g(x) = x^2 - 4$

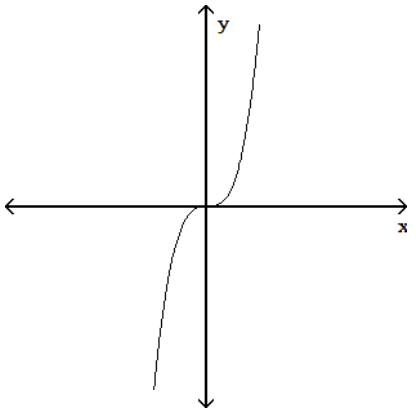
D) $f(x) = \frac{1}{x^2}$, $g(x) = -\frac{1}{4}$

Answer: B
Diff: 0 Type: BI

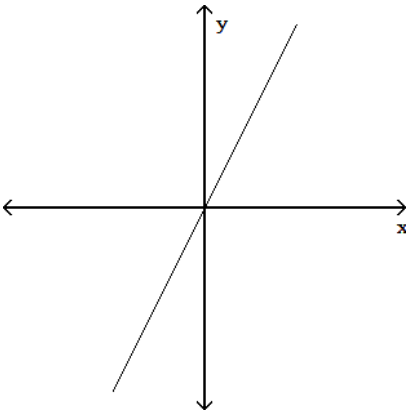
Match the equation with its graph.

101) $y = x^2$ 101) _____

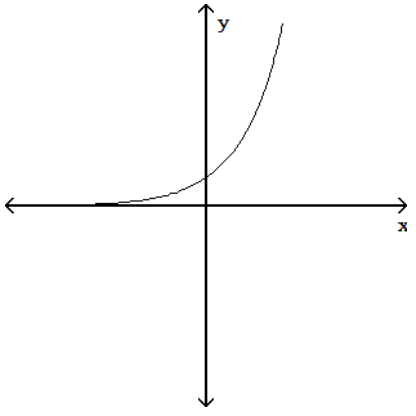
A)



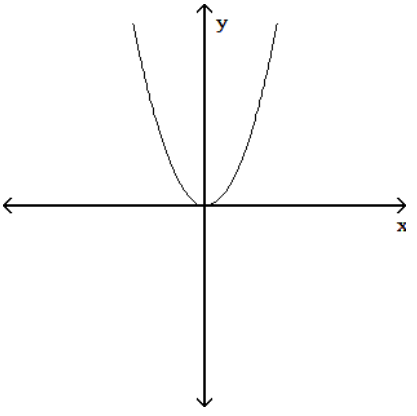
B)



C)



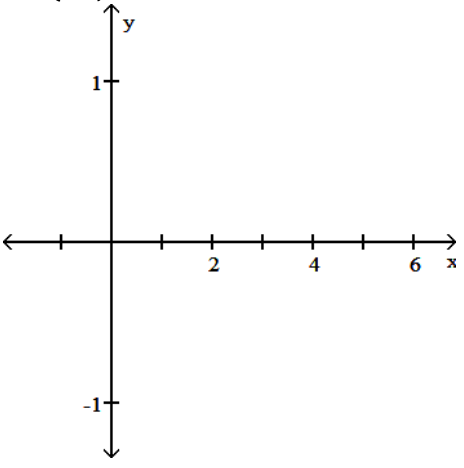
D)



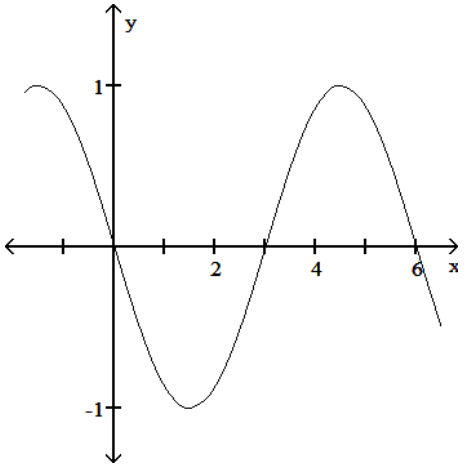
Answer: D
Diff: 0 Type: MC

State the period of the function and graph.

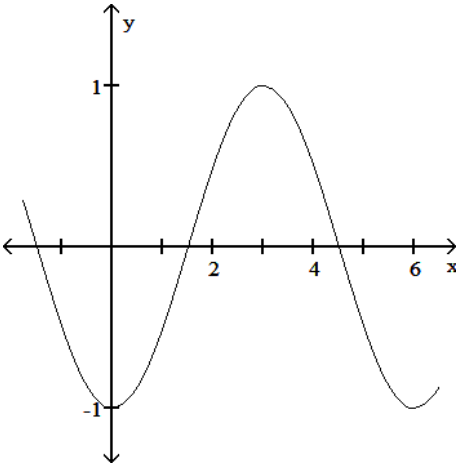
102) $\cos\left(\frac{\pi x}{3}\right)$ 102) _____



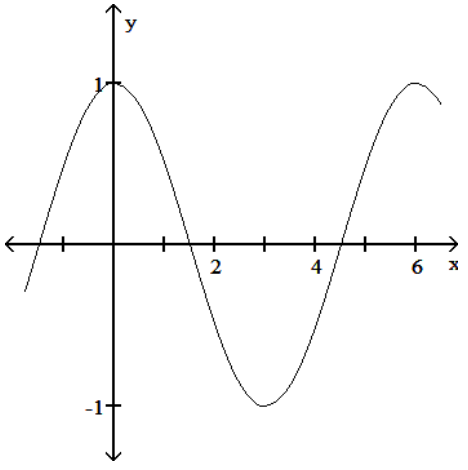
A) Period 6



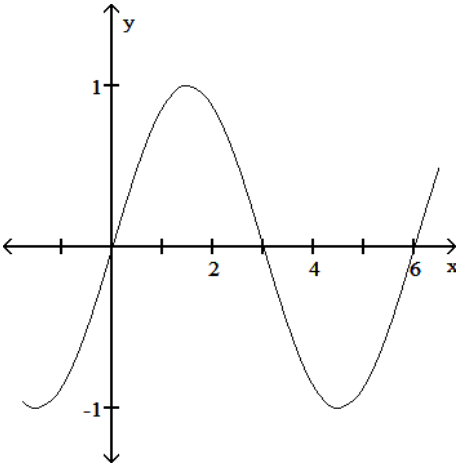
B) Period 6



C) Period 6



D) Period 6



Answer: C
Diff: 0 Type: BI

Express the given function as a composite of functions f and g such that y = f(g(x)).

103) $y = \frac{8}{\sqrt{8x + 8}}$ 103) _____

A) $f(x) = \frac{8}{x}$, $g(x) = 8x + 8$

B) $f(x) = 8$, $g(x) = \sqrt{8 + 8}$

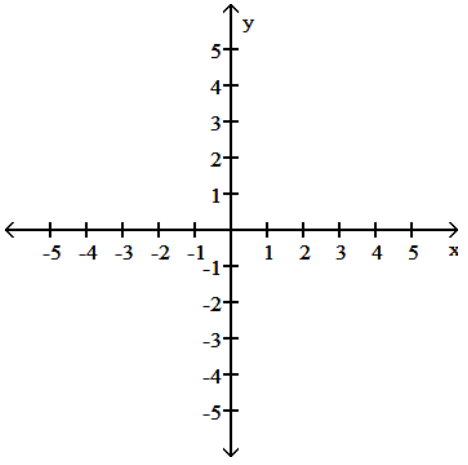
C) $f(x) = \frac{8}{\sqrt{x}}$, $g(x) = 8x + 8$

D) $f(x) = \sqrt{8x + 8}$, $g(x) = 8$

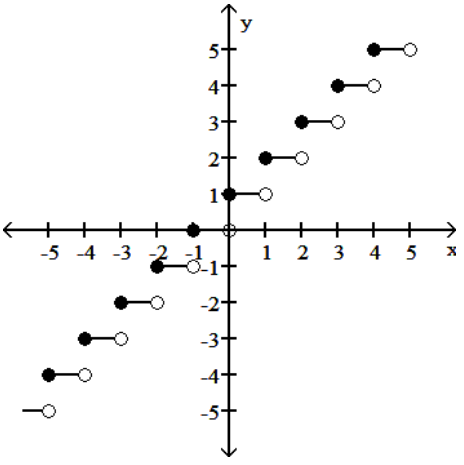
Answer: C
Diff: 0 Type: BI

Provide an appropriate response.

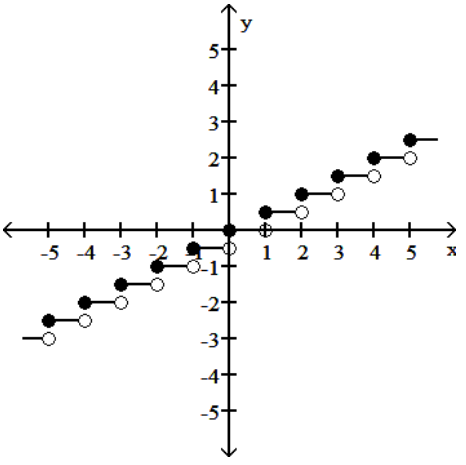
104) Graph the function f(x) = $\lfloor x \rfloor$. 104) _____



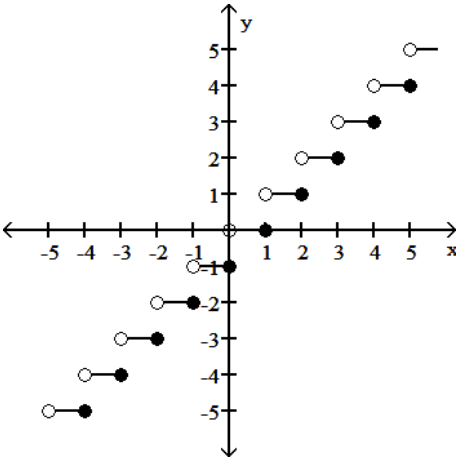
A)



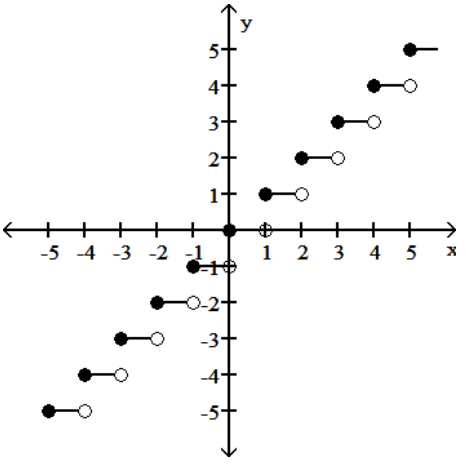
B)



C)



D)



Answer: D
Diff: 0 Type: BI

Solve the problem.

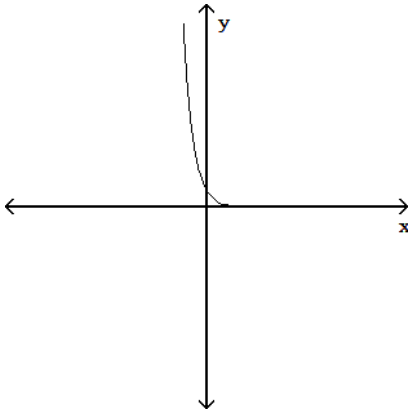
105) Let g(x) = x + 5. Find a function y = f(x) so that (f ∘ g)(x) = 2x + 10 105) _____

A) f(x) = 2(x + 1) B) f(x) = 2x C) f(x) = 2x - 5 D) f(x) = 2x + 5

Answer: B
Diff: 0 Type: BI

Determine whether or not the graph is a graph of a function of x.

106) 106) _____



A) Function B) Not a function

Answer: A
Diff: 0 Type: BI

Determine if the function is even, odd, or neither.

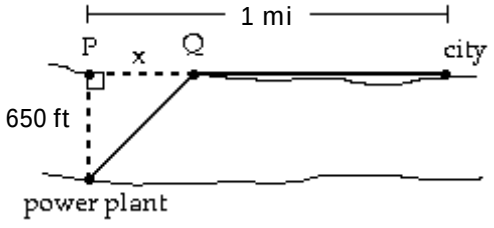
107) $f(x) = -4x^5 + 9x^3$ 107) _____

A) Even B) Odd C) Neither

Answer: B
Diff: 0 Type: BI

Solve the problem.

108) A power plant is located on a river that is 650 feet wide. To lay a new cable from the plant to a location in a city 1 mile downstream on the opposite side costs $225 per foot across the river and $ 150 per foot along the land. Suppose that the cable goes from the plant to a point Q on the opposite side that is x feet from the point P directly opposite the plant. Write a function C(x) that gives the cost of laying the cable in terms of the distance x. 108) _____



A) $C(x) = 225\sqrt{x^2 + 650^2} + 150(5280 - x)$ B) $C(x) = 225(650 - x) + 150(1 - x)$

C) $C(x) = 150\sqrt{x^2 + 650^2} + 225(5280 - x)$ D) $C(x) = 225\sqrt{x^2 + 650^2} + 150(1 - x)$

Answer: A
Diff: 0 Type: BI

The problem tells by what factor and direction the graph of the given function is to be stretched or compressed. Give an equation for the stretched or compressed graph.

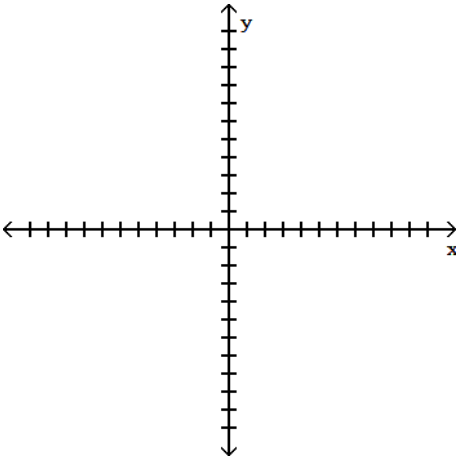
109) $y = 1 + \frac{1}{x^2}$ stretched vertically by a factor of 2 109) _____

A) $y = \frac{1}{2} + \frac{1}{2x^2}$ B) $y = 1 + \frac{2}{x^2}$ C) $y = 2 + \frac{2}{x^2}$ D) $y = 1 + \frac{4}{x^2}$

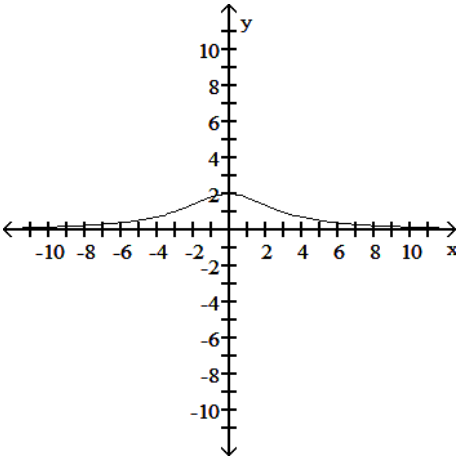
Answer: C
Diff: 0 Type: BI

Determine an appropriate viewing window for the given function and use it to display its graph.

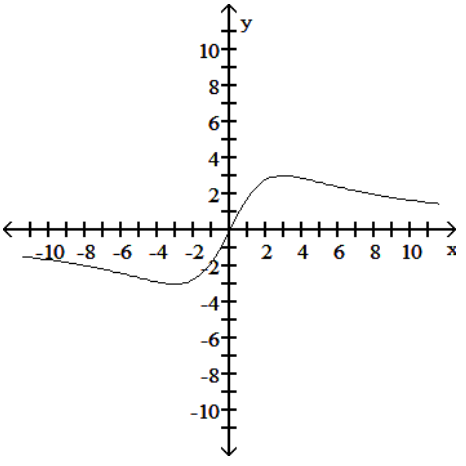
110) $f(x) = \frac{18x}{x^2 - 9}$ 110) _____



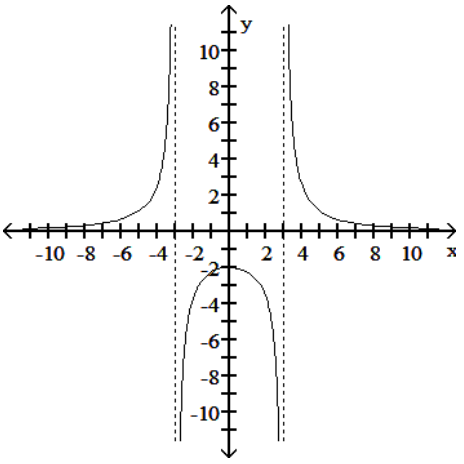
A)



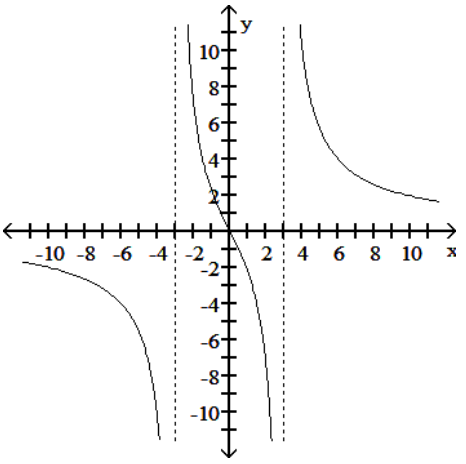
B)



C)



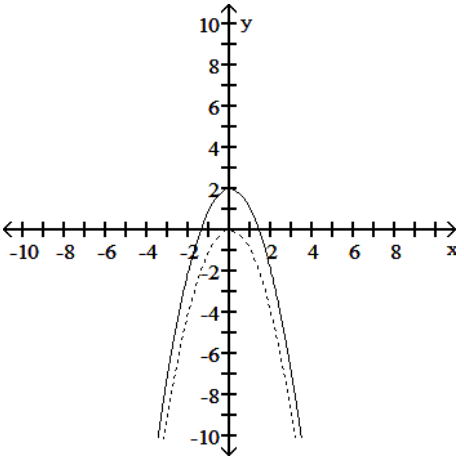
D)



Answer: D
Diff: 0 Type: BI

Solve the problem.

111) The accompanying figure shows the graph of $y = -x^2$ shifted to a new position. Write the equation for the new graph. 111) _____



A) $y = -(x + 2)^2$ B) $y = -x^2 - 2$ C) $y = -x^2 + 2$ D) $y = -(x - 2)^2$

Answer: C
Diff: 0 Type: BI

Assume that f is an even function, g is an odd function, and both f and g are defined on the entire real line. State whether the combination of functions (where defined) is even or odd.

112) fg 112) _____

A) Even B) Odd

Answer: B
Diff: 0 Type: BI

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Use the addition formulas to derive the identity.

113) $\cos\left(x - \frac{\pi}{2}\right) = \sin x$ 113) _____

Answer: $\cos\left(x - \frac{\pi}{2}\right) = \cos x \cos\left(-\frac{\pi}{2}\right) - \sin x \sin\left(-\frac{\pi}{2}\right)$

$= \cos x\,(0) - \sin x\,(-1)$

$= 0 + \sin x$

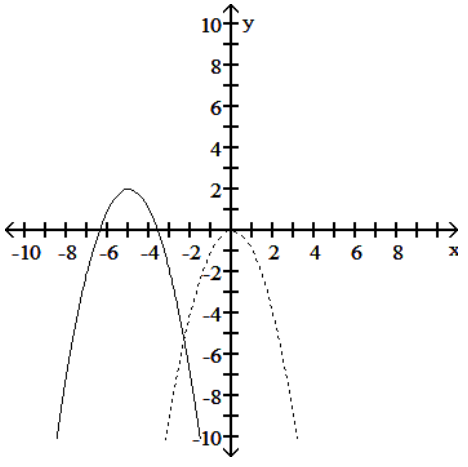
$= \sin x$

Diff: 0 Type: SA

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the problem.

114) The accompanying figure shows the graph of $y = -x^2$ shifted to a new position. Write the equation for the new graph. 114) _____



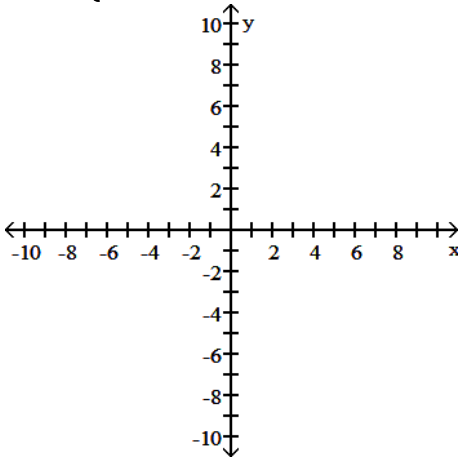
A) $y = -(x + 2)^2 - 5$ B) $y = -(x - 5)^2 + 2$ C) $y = -(x + 5)^2 - 2$ D) $y = -(x + 5)^2 + 2$

Answer: D

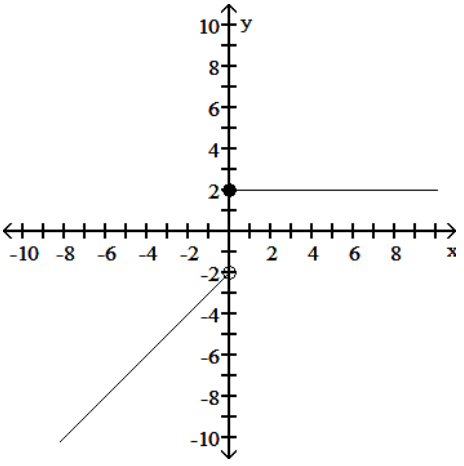
Diff: 0 Type: BI

Graph the function.

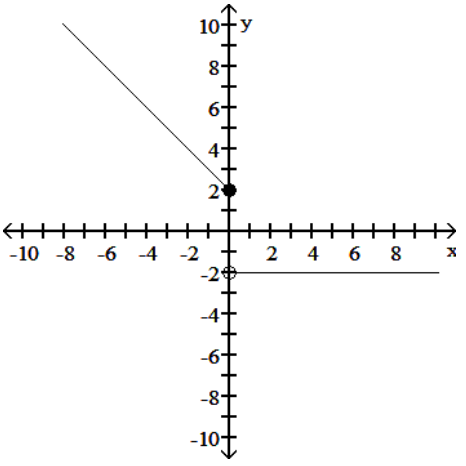
115) $G(x) = \begin{cases} |x| + 2, & x < 0 \\ 2, & x \geq 0 \end{cases}$ 115) _____



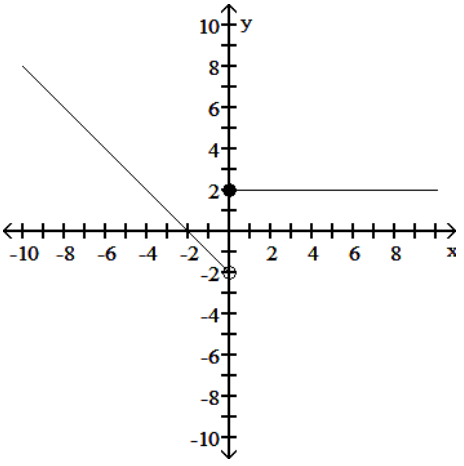
A)



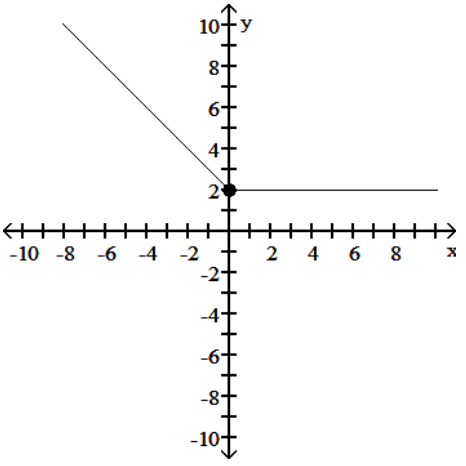
B)



C)



D)



Answer: D
Diff: 0 Type: BI

One of sin x, cos x, and tan x is given. Find the other two if x lies in the specified interval.

116) $\cos x = -\frac{\sqrt{2}}{2}, \quad x \text{ in } \left[-\frac{3\pi}{2}, -\pi\right]$ 116) _____

A) $\sin x = \frac{\sqrt{2}}{2}, \tan x = -1$

B) $\sin x = -\frac{\sqrt{2}}{2}, \tan x = 1$

C) $\sin x = \frac{\sqrt{2}}{2}, \tan x = 1$

D) $\sin x = -\frac{\sqrt{2}}{2}, \tan x = -1$

Answer: A
Diff: 0 Type: BI

Use the appropriate addition formula to find the exact value of the expression.

117) $\sin\left(\frac{11\pi}{12}\right)$ 117) _____

A) $\frac{\sqrt{6}+\sqrt{2}}{4}$ B) $\frac{\sqrt{6}-\sqrt{2}}{4}$ C) $\frac{\sqrt{2}-\sqrt{6}}{4}$ D) $-\frac{\sqrt{6}+\sqrt{2}}{4}$

Answer: B
Diff: 0 Type: BI

Express the given function as a composite of functions f and g such that y = f(g(x)).

118) $y = \frac{10}{x^2} + 6$ 118) _____

A) $f(x) = x + 6, g(x) = \frac{10}{x^2}$

B) $f(x) = x, g(x) = \frac{10}{x} + 6$

C) $f(x) = \frac{10}{x^2}, g(x) = 6$

D) $f(x) = \frac{1}{x}, g(x) = \frac{10}{x} + 6$

Answer: A
Diff: 0 Type: BI

Find the domain and range of the function.

119) $F(t) = \frac{9}{\sqrt{t}}$ 119) _____

A) D: $(-\infty,\infty)$, R: $(-\infty,\infty)$

B) D: $(-\infty,0)$, R: $(-\infty,0)$

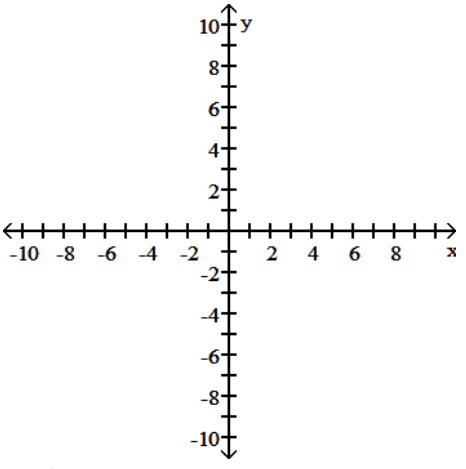
C) D: $(0,\infty)$, R: $(0,\infty)$

D) D: $[0,\infty)$, R: $(-\infty,\infty)$

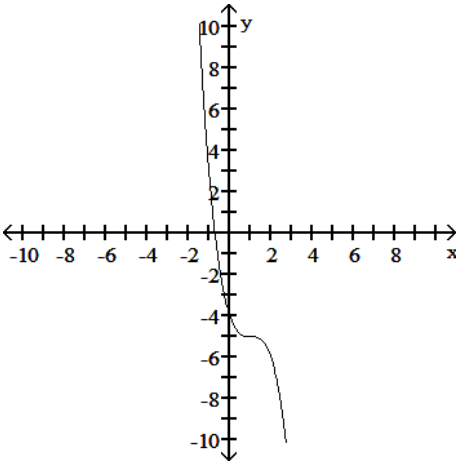
Answer: C
Diff: 0 Type: BI

Graph the function.

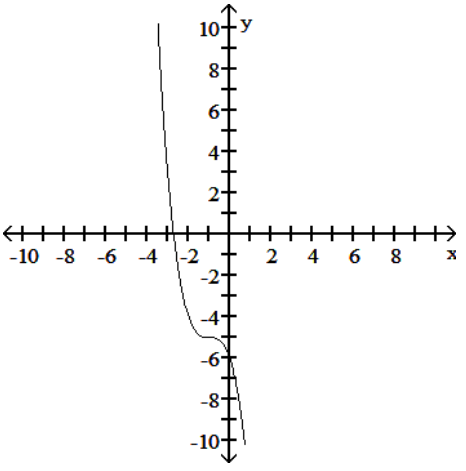
120) $y = (1 - x)^3 - 5$ 120) _____



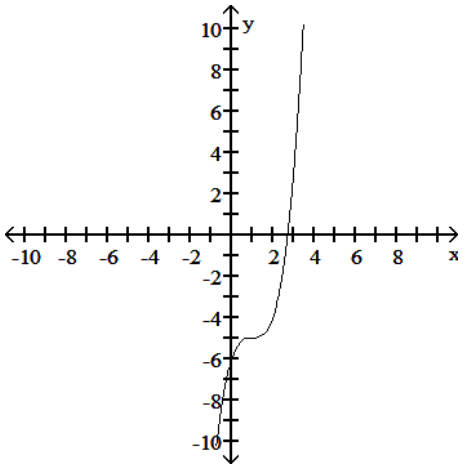
A)



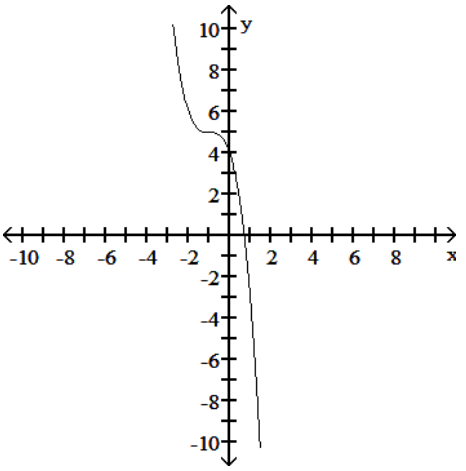
B)



C)



D)



Answer: A
Diff: 0 Type: BI

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Use the addition formulas to derive the identity.

121) $\cos\left(x + \frac{\pi}{2}\right) = -\sin x$ 121) _____

Answer: $\cos\left(x + \frac{\pi}{2}\right) = \cos x \cos\frac{\pi}{2} - \sin x \sin\frac{\pi}{2}$

$= \cos x\,(0) - \sin x\,(1)$

$= 0 - \sin x$

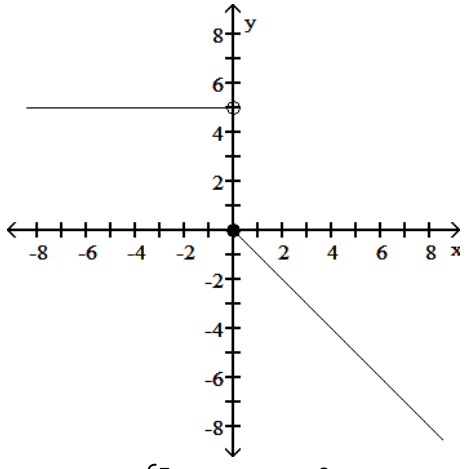
$= -\sin x$

Diff: 0 Type: SA

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find a formula for the function graphed.

122) 122) _____



A) $f(x) = \begin{cases} 5, & x < 0 \\ -5x, & x \geq 0 \end{cases}$

B) $f(x) = \begin{cases} 5, & x < 0 \\ -x, & x \geq 0 \end{cases}$

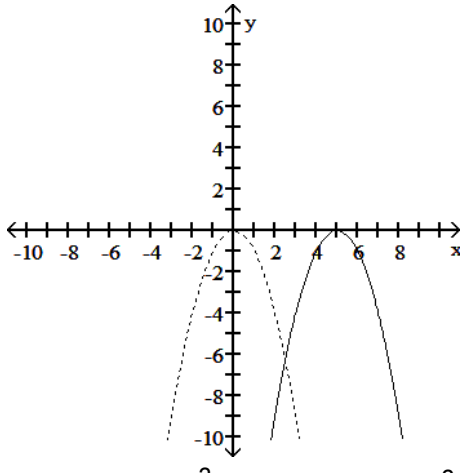
C) $f(x) = \begin{cases} 5, & x \leq 0 \\ -x, & x > 0 \end{cases}$

D) $f(x) = \begin{cases} 5, & x < 0 \\ x, & x \geq 0 \end{cases}$

Answer: B
Diff: 0 Type: BI

Solve the problem.

123) The accompanying figure shows the graph of $y = -x^2$ shifted to a new position. Write the equation for the new graph. 123) _____



A) $y = -(x - 5)^2$ B) $y = -x^2 + 5$ C) $y = -(x + 5)^2$ D) $y = -x^2 - 5$

Answer: A
Diff: 0 Type: BI

Solve for the angle θ, where $0 \le \theta \le 2\pi$

124) $\sin 2\theta + \cos\theta = 0$ 124) _____

A) $\theta = \frac{\pi}{2}, \frac{3\pi}{2}, \frac{\pi}{6}, \frac{5\pi}{6}$

B) $\theta = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$

C) $\theta = \frac{\pi}{2}, \frac{3\pi}{2}, \frac{7\pi}{6}, \frac{11\pi}{6}$

D) $\frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{6}, \frac{11\pi}{6}$

Answer: C
Diff: 0 Type: BI

Find the domain and range of the function.

125) $F(t) = \frac{10}{3\sqrt{t}}$ 125) _____

A) D: $(-\infty,\infty)$, R: $(-\infty,\infty)$

B) D: $(0,\infty)$, R: $(0,\infty)$

C) D: $(-\infty,0)$, R: $(-\infty,0)$

D) D: $[0,\infty)$, R: $[0,\infty)$

Answer: B
Diff: 0 Type: BI

The problem tells by what factor and direction the graph of the given function is to be stretched or compressed. Give an equation for the stretched or compressed graph.

126) $y = x^3 + 1$ stretched vertically by a factor of 5 126) _____

A) $y = 125x^3 + 1$ B) $y = 5x^3 + 1$ C) $y = \frac{x^3}{5} + \frac{1}{5}$ D) $y = 5x^3 + 5$

Answer: D
Diff: 0 Type: BI

Determine if the function is even, odd, or neither.

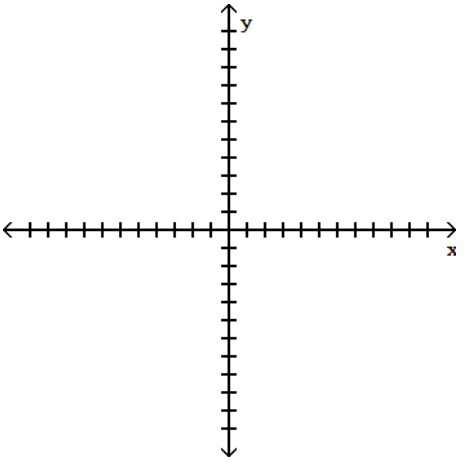
127) $g(x) = \frac{6x}{x^2 + 1}$ 127) _____

A) Even B) Odd C) Neither

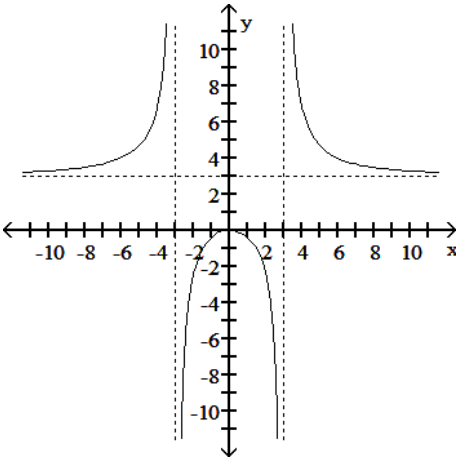
Answer: B
Diff: 0 Type: BI

Determine an appropriate viewing window for the given function and use it to display its graph.

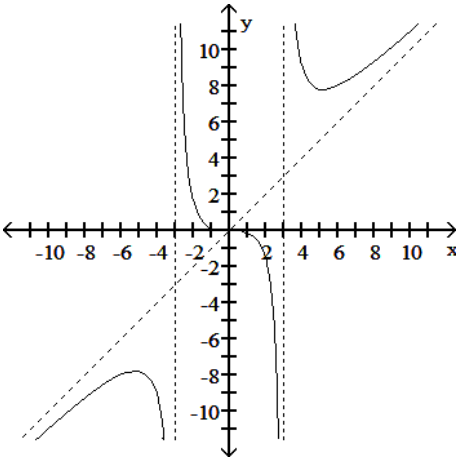
128) $f(x) = \frac{x^3}{x^2 - 9}$ 128) _____



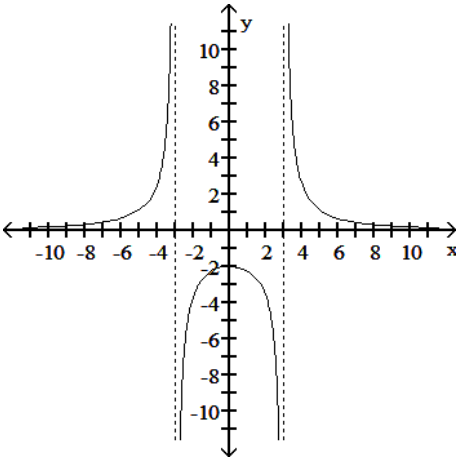
A)



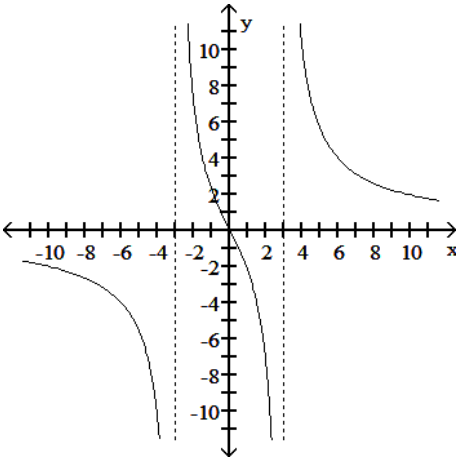
B)



C)



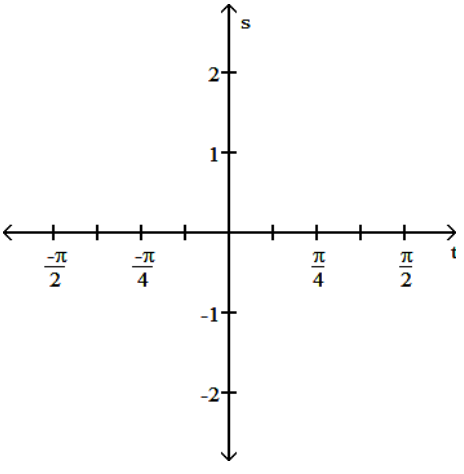
D)



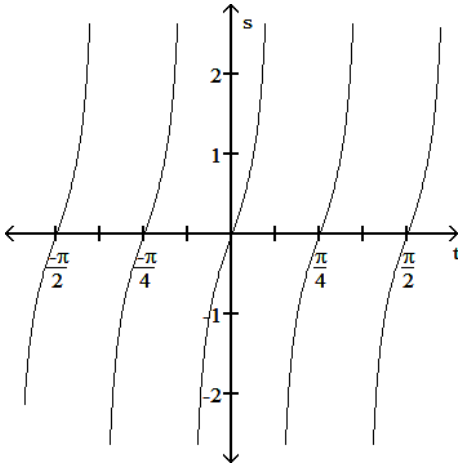
Answer: B
Diff: 0 Type: BI

Graph the function in the ts-plane (t-axis horizontal, s-axis vertical). State the period and symmetry of the function.

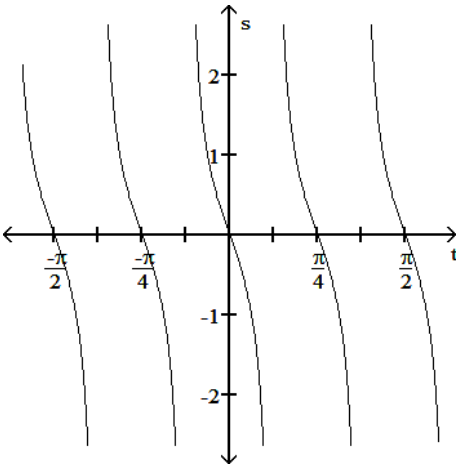
129) $s = -\cot 4t$ 129) _____



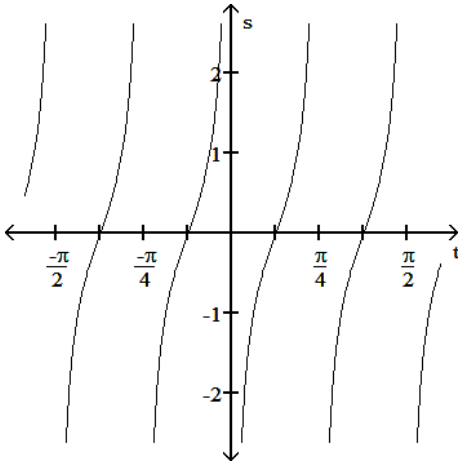
A) Period π, symmetric about the origin



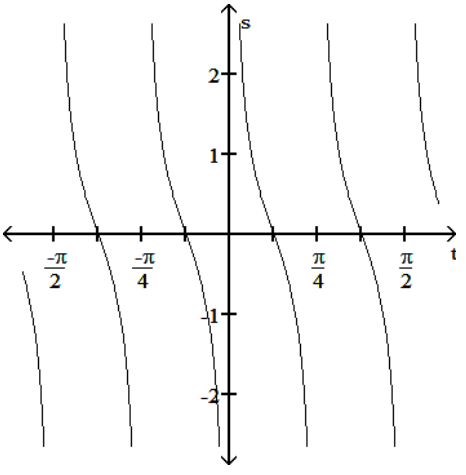
B) Period $\frac{\pi}{4}$, symmetric about the origin



C) Period $\frac{\pi}{4}$, symmetric about the origin



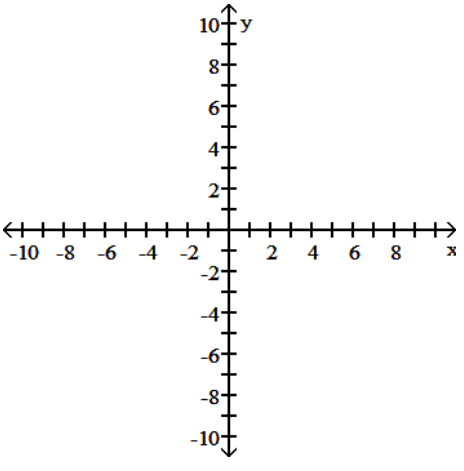
D) Period $\frac{\pi}{4}$, symmetric about the s-axis



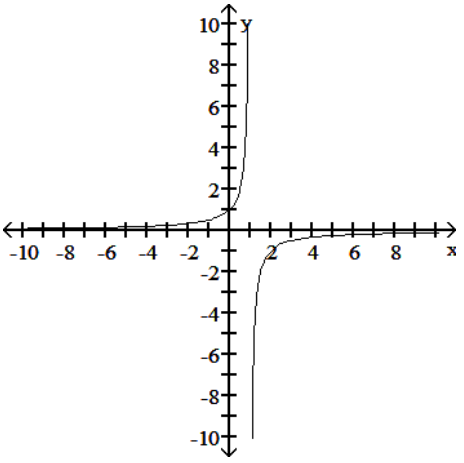
Answer: C
Diff: 0 Type: BI

Graph the function.

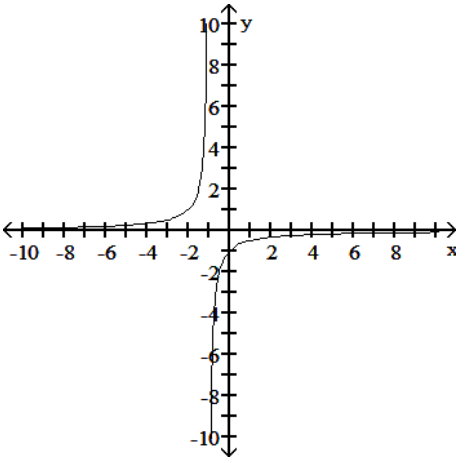
130) $y = \frac{1}{x - 1}$ 130) _____



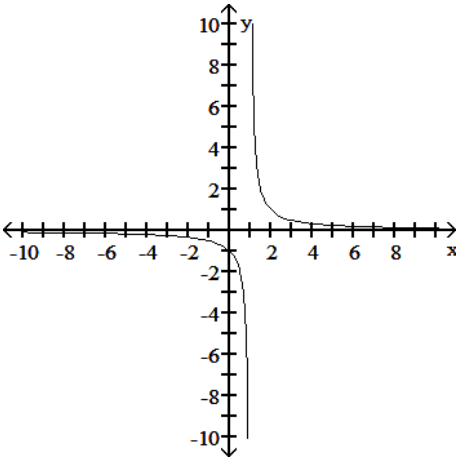
A)



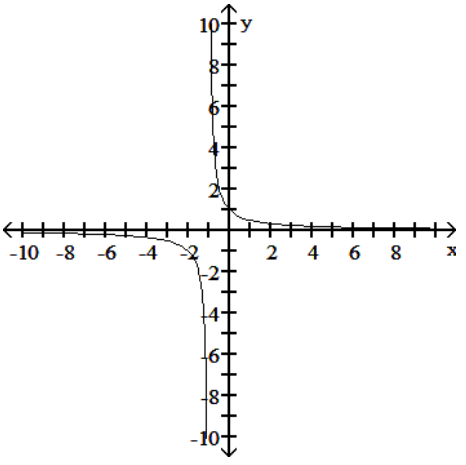
B)



C)

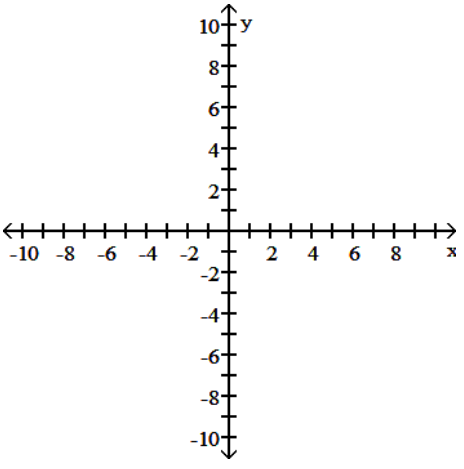


D)

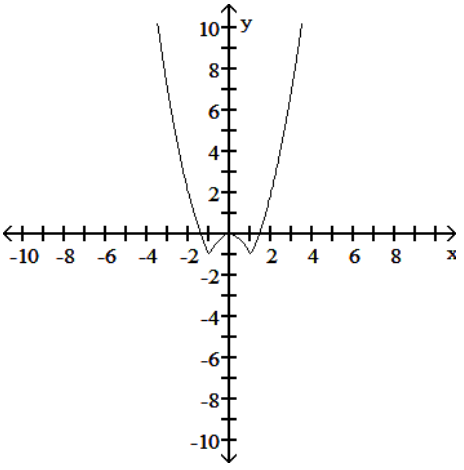


Answer: C
Diff: 0 Type: BI

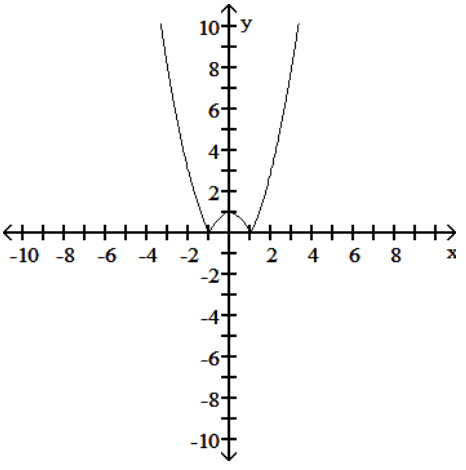
131) $y = |x^2 - 1|$ 131) _____



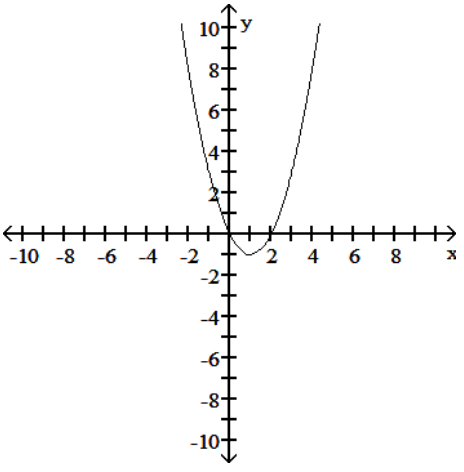
A)



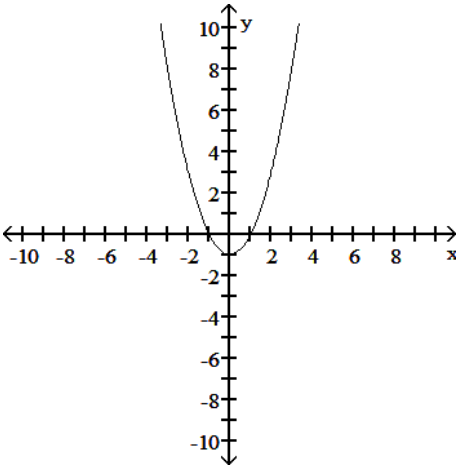
B)



C)



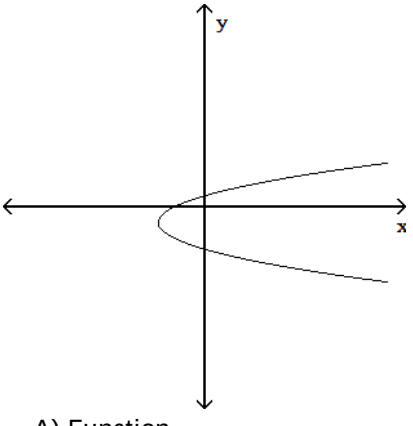
D)



Answer: B
Diff: 0 Type: BI

Determine whether or not the graph is a graph of a function of x.

132) 132) _____



A) Function

B) Not a function

Answer: B
Diff: 0 Type: BI

Use a graphing calculator or computer to determine which of the given viewing windows displays the most appropriate graph of the specified function.

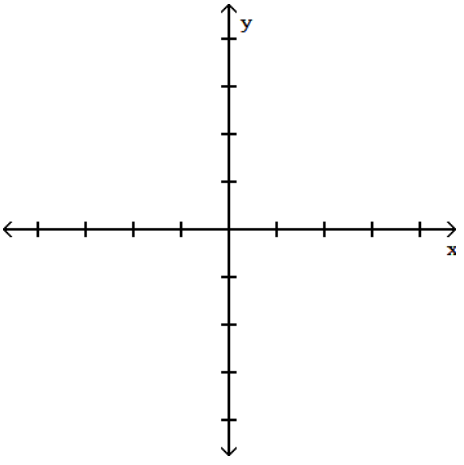
133) $f(x) = \dfrac{x^2 - 1}{x^2 + 1}$ 133) _____

A) [-1, 1] by [-2, 2]
B) [-10, 10] by [-10, 10]
C) [-5, 5] by [-15, 15]
D) [-10, 10] by [-2, 2]

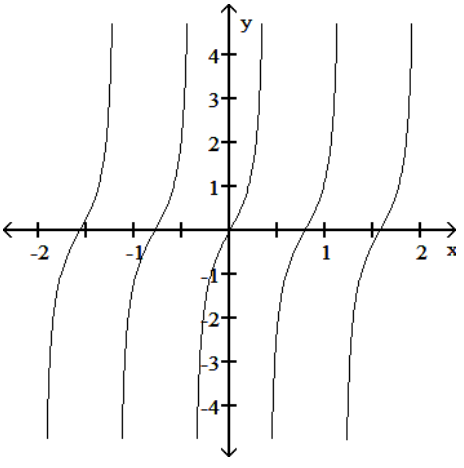
Answer: D
Diff: 0 Type: MC

Graph the function.

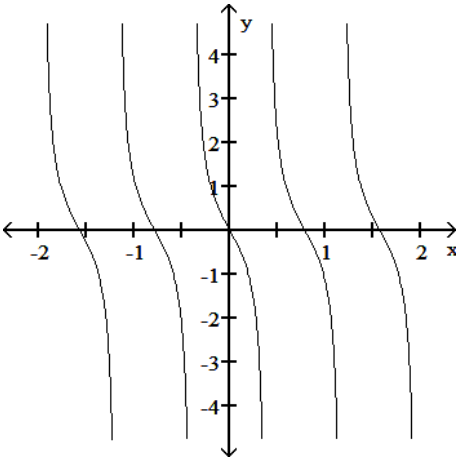
134) Graph five periods of the function f(x) = tan 4x. 134) _____



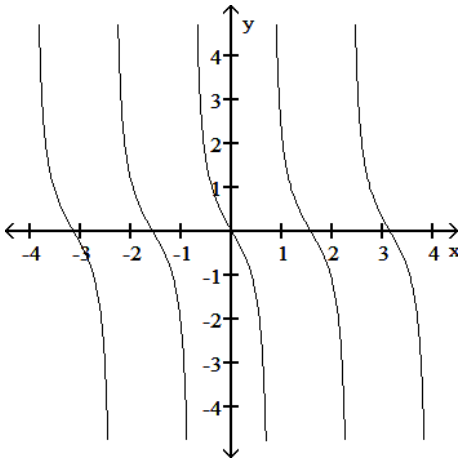
A)



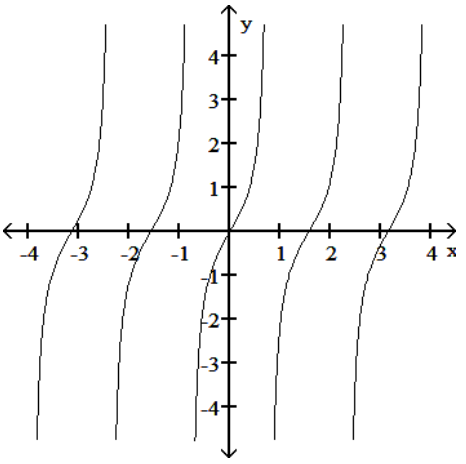
B)



C)



D)



Answer: A
Diff: 0 Type: BI

Express the given quantity in terms of sin x or cos x.

135) cos (6π - x) 135) _____

A) -cos x B) cos x + sin x C) cos x - sin x D) cos x

Answer: D
Diff: 0 Type: BI

Use the appropriate addition formula to find the exact value of the expression.

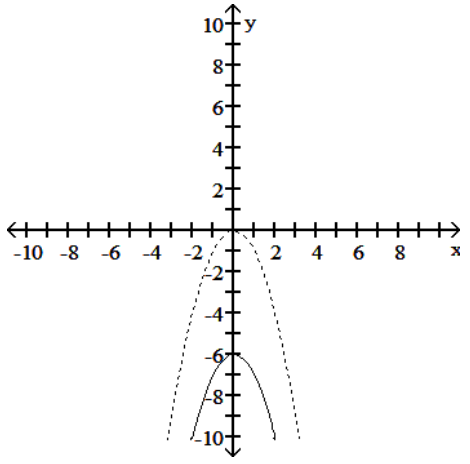
136) $\sin\left(-\frac{11\pi}{12}\right)$ 136) _____

A) $\frac{\sqrt{6}+\sqrt{2}}{4}$ B) $-\frac{\sqrt{6}+\sqrt{2}}{4}$ C) $\frac{\sqrt{2}-\sqrt{6}}{4}$ D) $\frac{\sqrt{6}-\sqrt{2}}{4}$

Answer: C
Diff: 0 Type: BI

Solve the problem.

137) The accompanying figure shows the graph of $y = -x^2$ shifted to a new position. Write the equation for the new graph. 137) _____



A) $y = -x^2 - 6$ B) $y = -(x - 6)^2$ C) $y = -(x + 6)^2$ D) $y = -x^2 + 6$

Answer: A
Diff: 0 Type: BI

One of sin x, cos x, and tan x is given. Find the other two if x lies in the specified interval.

138) $\sin x = -\frac{2}{3}, \quad x \text{ in } \left[-\frac{\pi}{2}, 0\right]$ 138) _____

A) $\cos x = \frac{\sqrt{5}}{3}, \tan x = \frac{2\sqrt{5}}{5}$ B) $\cos x = -\frac{\sqrt{5}}{3}, \tan x = \frac{2\sqrt{5}}{5}$

C) $\cos x = -\frac{\sqrt{5}}{3}, \tan x = -\frac{2\sqrt{5}}{5}$ D) $\cos x = \frac{\sqrt{5}}{3}, \tan x = -\frac{2\sqrt{5}}{5}$

Answer: D
Diff: 0 Type: BI

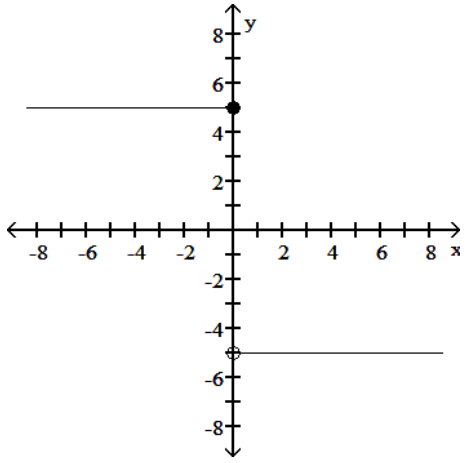
Find the requested information using the law of cosines and/or the law of sines. Round to three decimal places.

139) A triangle has sides a = 4 and b = 3 and angle C = 30°. Find the sine of B. 139) _____

A) 0.974 B) 0.244 C) 0.081 D) 0.731

Answer: D
Diff: 0 Type: BI

Find a formula for the function graphed.

140) 

140) _____

A) $f(x) = \begin{cases} 5, & x < 0 \\ -5, & x \geq 0 \end{cases}$

B) $f(x) = \begin{cases} -5, & x \leq 0 \\ 5, & x > 0 \end{cases}$

C) $f(x) = \begin{cases} 5x, & x \leq 0 \\ -5x, & x > 0 \end{cases}$

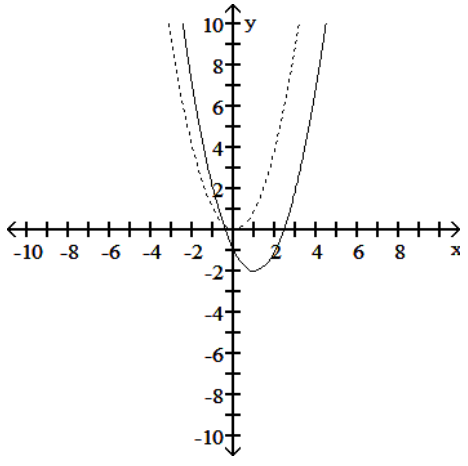
D) $f(x) = \begin{cases} 5, & x \leq 0 \\ -5, & x > 0 \end{cases}$

Answer: D
Diff: 0 Type: BI

Solve the problem.

141) The accompanying figure shows the graph of $y = x^2$ shifted to a new position. Write the equation for the new graph.

141) _____



A) $y = (x + 2)^2 - 1$ B) $y = (x - 1)^2 + 2$ C) $y = (x + 1)^2 - 2$ D) $y = (x - 1)^2 - 2$

Answer: D
Diff: 0 Type: BI

Express the given quantity in terms of sin x or cos x.

142) $\sin(2\pi - x)$

142) _____

A) $-\sin x$ B) $\sin(-x)$ C) $\cos x - \sin x$ D) $\sin x$

Answer: A
Diff: 0 Type: BI

Find the exact value of the trigonometric function. Do not use a calculator or tables.

143) $\tan\left(\frac{\pi}{3}\right)$ 143) _____

A) 2 B) $\frac{\sqrt{3}}{3}$ C) $\frac{\sqrt{3}}{2}$ D) $\sqrt{3}$

Answer: D
Diff: 0 Type: BI

Provide an appropriate response.

144) Graph the functions $f(x) = \frac{4}{x - 1}$ and $g(x) = \frac{2}{x + 1}$ together to identify the values of x for which 144) _____

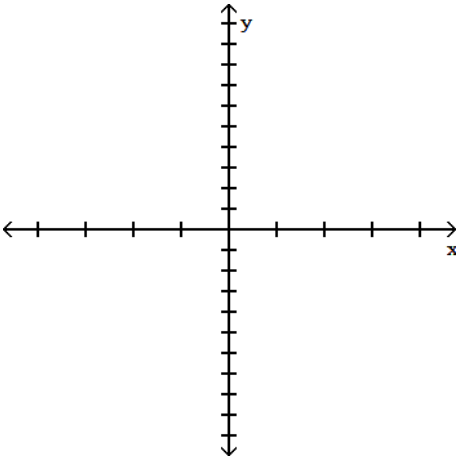
$\frac{4}{x - 1} < \frac{2}{x + 1}$. Confirm your findings algebraically.

A) $(-1, 1) \cup (1, \infty)$ B) $(-3, -1) \cup (1, \infty)$ C) $(-\infty, -3)$ D) $(-3, \infty)$

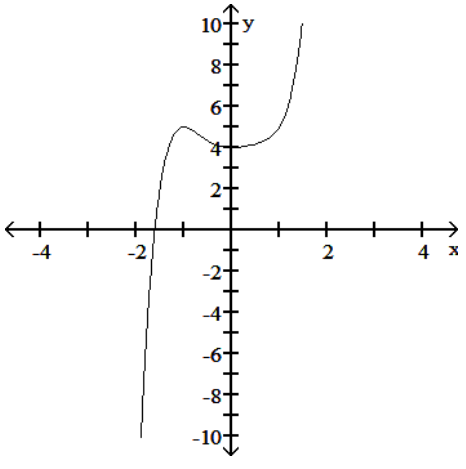
Answer: C
Diff: 0 Type: BI

Determine an appropriate viewing window for the given function and use it to display its graph.

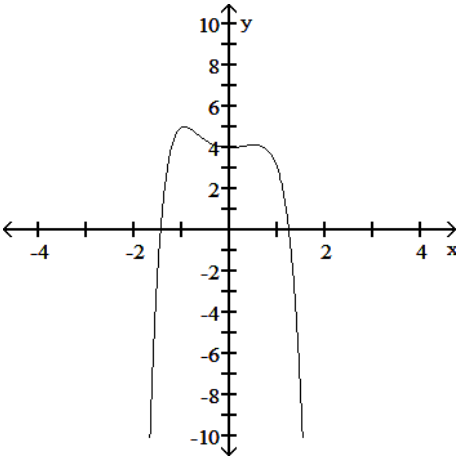
145) $f(x) = x^5 - x^3 + x^2 + 4$ 145) _____



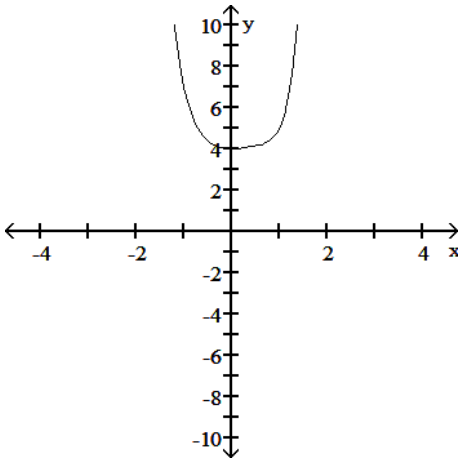
A)



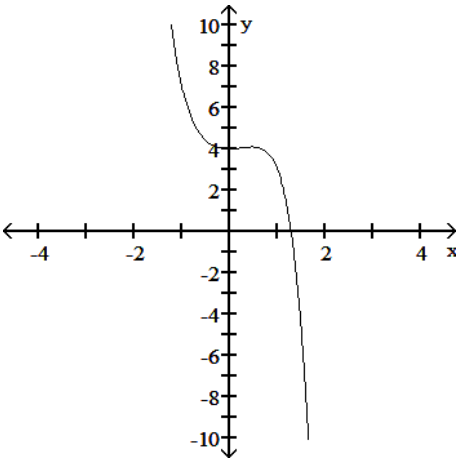
B)



C)



D)



Answer: A
Diff: 0 Type: BI

Express the given quantity in terms of sin x or cos x.

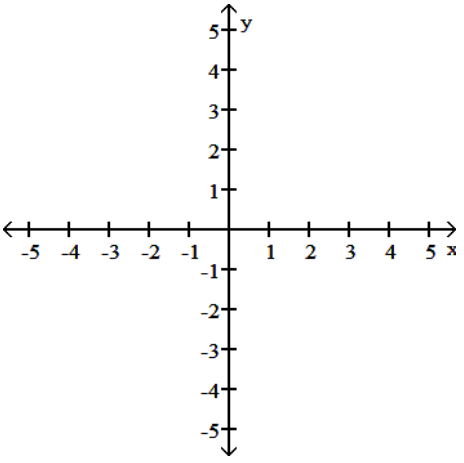
146) $\cos\left(\frac{7\pi}{2} - x\right)$ 146) _____

A) sin (-x) B) -sin x C) sin x D) cos x + sin x

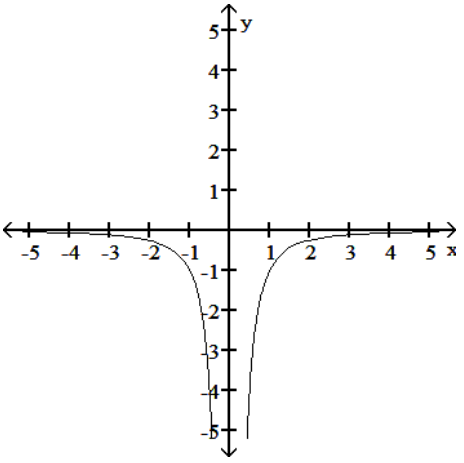
Answer: B
Diff: 0 Type: BI

Graph the function. Determine the symmetry, if any, of the function.

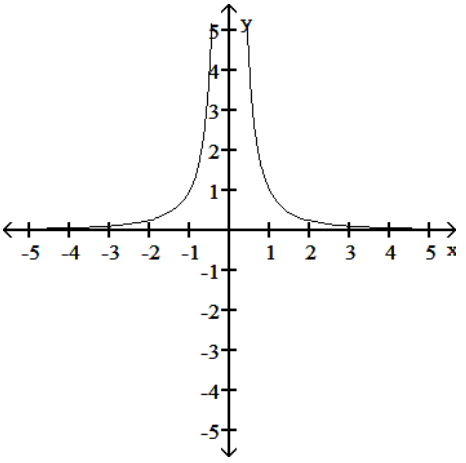
147) $y = -\frac{1}{x^2}$ 147) _____



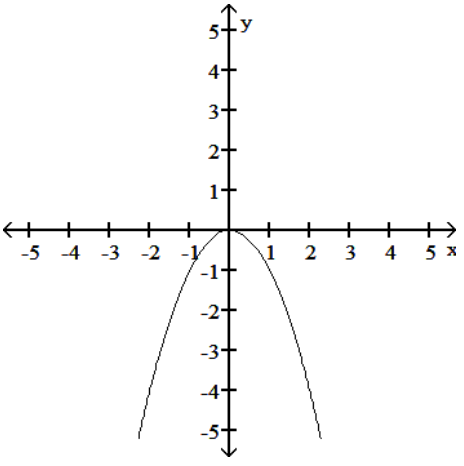
A) Symmetric about the y-axis



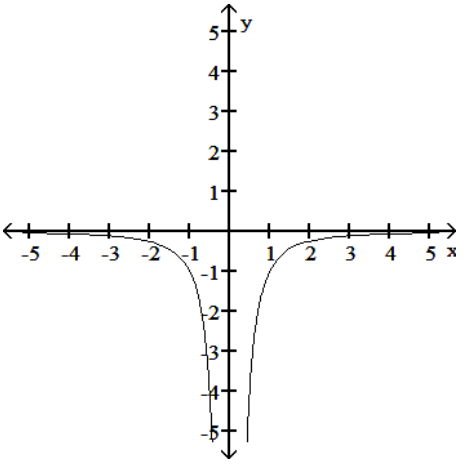
B) Symmetric about the y-axis



C) Symmetric about the y-axis



D) No symmetry



Answer: A
Diff: 0 Type: BI

Provide an appropriate response.

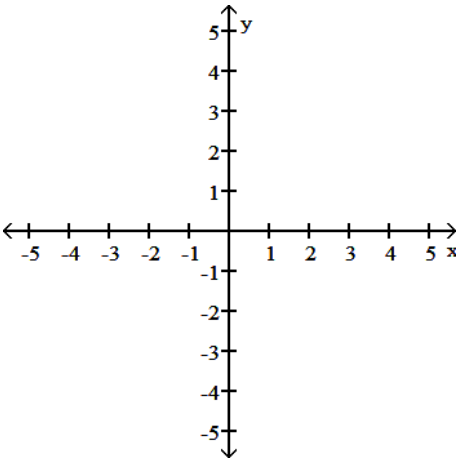
148) What is the domain of the function $y = \sqrt{1 - \frac{1}{x}}$? 148) _____

A) (0, 1] B) $(-\infty, \infty)$ C) $(-\infty, 0) \cup [1, \infty)$ D) $(-\infty, 0) \cup (1, \infty)$

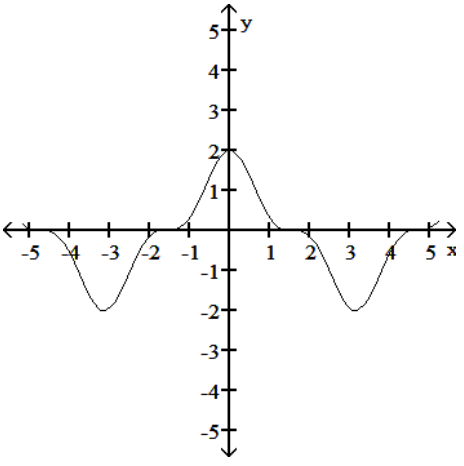
Answer: C
Diff: 0 Type: BI

Graph the function.

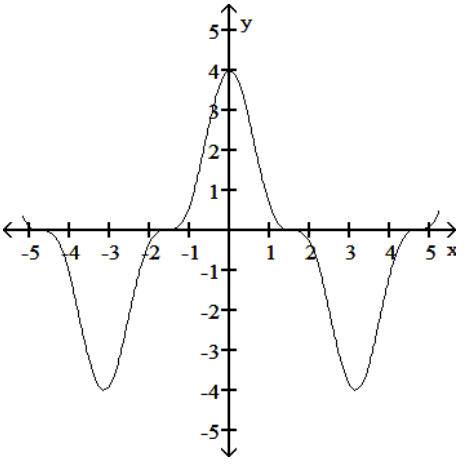
149) Graph the function $f(x) = 2\cos^3 x$. 149) _____



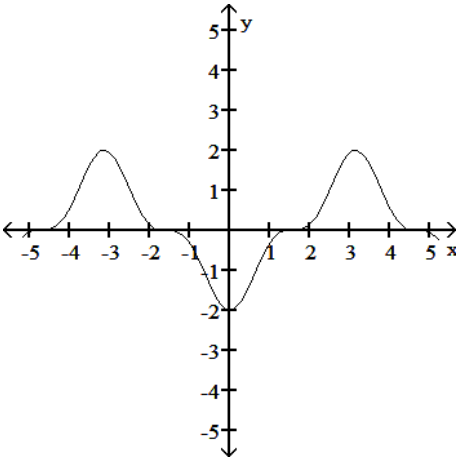
A)



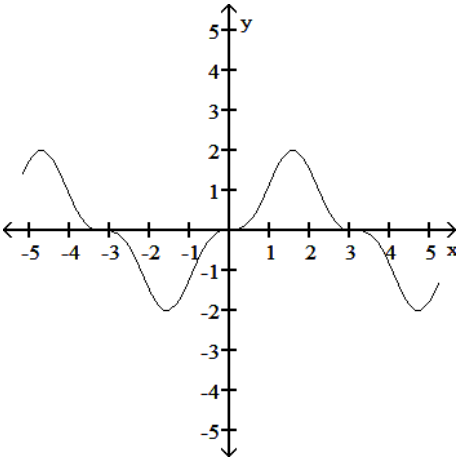
B)



C)



D)



Answer: A
Diff: 0 Type: BI

Use the appropriate addition formula to find the exact value of the expression.

150) $\tan\left(\frac{7\pi}{12}\right)$ 150) _____

A) $2 + \sqrt{3}$ B) $\frac{2 - \sqrt{3}}{4}$ C) $-2 - \sqrt{3}$ D) $\frac{2 + \sqrt{3}}{4}$

Answer: C
Diff: 0 Type: BI

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Solve the problem.

151) Graph $y = \sin\frac{x}{2}$ and $y = \csc\frac{x}{2}$ together for $-2\pi \le x \le 2\pi$. Comment on the behavior of csc $\frac{x}{2}$ in relation to the signs and values of $\sin\frac{x}{2}$. 151) _____

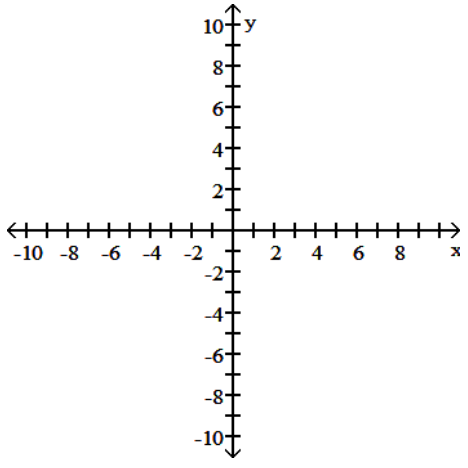
Answer: When $y = \sin\frac{x}{2}$ is at a maximum point, which is at $x = (4n + 1)\pi$ for all integers n, y $= \csc\frac{x}{2}$ is at a minimum point. Similarly, when $y = \sin\frac{x}{2}$ is at minimum point, , which is at $x = (4n - 1)\pi$ for all integers n, $y = \csc\frac{x}{2}$ is at a maximum point.

Diff: 0 Type: SA

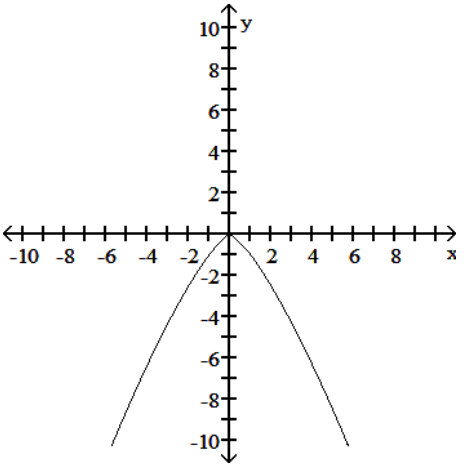
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Graph the function. Specify the intervals over which the function is increasing and the intervals where it is decreasing.

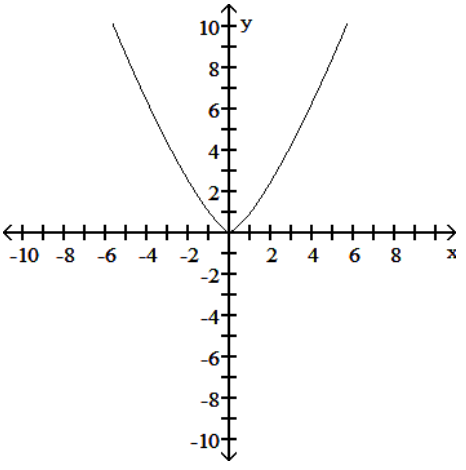
152) $y = -x^{4/3}$ 152) _____



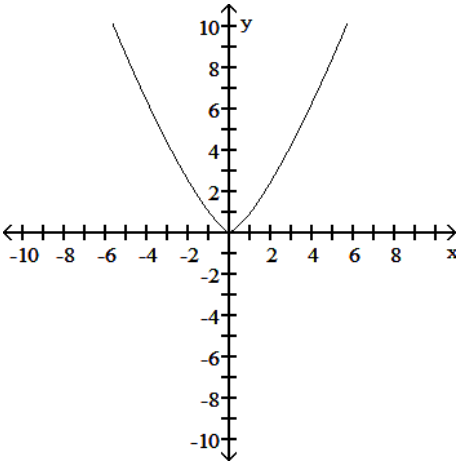
A) Increasing $-\infty < x < 0$
Decreasing $0 < x < \infty$



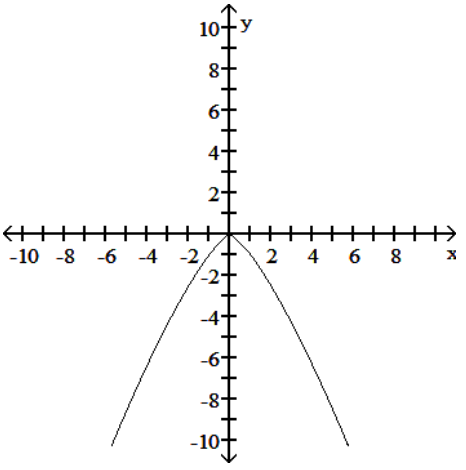
B) Decreasing $-\infty < x \leq 0$
Increasing $0 \leq x < \infty$



C) Increasing $-\infty < x < \infty$



D) Decreasing $-\infty < x < \infty$



Answer: A
Diff: 0 Type: BI

Solve the problem.

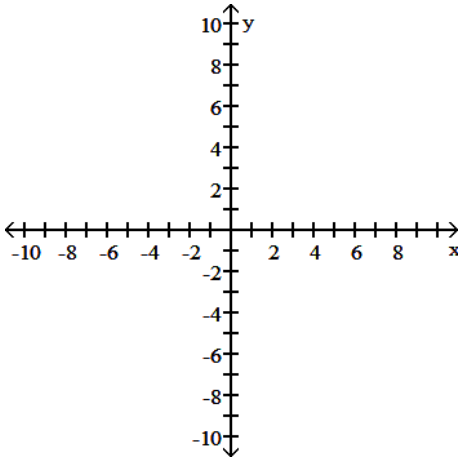
153) If $f(x) = -7x + 1$ and $g(x) = 9x^2 - 4x - 7$, find $g(f(-3))$. 153) _____

A) 155 B) 4261 C) -601 D) 103

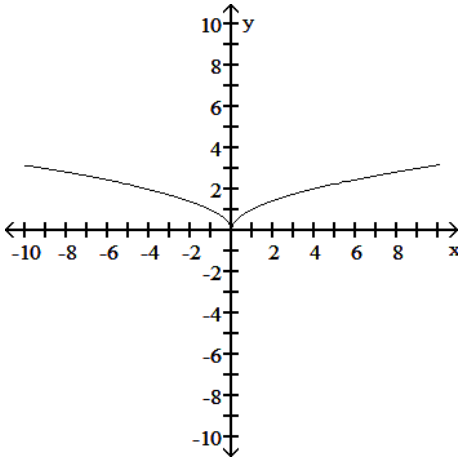
Answer: B
Diff: 0 Type: BI

Find the domain and graph the function.

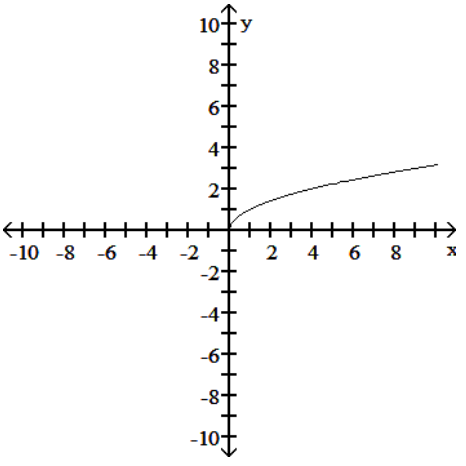
154) $G(x) = \sqrt{|x|}$ 154) _____



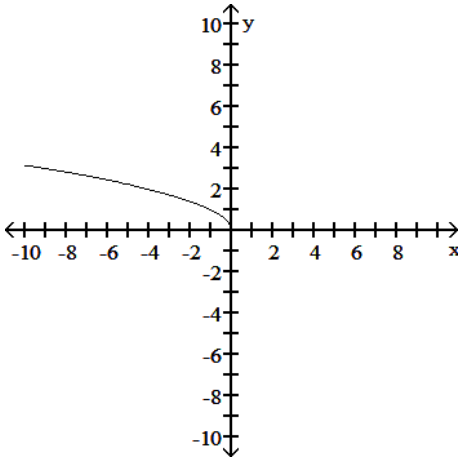
A) D: $(-\infty, \infty)$



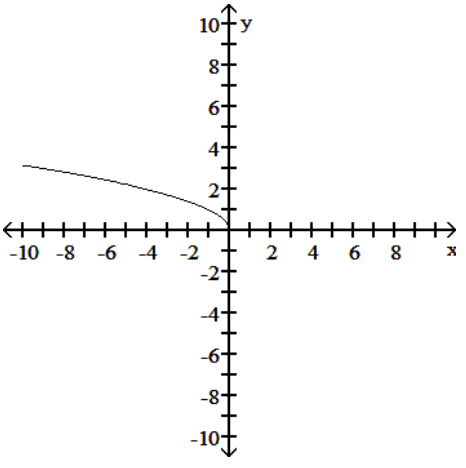
B) D: $[0, \infty)$



C) D: $(-\infty, 0)$

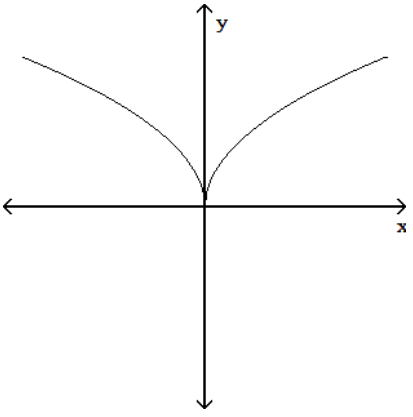


D) D: $(-\infty, 0]$



Answer: A
Diff: 0 Type: BI

Determine whether or not the graph is a graph of a function of x.

155) 

155) _____

A) Function

B) Not a function

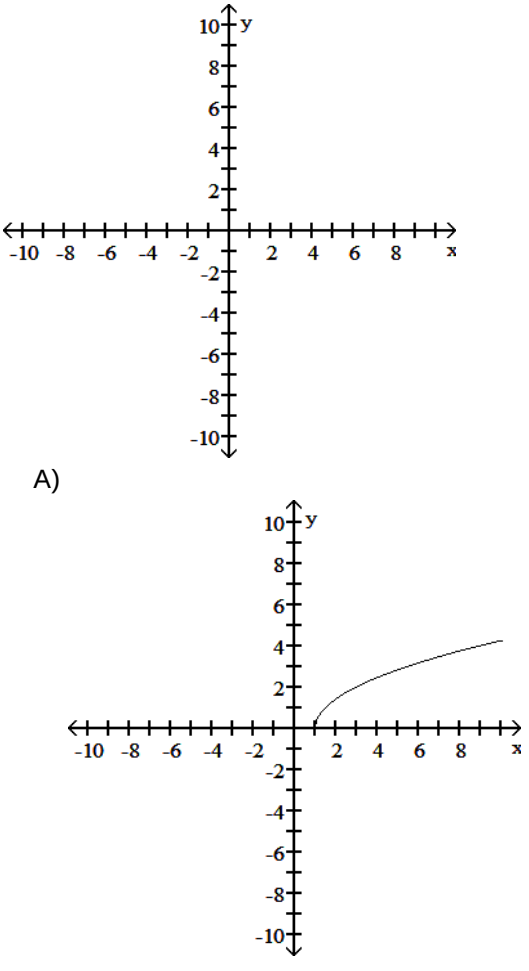
Answer: A

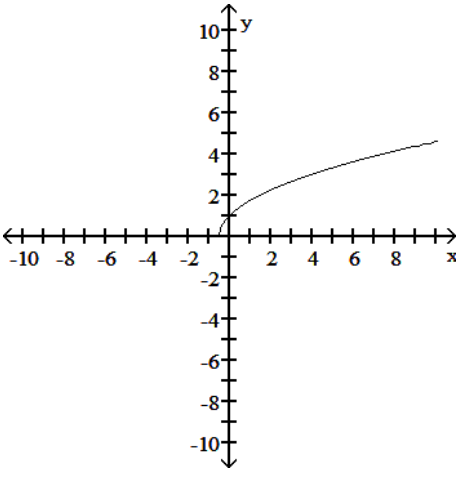
Diff: 0 Type: BI

Graph the function.

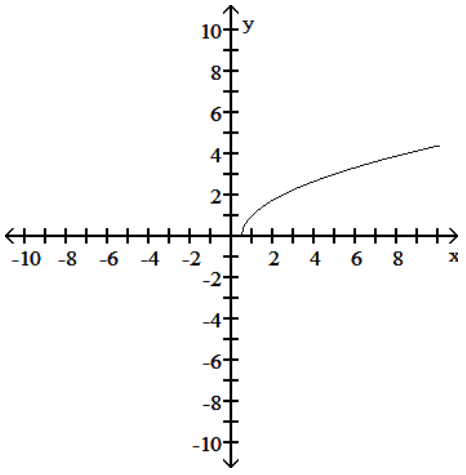
156) $y = \sqrt{2x - 2}$

156) _____

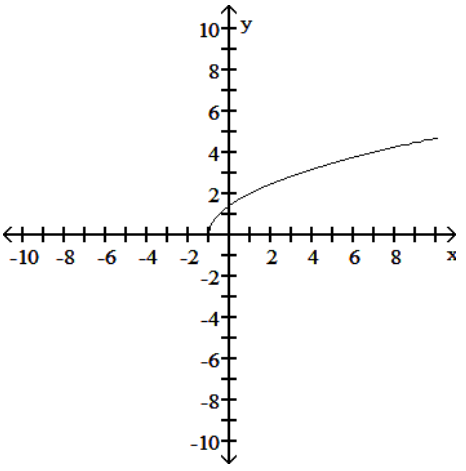
A) 

B) 

C)



D)



Answer: A
Diff: 0 Type: BI

Provide an appropriate response.

157) What real numbers x satisfy the equation $\lfloor x \rfloor = \lceil x \rceil$? 157) _____

A) {x | x ∈ real numbers} B) {x | x = 0}
C) {x | x ∈ integers} D) ∅

Answer: C
Diff: 0 Type: BI

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Solve the problem.

158) Use the angle sum formulas to derive sin (A - B) = sin A cos B - cos A sin B. 158) _____

Answer: sin (A - B)
= sin (A + (-B))
= sin A cos (-B) + cos A sin (-B)
= sin A cos B - cos A sin B
Diff: 0 Type: SA

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Assume that f is an even function, g is an odd function, and both f and g are defined on the entire real line. State whether the combination of functions (where defined) is even or odd.

159) g ∘ g 159) _____

A) Even B) Odd

Answer: B
Diff: 0 Type: BI

Express the given quantity in terms of sin x or cos x.

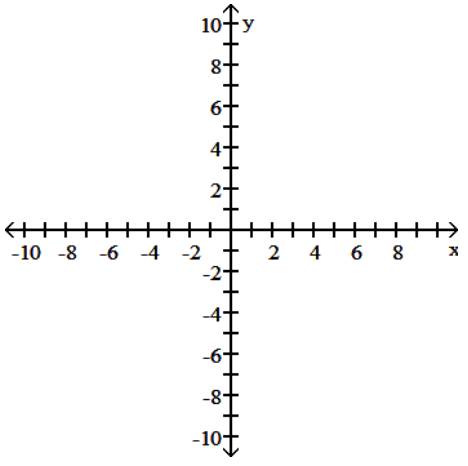
160) sin (6π + x) 160) _____

A) -sin x B) cos x - sin x C) cos x + sin x D) sin x

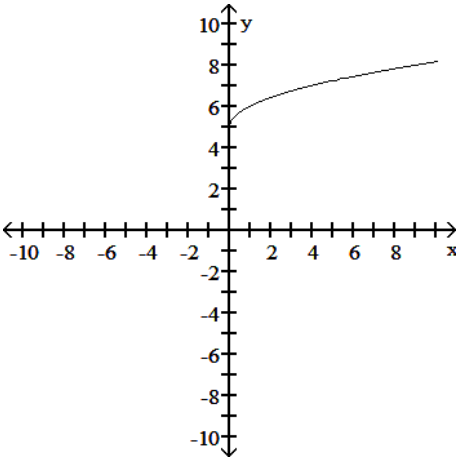
Answer: D
Diff: 0 Type: BI

Graph the function.

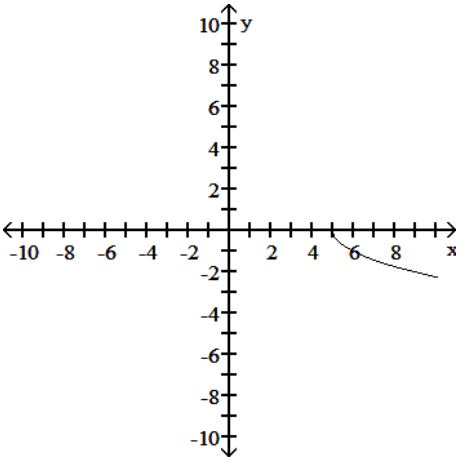
161) $y = 5 - \sqrt{x}$ 161) _____



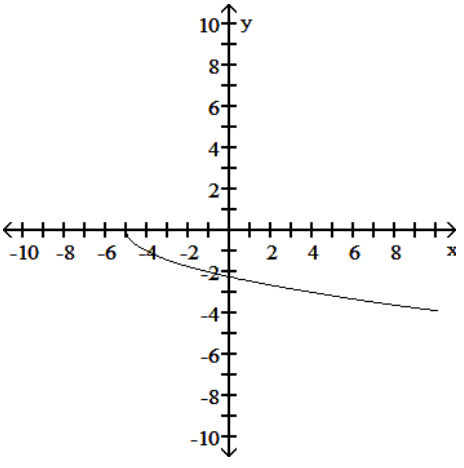
A)



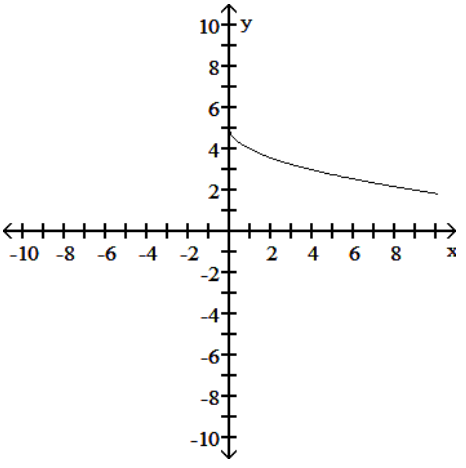
B)



C)



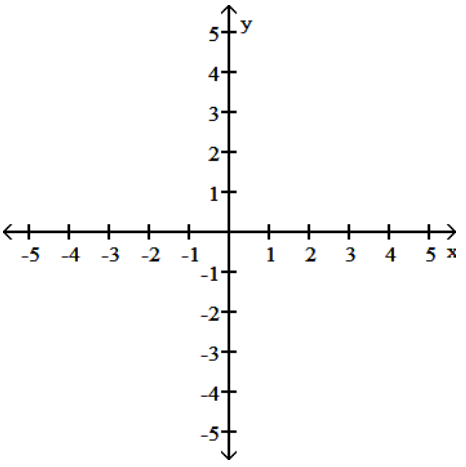
D)



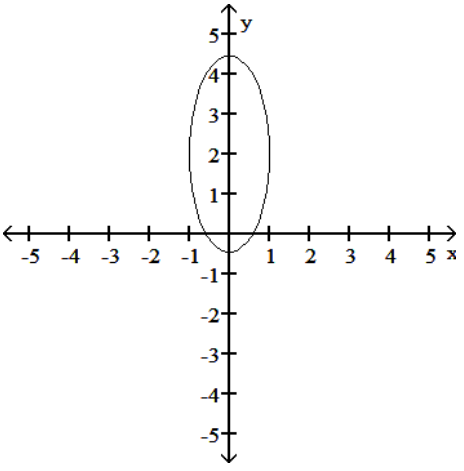
Answer: D
Diff: 0 Type: BI

The equation of an ellipse is given. Put the equation in standard form and sketch the ellipse.

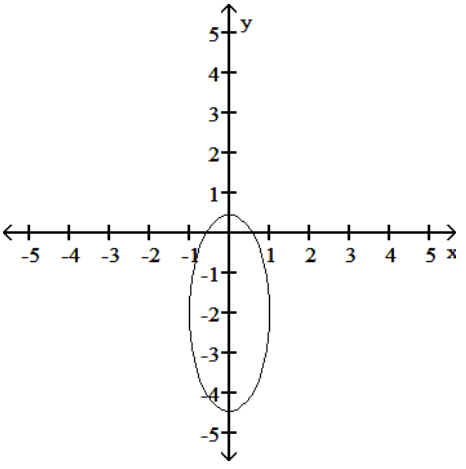
162) $6x^2 + (y + 2)^2 = 6$ 162) _____



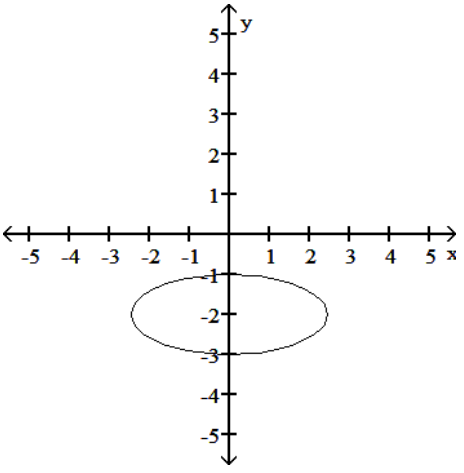
A) $x^2 + \frac{(y + 2)^2}{6} = 1$



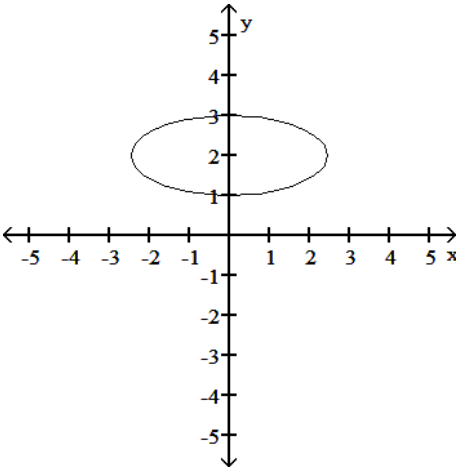
B) $x^2 + \frac{(y + 2)^2}{6} = 1$



C) $\frac{x^2}{6} + (y + 2)^2 = 1$



D) $\frac{x^2}{6} + (y + 2)^2 = 1$



Answer: B
Diff: 0 Type: BI

Determine if the function is even, odd, or neither.

163) f(x) = 4 163) _____

A) Even B) Odd C) Neither

Answer: A
Diff: 0 Type: BI

Use a graphing calculator or computer to determine which of the given viewing windows displays the most appropriate graph of the specified function.

164) $f(x) = x^4 - 9x^2 + 5x$ 164) _____

A) [-5, 5] by [-25, 15]
B) [-10, 15] by [-5, 5]
C) [-5, 5] by [-10, 15]
D) [-25, 15] by [-5, 5]

Answer: A
Diff: 0 Type: MC

Solve the problem.

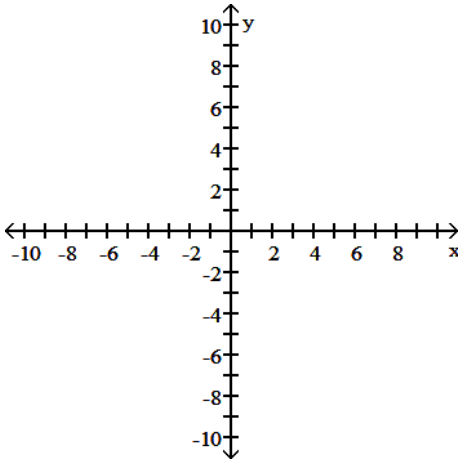
165) The kinetic energy K of a mass is proportional to the square of its velocity v. If K = 7200 joules when v = 12 m/sec, what is K when v = 8 m/sec? 165) _____

A) 2560 joules B) 3840 joules C) 3520 joules D) 3200 joules

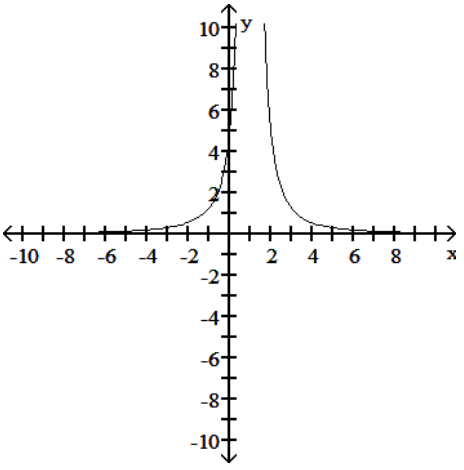
Answer: D
Diff: 0 Type: BI

Graph the function.

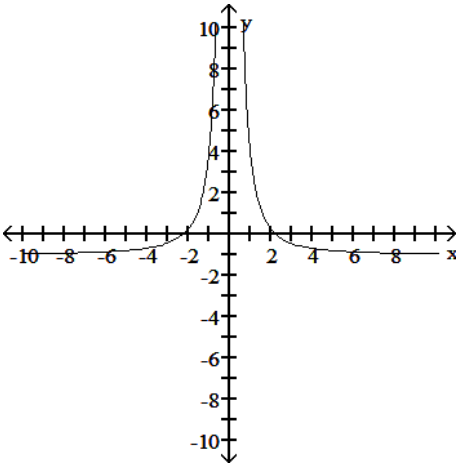
166) $y = \frac{5}{x^2} + 1$ 166) _____



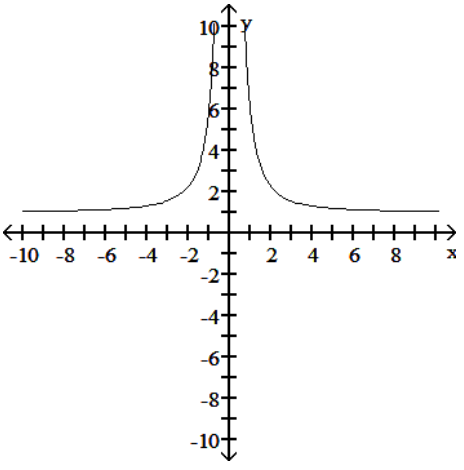
A)



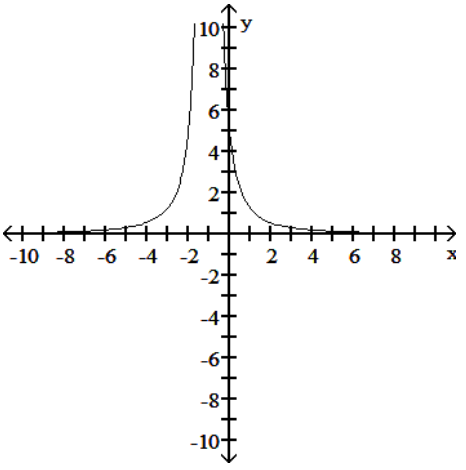
B)



C)



D)



Answer: C
Diff: 0 Type: BI

Find the exact value of the trigonometric function. Do not use a calculator or tables.

167) $\tan\left(\frac{\pi}{4}\right)$ 167) _____

A) 1 B) $\frac{\sqrt{2}}{2}$ C) $\frac{\sqrt{3}}{2}$ D) $\sqrt{2}$

Answer: A
Diff: 0 Type: BI

Express the given quantity in terms of sin x or cos x.

168) cos (3π + x) 168) _____

A) -sin x B) -cos x C) cos x D) sin x - cos x

Answer: B
Diff: 0 Type: BI

For

$$f(x) = A \sin\left[\frac{2\pi}{B}(x - C)\right] + D,$$

identify either A, B, C, or D as indicated for the sine function.

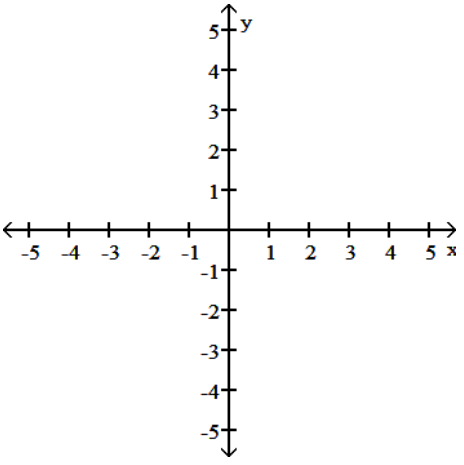
169) $y = -4 \cos\left[5x + \frac{\pi}{2}\right]$ Find B. 169) _____

A) $\frac{2\pi}{5}$ B) π C) 4 D) $\frac{\pi}{2}$

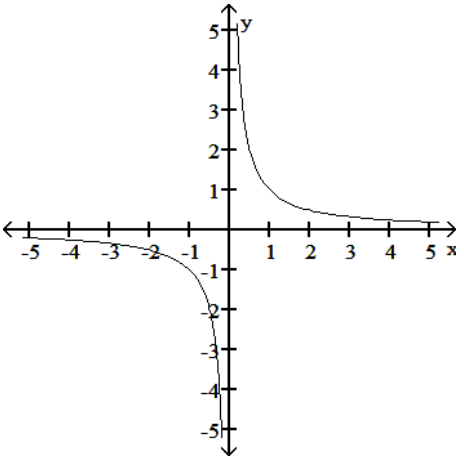
Answer: A
Diff: 0 Type: BI

Graph the function. Determine the symmetry, if any, of the function.

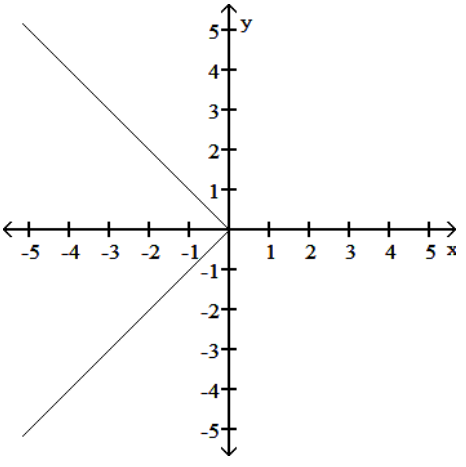
170) $y = -|x|$ 170) _____



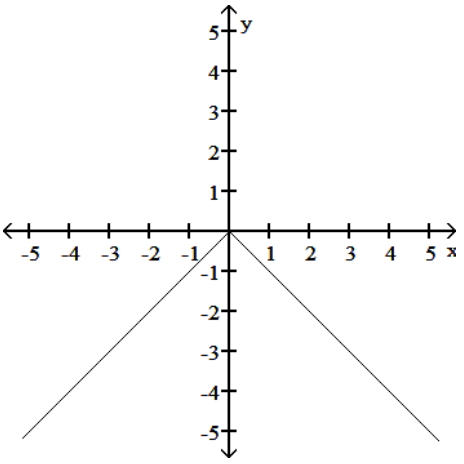
A) Symmetric about the origin



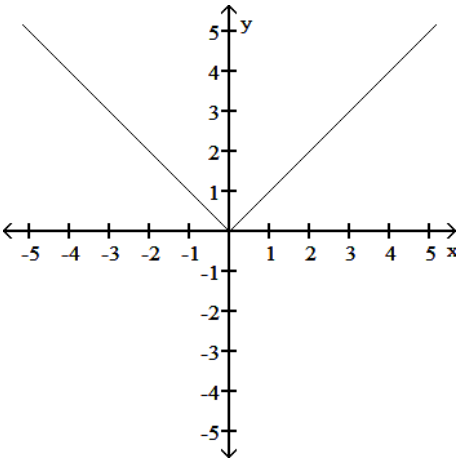
B) Symmetric about the x-axis



C) Symmetric about the y-axis



D) Symmetric about the y-axis



Answer: C
Diff: 0 Type: BI

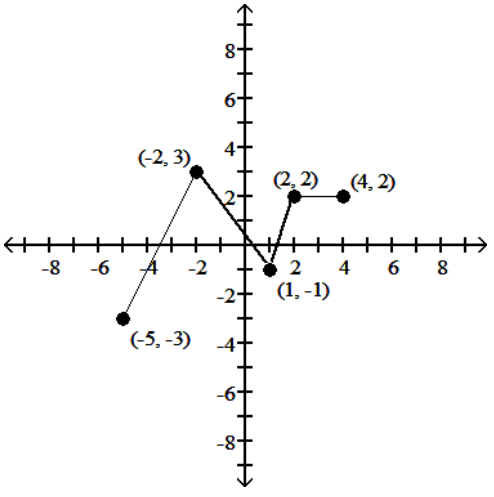
Solve the problem.

171) If $f(x) = -3x + 7$ and $g(x) = -2x^2 + 6x + 5$, find $g(f(-4))$. 171) _____

A) 160 B) -603 C) 40 D) 81

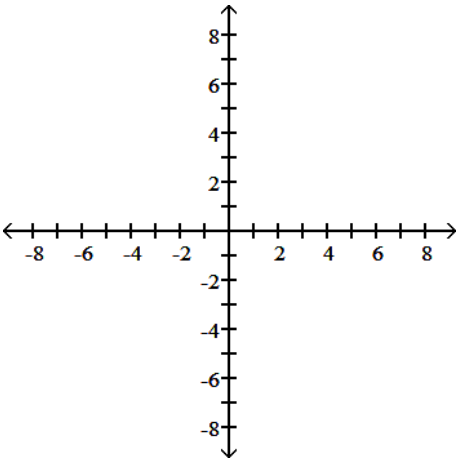
Answer: B
Diff: 0 Type: BI

Using the graph below, find the domain and range of the given function, and sketch the graph.

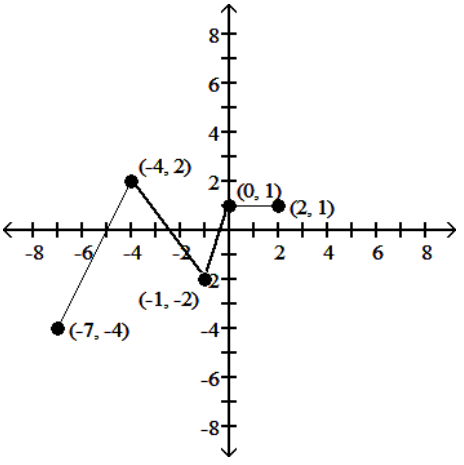


172) y = f(x + 2) - 1

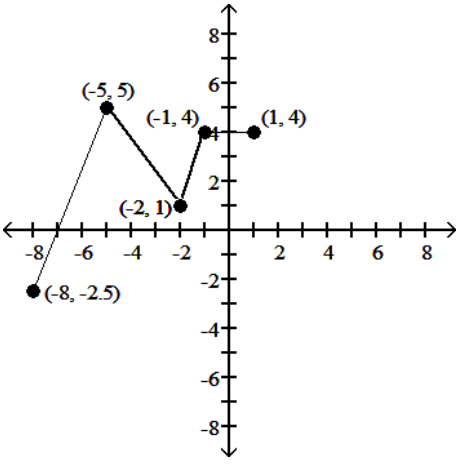
172) _____



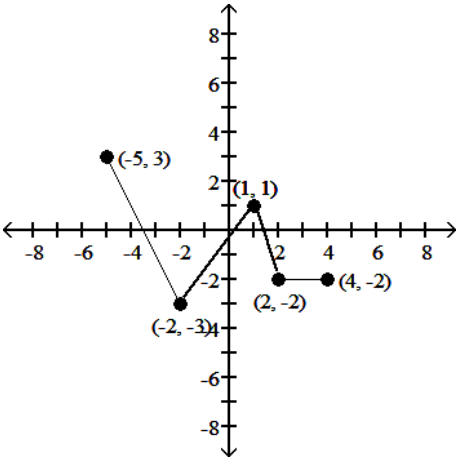
A) D: [-7, 2]; R: [-4, 2]



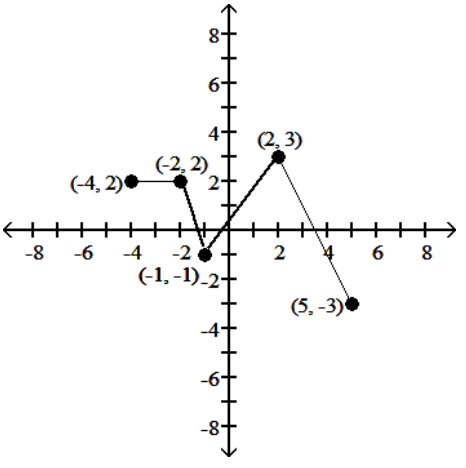
B) D: [-8, 1]; R: [-2.5, 5]



C) D: [-5, 4]; R: [-3, 3]



D) D: [-4, 5]; R: [-3, 3]



Answer: A

Diff: 0 Type: BI

Solve the problem.

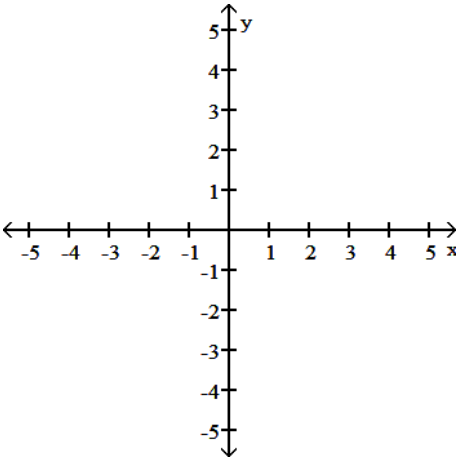
173) On a circle of radius 18 meters, how long is an arc that subtends a central angle of 45°? 173) _____

A) $\frac{9}{2}$ m B) 810π m C) $\frac{9\pi}{2}$ m D) 810 m

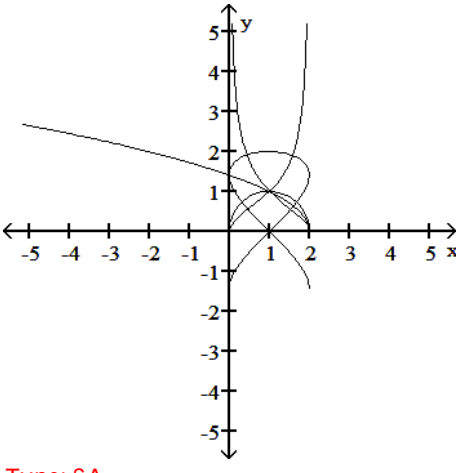
Answer: C
Diff: 0 Type: BI

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

174) Graph the functions $f(x) = \sqrt{x}$ and $g(x) = \sqrt{2 - x}$ together with their sum, product, two differences, and two quotients. 174) _____



Answer:



Diff: 0 Type: SA

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Use a graphing calculator or computer to determine which of the given viewing windows displays the most appropriate graph of the specified function.

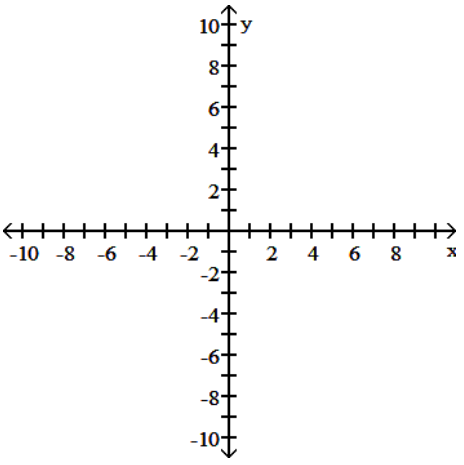
175) $f(x) = x^3 - 2x^2 - 3x + 10$ 175) _____

A) [-5, 5] by [-5, 25] B) [-20, 20] by [-100, 100]
C) [-2, 2] by [-10, 10] D) [-5, 25] by [-5, 5]

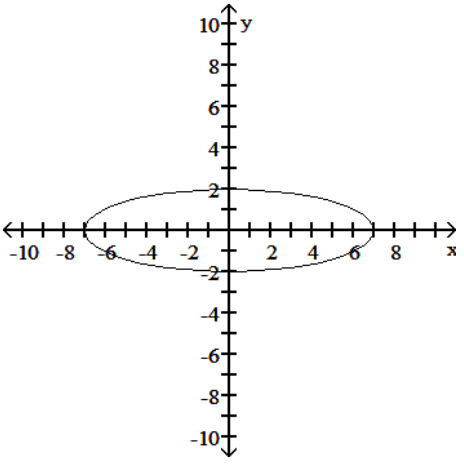
Answer: A
Diff: 0 Type: MC

The equation of an ellipse is given. Put the equation in standard form and sketch the ellipse.

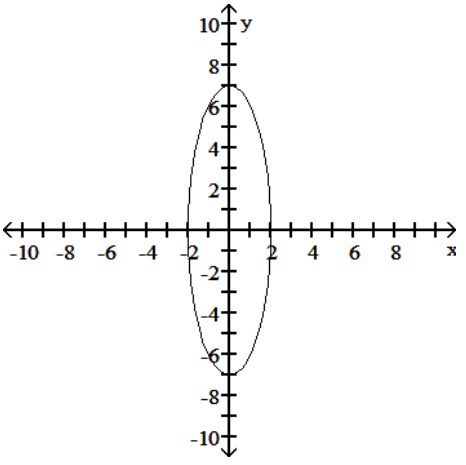
176) $49x^2 + 4y^2 = 196$ 176) _____



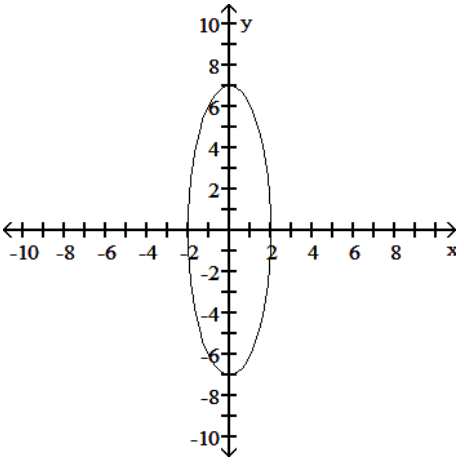
A) $\frac{x^2}{4} + \frac{y^2}{49} = 1$



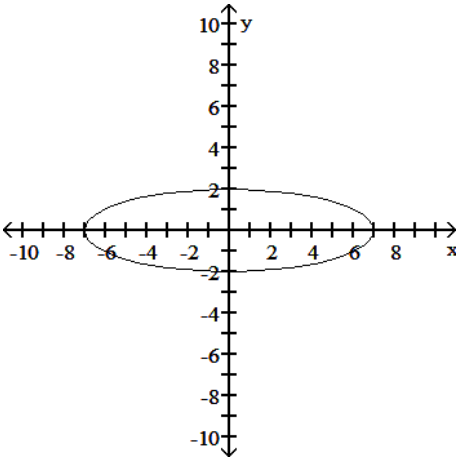
B) $\frac{x^2}{4} + \frac{y^2}{49} = 1$



C) $\frac{x^2}{49} + \frac{y^2}{4} = 1$



D) $\frac{x^2}{49} + \frac{y^2}{4} = 1$



Answer: B
Diff: 0 Type: BI

Find the domain and range of the function.

177) $g(z) = -6 - \sqrt{z}$ 177) _____

A) D: $(-\infty,-6]$, R: $(-\infty, \infty)$

B) D: $(-\infty, \infty)$, R: $(-\infty,-6]$

C) D: $[0,\infty)$, R: $(-\infty,-6]$

D) D: $(-\infty,0]$, R: $[-6,\infty)$

Answer: C
Diff: 0 Type: BI

One of sin x, cos x, and tan x is given. Find the other two if x lies in the specified interval.

178) $\sin x = -\frac{\sqrt{3}}{2}, \quad x \text{ in } \left[-\frac{\pi}{2}, 0\right]$ 178) _____

A) $\cos x = \frac{1}{2}, \tan x = \sqrt{3}$

B) $\cos x = -2, \tan x = \frac{\sqrt{3}}{3}$

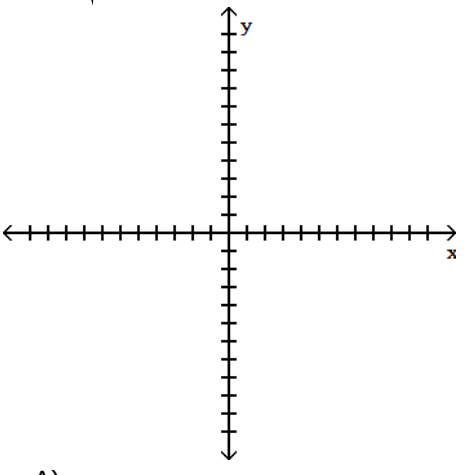
C) $\cos x = \frac{1}{2}, \tan x = -\sqrt{3}$

D) $\cos x = -\frac{1}{2}, \tan x = -\sqrt{3}$

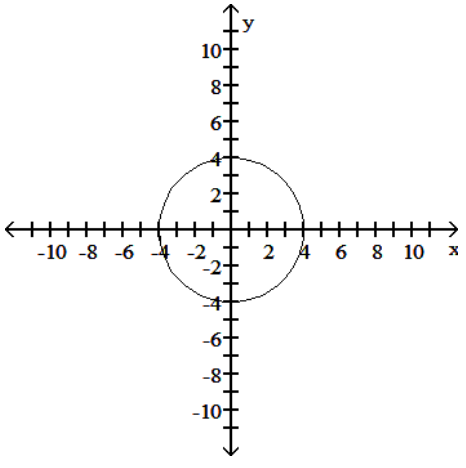
Answer: C
Diff: 0 Type: BI

Determine an appropriate viewing window for the given function and use it to display its graph.

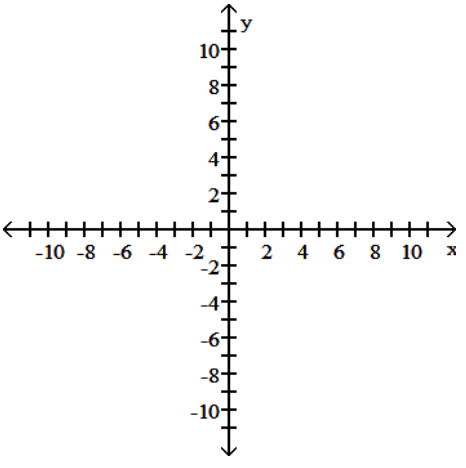
179) $y = 16\sqrt{\frac{16 + x^2}{16}}$ 179) _____



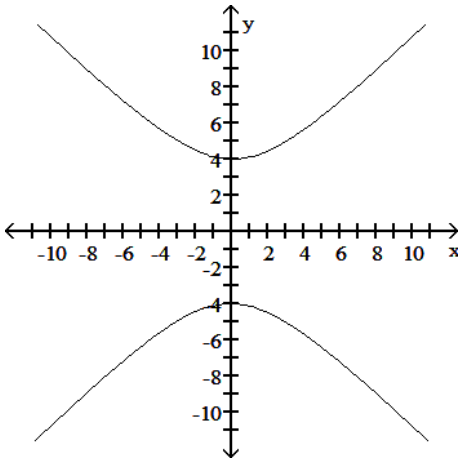
A)



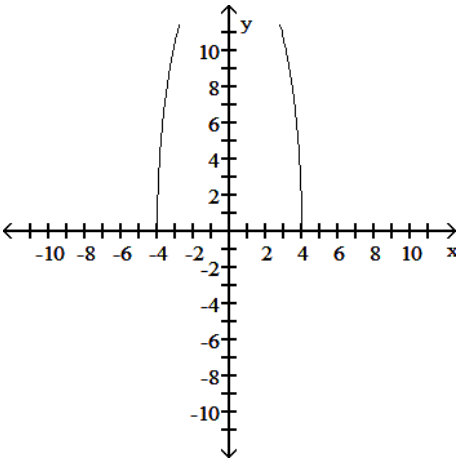
B)



C)



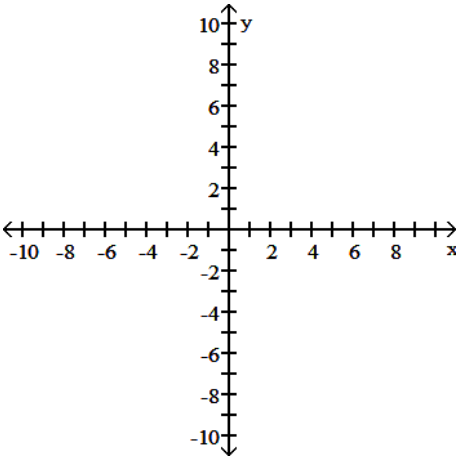
D)



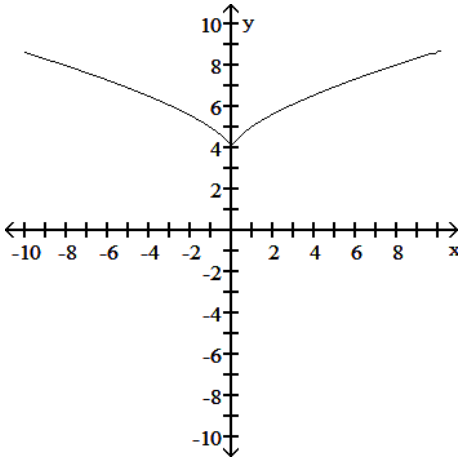
Answer: B
Diff: 0 Type: BI

Graph the function.

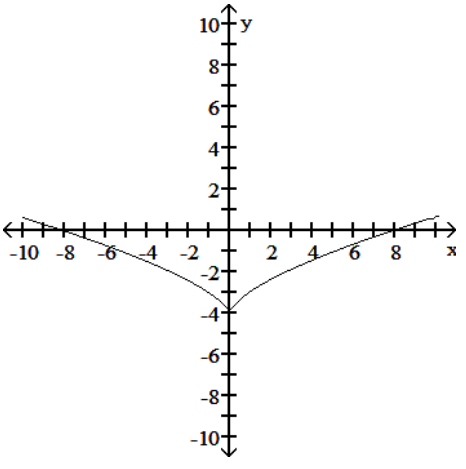
180) $y = (x - 4)^{2/3}$ 180) _____



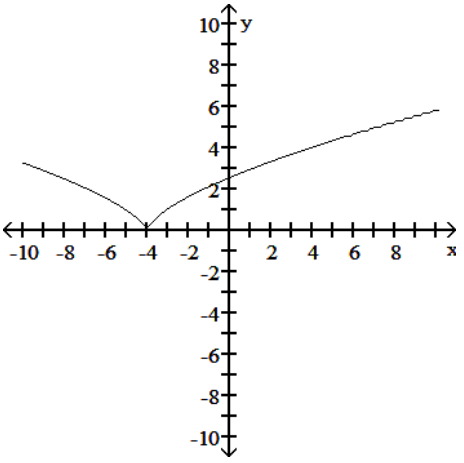
A)



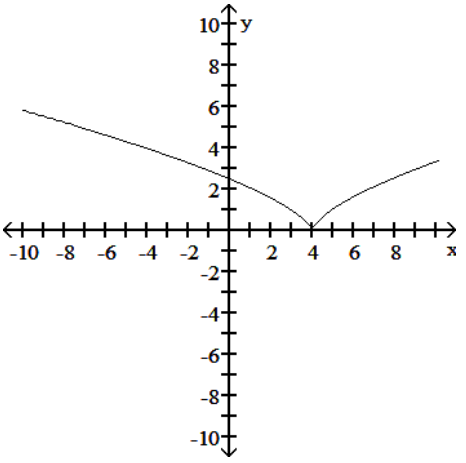
B)



C)



D)



Answer: D
Diff: 0 Type: BI

For

$$f(x) = A \sin\left[\frac{2\pi}{B}(x - C)\right] + D,$$

identify either A, B, C, or D as indicated for the sine function.

181) $y = 5 \cos\left[3x + \frac{\pi}{2}\right]$ Find A. 181) _____

A) 15 B) 3 C) $\frac{\pi}{2}$ D) 5

Answer: D
Diff: 0 Type: BI

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Solve the problem.

182) The standard formula for the tangent of the difference of two angles is 182) _____

$\tan(A - B) = \frac{\tan A - \tan B}{1 + \tan A \tan B}$. Derive the formula.

Answer: $\tan(A - B) = \frac{\sin(A - B)}{\cos(A - B)} = \frac{\sin A \cos B - \sin B \cos A}{\cos A \cos B + \sin A \sin B} =$

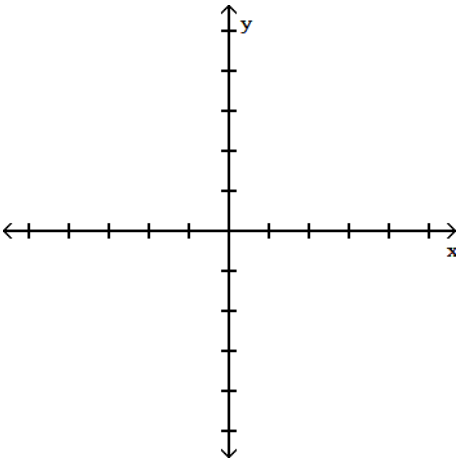
$$\frac{(\cos A \cos B)^{-1}(\sin A \cos B - \sin B \cos A)}{(\cos A \cos B)^{-1}(\cos A \cos B + \sin A \sin B)} = \frac{\tan A - \tan B}{1 + \tan A \tan B}.$$

Diff: 0 Type: SA

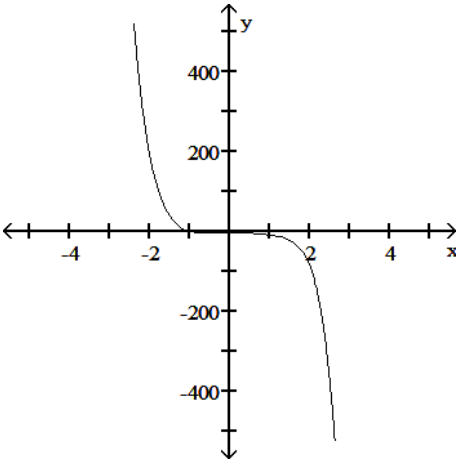
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Determine an appropriate viewing window for the given function and use it to display its graph.

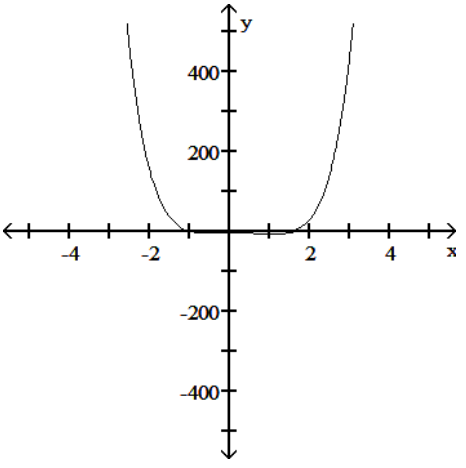
183) $f(x) = -0.6x^6 - x^5 + 5x^4 - 4x^3 - 6x^2 + x - 3$ 183) _____



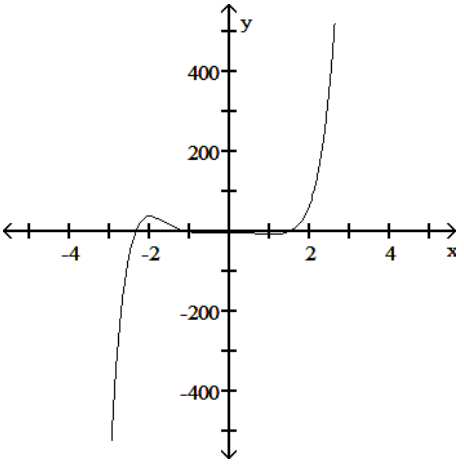
A)



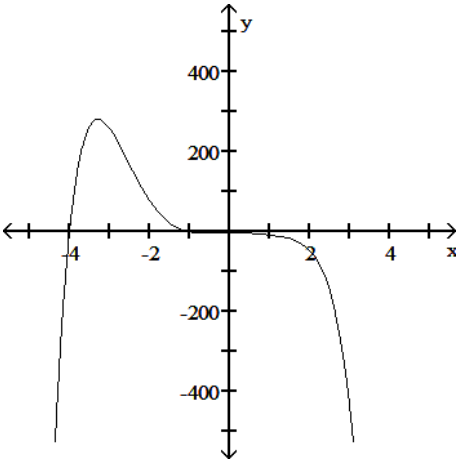
B)



C)



D)



Answer: D
Diff: 0 Type: BI

For

$f(x) = A \sin\left[\frac{2\pi}{B}(x - C)\right] + D,$

identify either A, B, C, or D as indicated for the sine function.

184) $y = 5 \sin\left[4x + \frac{\pi}{2}\right]$ Find B. 184) _____

A) $\frac{\pi}{2}$ B) 4 C) 5 D) π

Answer: A
Diff: 0 Type: BI

Find the function value.

185) $\sin^2 \frac{\pi}{12}$ 185) _____

A) $\frac{2 - \sqrt{3}}{4}$ B) $2 - \sqrt{3}$ C) $\frac{2 + \sqrt{3}}{4}$ D) $\frac{1 - \sqrt{3}}{2}$

Answer: A
Diff: 0 Type: BI

Solve the problem.

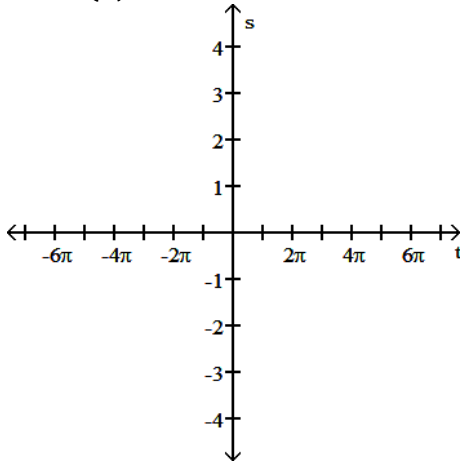
186) Let $f(x) = \sqrt{x - 3}$. Find a function $y = g(x)$ so that $(f \circ g)(x) = \sqrt{x^2 - 3}$. 186) _____

A) $g(x) = x^2 - 3$ B) $g(x) = x^2$ C) $g(x) = 2x$ D) $g(x) = x^2 + 3$

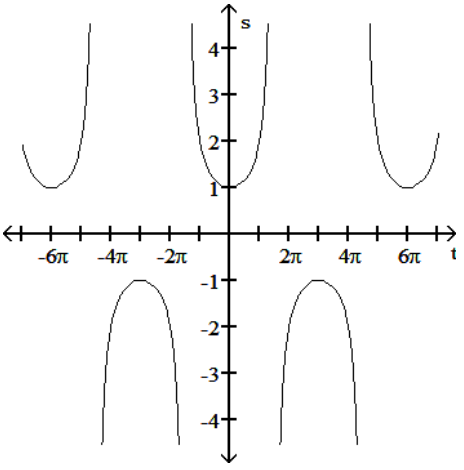
Answer: B
Diff: 0 Type: BI

Graph the function in the ts-plane (t-axis horizontal, s-axis vertical). State the period and symmetry of the function.

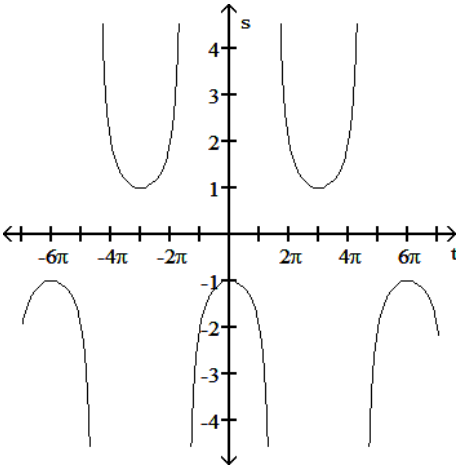
187) $s = \sec\left[\frac{t}{3}\right]$ 187) _____



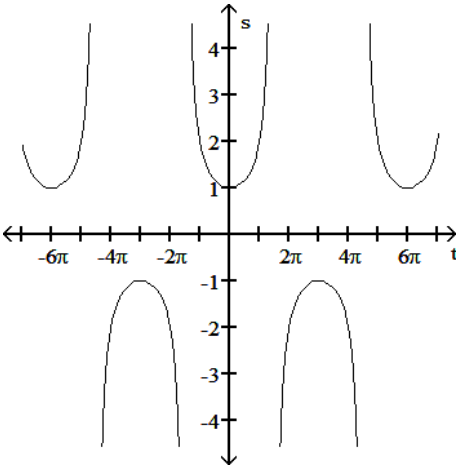
A) Period 6π, symmetric about the s-axis



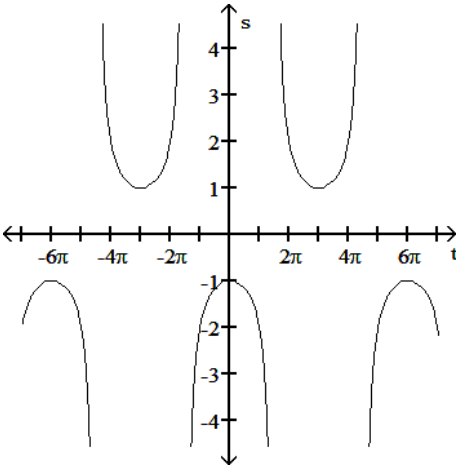
B) Period 6π, symmetric about the t-axis



C) Period 6π, symmetric about the t-axis



D) Period 6π, symmetric about the s-axis



Answer: A
Diff: 0 Type: BI

One of sin x, cos x, and tan x is given. Find the other two if x lies in the specified interval.

188) $\sin x = \frac{5}{13}$, x in $\left[\frac{\pi}{2}, \pi\right]$ 188) _____

A) $\cos x = -\frac{12}{13}$, $\tan x = -\frac{12}{5}$

B) $\cos x = \frac{12}{13}$, $\tan x = \frac{5}{12}$

C) $\cos x = \frac{12}{13}$, $\tan x = -\frac{12}{5}$

D) $\cos x = -\frac{12}{13}$, $\tan x = -\frac{5}{12}$

Answer: D
Diff: 0 Type: BI

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Solve the problem.

189) Graph $y = \cos 2x$ and $y = \sec 2x$ together for $-\frac{3\pi}{4} \le x \le \frac{3\pi}{4}$. Comment on the behavior of sec 2x in relation to the signs and values of cos 2x. 189) _____

Answer: When $y = \cos 2x$ is at a maximum point, which is at any multiple of π, $y = \sec 2x$ is a minimum point. Similarly, when cos (2x) is at a minimum point, which is at any odd multiple of $\frac{\pi}{2}$, $y = \sec 2x$ is a at maximum point.

Diff: 0 Type: SA

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find the exact value of the trigonometric function. Do not use a calculator or tables.

190) $\sec\left(-\frac{3\pi}{2}\right)$ 190) _____

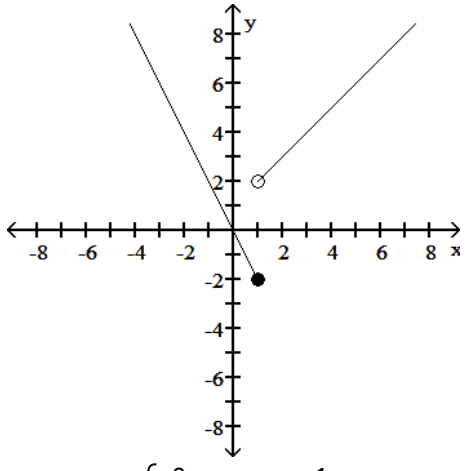
A) -1 B) 1 C) 0 D) Undefined

Answer: D

Diff: 0 Type: BI

Find a formula for the function graphed.

191) 191) _____



A) $f(x) = \begin{cases} -2x, & x \le 1 \\ x + 1, & x > 1 \end{cases}$

B) $f(x) = \begin{cases} 2x, & x \le 1 \\ x + 1, & x > 1 \end{cases}$

C) $f(x) = \begin{cases} -2x, & x \le 1 \\ x + 2, & x > 1 \end{cases}$

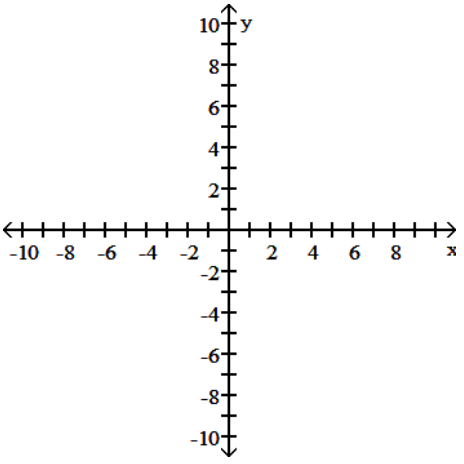
D) $f(x) = \begin{cases} x, & x \le 1 \\ 2x + 1, & x > 1 \end{cases}$

Answer: A

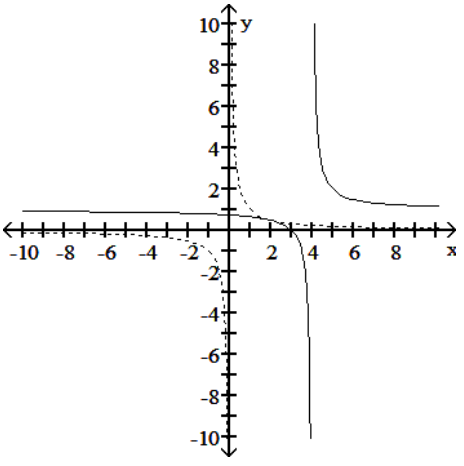
Diff: 0 Type: BI

The problem tells how many units and in what direction the graph of the given equation is to be shifted. Give an equation for the shifted graph. Then sketch the original graph with a dashed line and the shifted graph with a solid line.

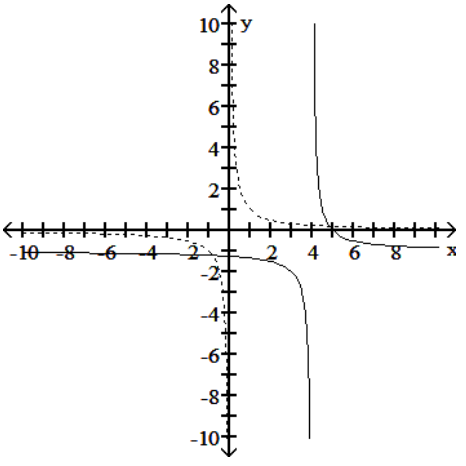
192) $y = \frac{1}{x}$ Down 1, right 4 192) _____



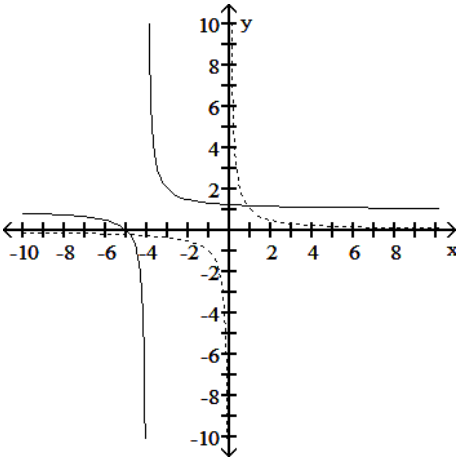
A) $y - 1 = \frac{1}{x - 4}$



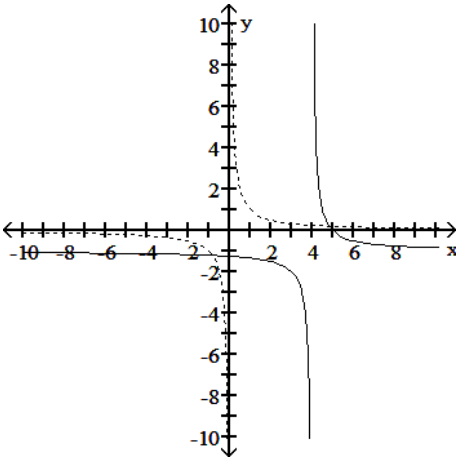
B) $y + 1 = \frac{1}{x + 4}$



C) $y - 1 = \frac{1}{x + 4}$



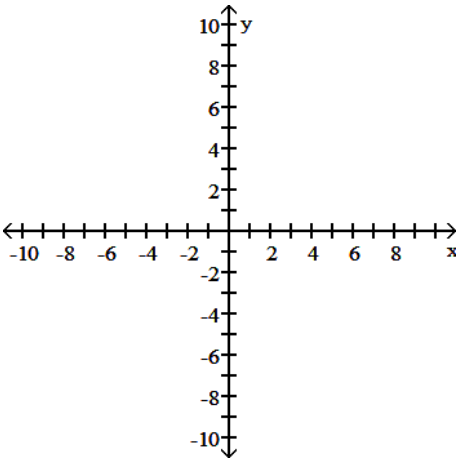
D) $y + 1 = \frac{1}{x - 4}$



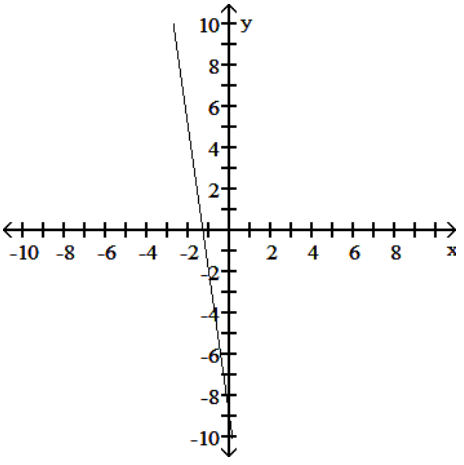
Answer: D
Diff: 0 Type: BI

Find the domain and graph the function.

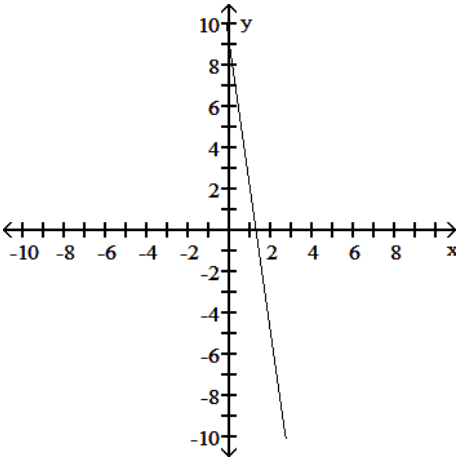
193) f(x) = -7x + 9 193) _____



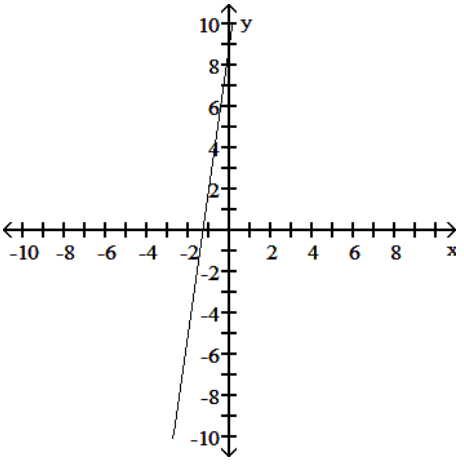
A) D: (-∞, ∞)



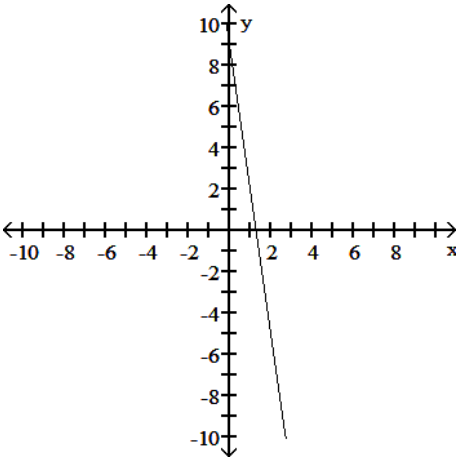
B) D: [0, ∞)



C) D: (-∞, ∞)



D) D: (-∞, ∞)

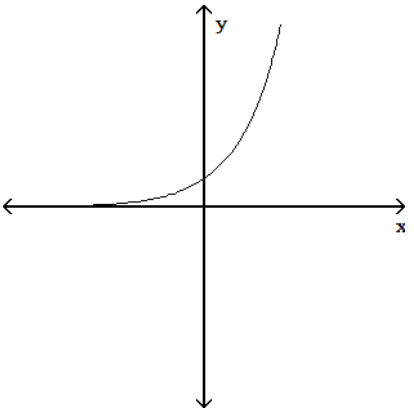


Answer: D
Diff: 0 Type: BI

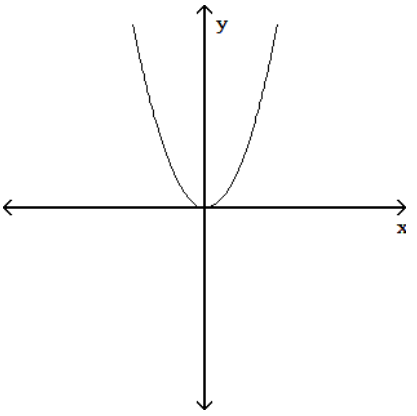
Match the equation with its graph.

194) $y = 2^x$ 194) _____

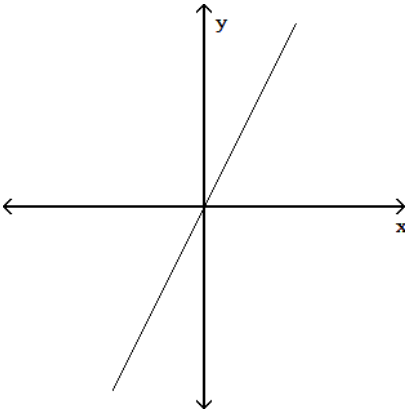
A)



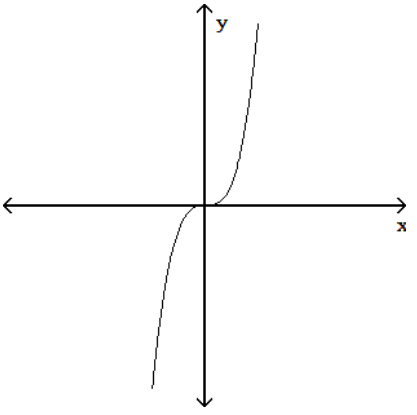
B)



C)



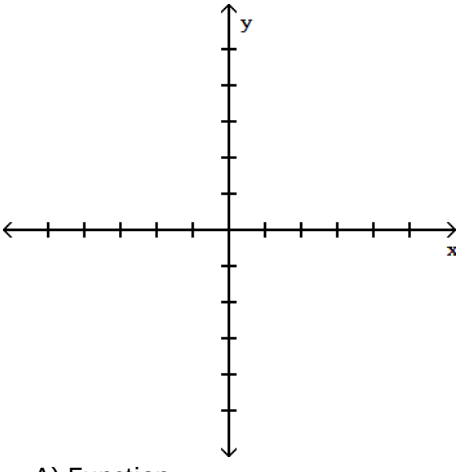
D)



Answer: A
Diff: 0 Type: MC

Provide an appropriate response.

195) Graph the equation $y^2 = x$ and decide whether or not the graph represents a function of x. 195) _____



A) Function

B) Not a Function

Answer: B
Diff: 0 Type: BI

Assume that f is an even function, g is an odd function, and both f and g are defined on the entire real line. State whether the combination of functions (where defined) is even or odd.

196) $g \circ f$ 196) _____

A) Even B) Odd

Answer: A
Diff: 0 Type: BI

Express the given quantity in terms of sin x or cos x.

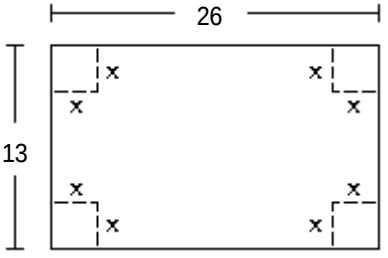
197) $\cos\left(\frac{7\pi}{2} + x\right)$ 197) _____

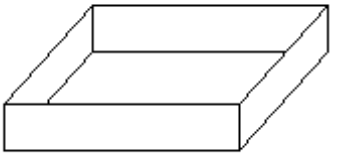
A) cos x + sin x B) -sin x C) cos x D) sin x

Answer: D
Diff: 0 Type: BI

Solve the problem.

198) A box with an open top is to be constructed from a rectangular piece of cardboard with dimensions 13 inches by 26 inches by cutting out equal squares of side x at each corner and then folding up the sides as in the figure. Express the volume V of the box as a function of x. 198) _____



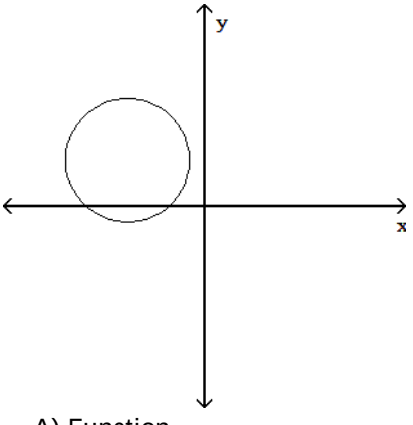


A) V(x) = (13 - x)(26 - x) B) V(x) = (13 - 2x)(26 - 2x)
C) V(x) = x(13 - 2x)(26 - 2x) D) V(x) = x(13 - x)(26 - x)

Answer: C
Diff: 0 Type: BI

Determine whether or not the graph is a graph of a function of x.

199) 199) _____



A) Function B) Not a function

Answer: B
Diff: 0 Type: BI

Use the appropriate addition formula to find the exact value of the expression.

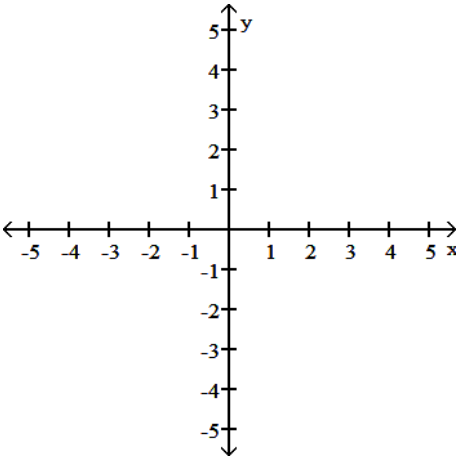
200) $\sin\left(\frac{17\pi}{12}\right)$ 200) _____

A) $-\frac{\sqrt{6}+\sqrt{2}}{4}$ B) $\frac{\sqrt{6}+\sqrt{2}}{4}$ C) $\frac{\sqrt{2}-\sqrt{6}}{4}$ D) $\frac{\sqrt{6}-\sqrt{2}}{4}$

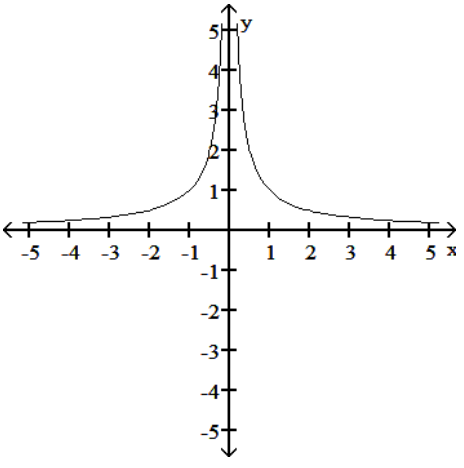
Answer: A
Diff: 0 Type: BI

Find the domain and graph the function.

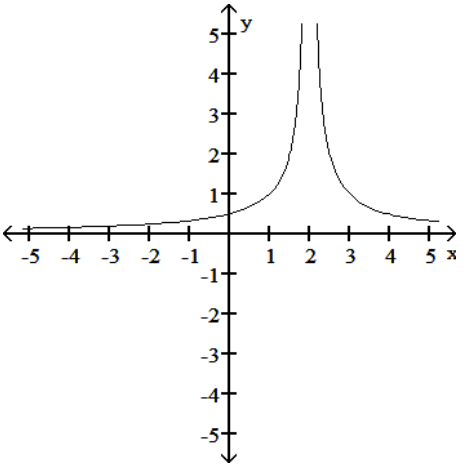
201) $G(t) = \frac{1}{|t-2|}$ 201) _____



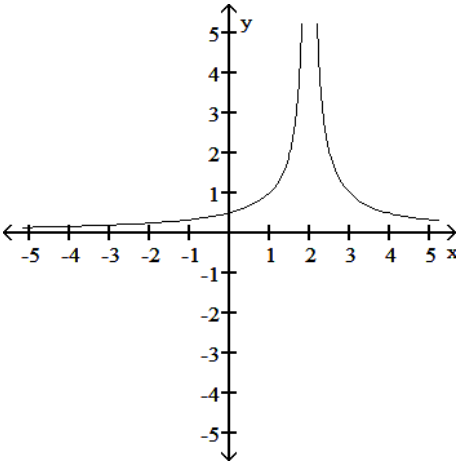
A) D: $(-\infty, 0) \cup (0, \infty)$



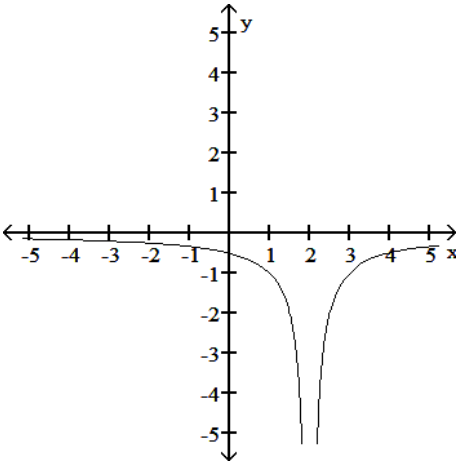
B) D: $(-\infty, 2) \cup (2, \infty)$



C) D: $(-\infty, \infty)$



D) D: $(-\infty, 2) \cup (2, \infty)$



Answer: B
Diff: 0 Type: BI

Find the formula for the function.

202) A point P in the first quadrant lies on the graph of the function $f(x) = x^2$. Express the slope of the line joining P to the origin as a function of x. 202) _____

A) $m = x$ B) $m = \frac{1}{x}$ C) $m = 2x$ D) $m = \frac{2}{x}$

Answer: A
Diff: 0 Type: BI

Use the appropriate addition formula to find the exact value of the expression.

203) $\tan\left(\frac{13\pi}{12}\right)$ 203) _____

A) $2 + \sqrt{3}$ B) $2 - \sqrt{3}$ C) $\frac{2 + \sqrt{3}}{4}$ D) $\frac{2 - \sqrt{3}}{4}$

Answer: B
Diff: 0 Type: BI

Find the formula for the function.

204) Express the area of a square as a function of its side length x. 204) _____

A) $A = x^4$ B) $A = 4x$ C) $A = x^2$ D) $A = 2x$

Answer: C
Diff: 0 Type: BI

Use a graphing calculator or computer to determine which of the given viewing windows displays the most appropriate graph of the specified function.

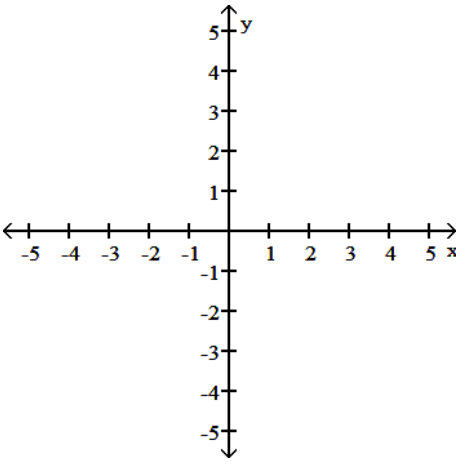
205) $f(x) = 7 + 7x - x^3$ 205) _____

A) [-10, 20] by [-50, 50] B) [-4, 5] by [-5, 5]
C) [-4, 5] by [-15, 25] D) [-10, 10] by [-10, 5]

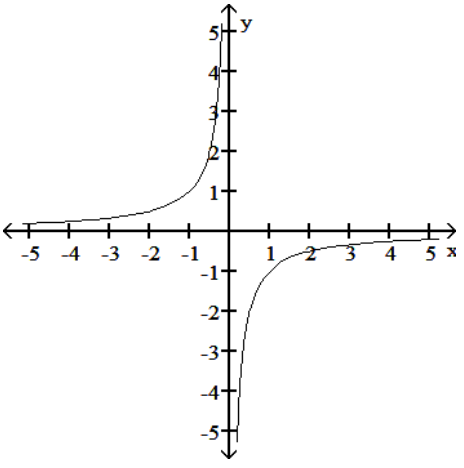
Answer: C
Diff: 0 Type: MC

Graph the function. Specify the intervals over which the function is increasing and the intervals where it is decreasing.

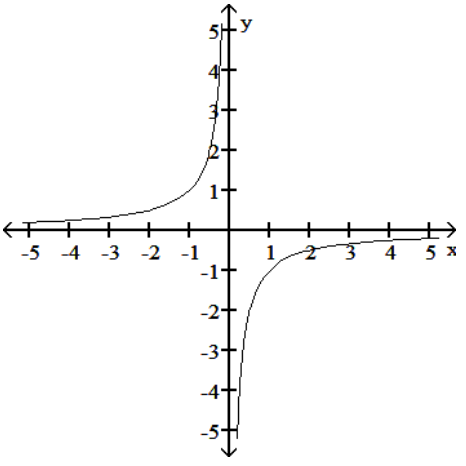
206) $y = \frac{1}{x}$ 206) _____



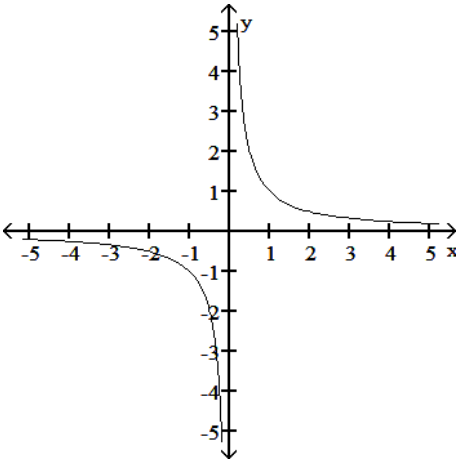
A) Increasing $-\infty < x < 0$ and $0 < x < \infty$



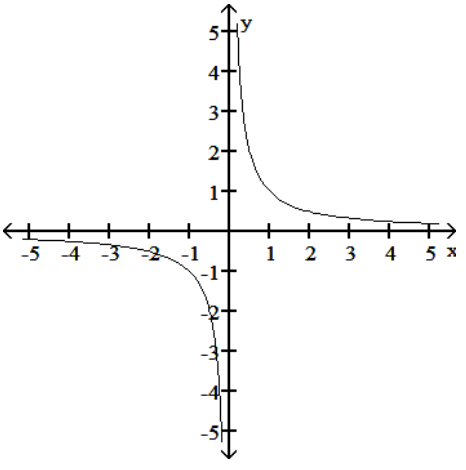
B) Increasing $-\infty < x < 0$
Decreasing $0 < x < \infty$



C) Decreasing $-\infty < x < 0$
Increasing $0 < x < \infty$



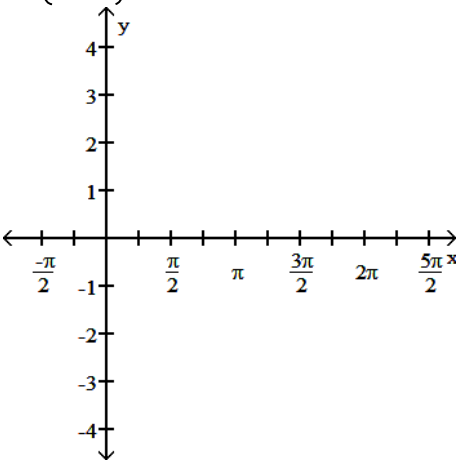
D) Decreasing $-\infty < x < 0$ and $0 < x < \infty$



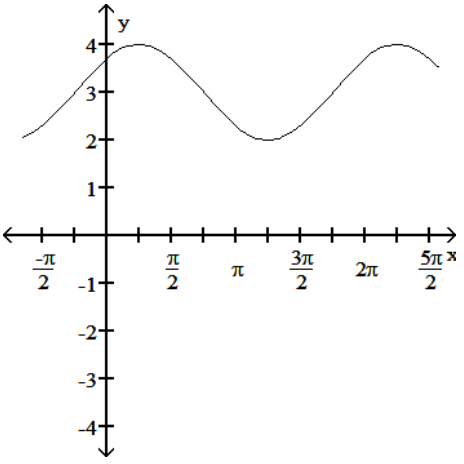
Answer: D
Diff: 0 Type: BI

State the period of the function and graph.

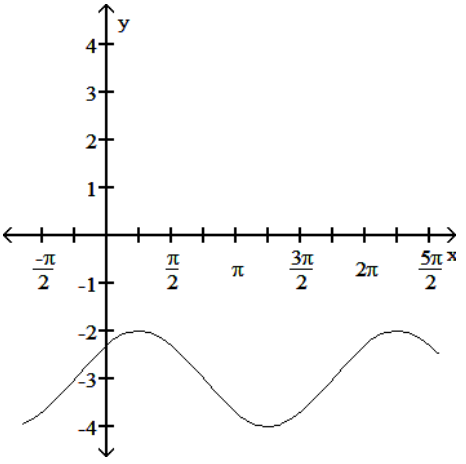
207) $\sin\left(x + \frac{\pi}{4}\right) - 3$ 207) _____



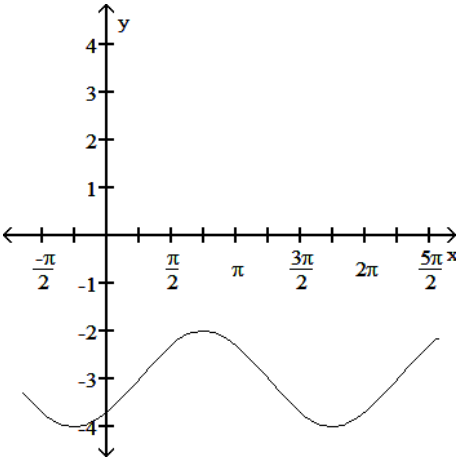
A) Period 2π



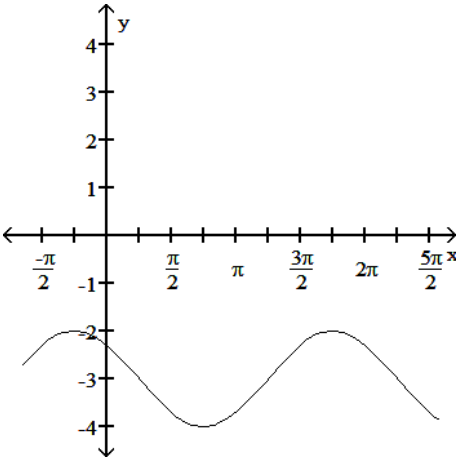
B) Period 2π



C) Period 2π



D) Period 2π



Answer: B
Diff: 0 Type: BI

Solve the problem.

208) If $f(x) = \frac{1}{x}$ and $g(x) = 9x^6$, find $g(f(x))$. 208) _____

A) $\frac{9}{x}$ B) $\frac{1}{x^6}$ C) $\frac{1}{9x^6}$ D) $\frac{9}{x^6}$

Answer: D
Diff: 0 Type: BI

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

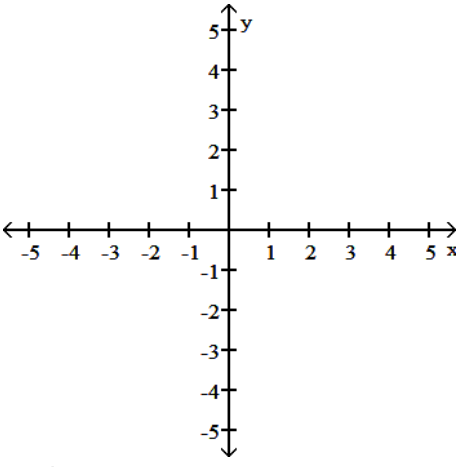
209) What happens if you set $B = -2\pi$ in the angle sum formulas for the sine and cosine functions? Do the results agree with something you already know? 209) _____

Answer: If $B = -2\pi$, then $\cos(A + B) = \cos A$ and $\sin(A + B) = \sin A$. Because the period of both of the sine and cosine functions is 2π, if B is replaced by a multiple of 2π the angle sum formulas must produce the same value as the sine or cosine function.
Diff: 0 Type: SA

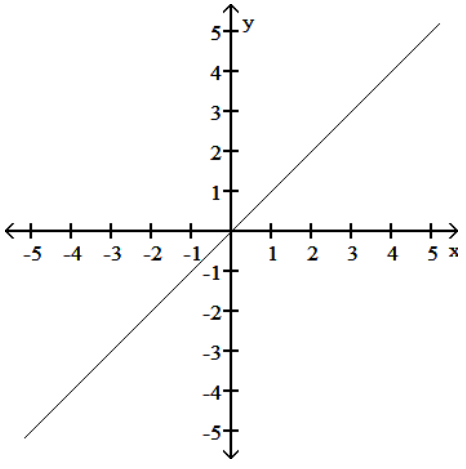
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Graph the function. Determine the symmetry, if any, of the function.

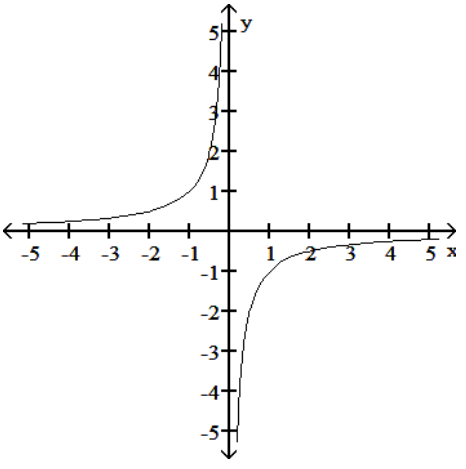
210) $y = \frac{1}{x}$ 210) _____



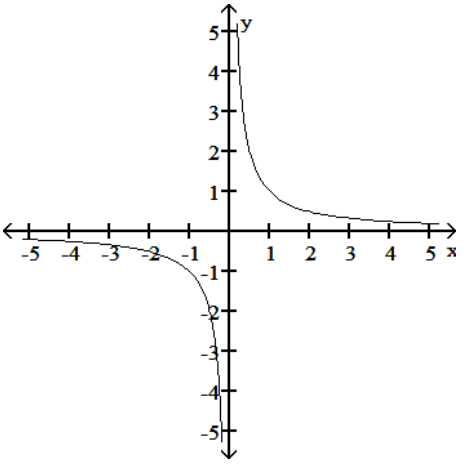
A) Symmetric about the origin



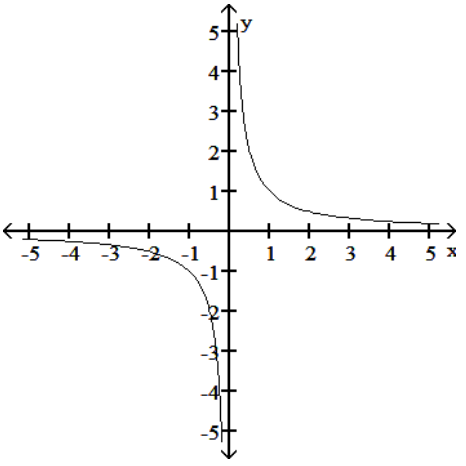
B) Symmetric about the origin



C) No symmetry



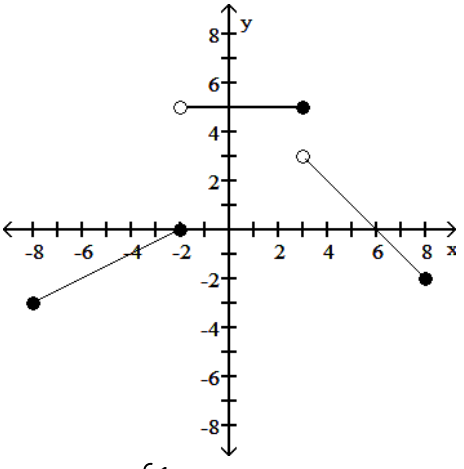
D) Symmetric about the origin



Answer: D
Diff: 0 Type: BI

Find a formula for the function graphed.

211) 211) _____



A) $f(x) = \begin{cases} \frac{1}{2}x + 1, & -8 \le x \le -2 \\ 5, & -2 < x < 3 \\ 6 - x, & 3 \le x \le 8 \end{cases}$

B) $f(x) = \begin{cases} \frac{1}{2}x + 1, & -8 \le x \le -2 \\ 5, & -2 < x \le 3 \\ 6 - x, & 3 < x \le 8 \end{cases}$

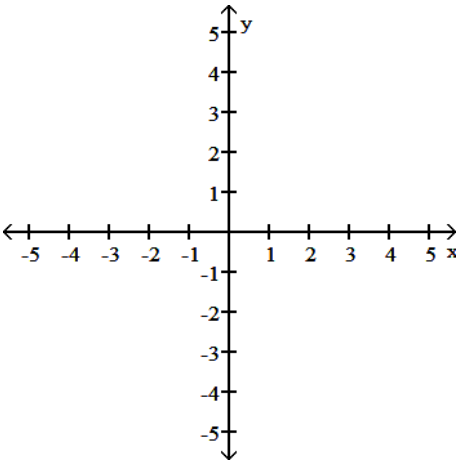
C) $f(x) = \begin{cases} -\frac{1}{2}x + 1, & -8 \le x \le -2 \\ 5, & -2 < x \le 3 \\ x - 6, & 3 < x \le 8 \end{cases}$

D) $f(x) = \begin{cases} \frac{1}{2}x + 1, & -8 < x \le -2 \\ 5, & -2 < x \le 3 \\ 6 - x, & 3 < x < 8 \end{cases}$

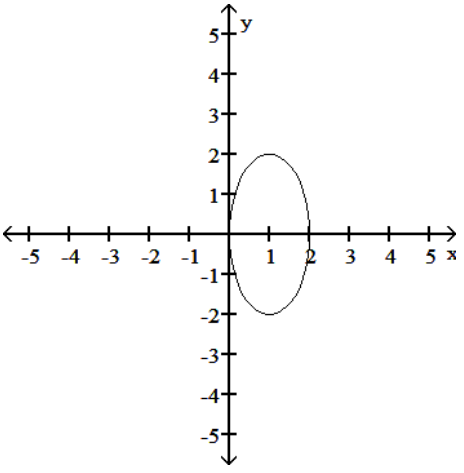
Answer: B
Diff: 0 Type: BI

The equation of an ellipse is given. Put the equation in standard form and sketch the ellipse.

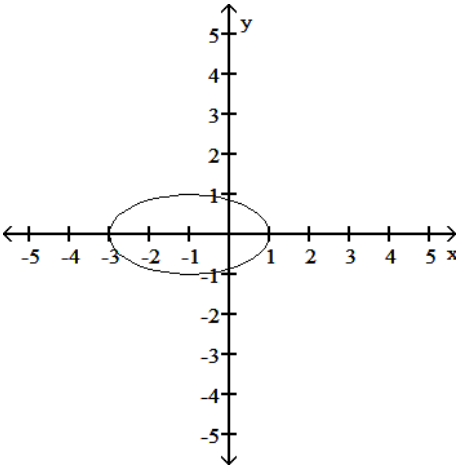
212) $(x + 1)^2 + 4y^2 = 4$ 212) _____



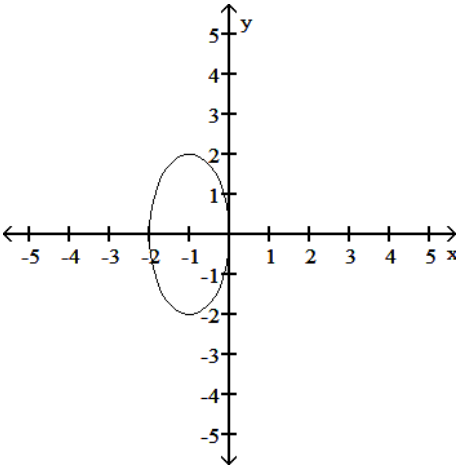
A) $(x + 1)^2 + \frac{y^2}{4} = 1$



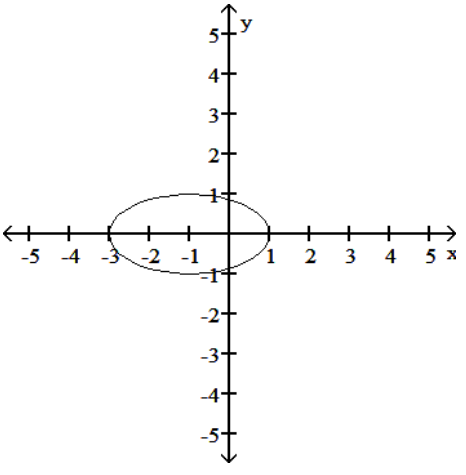
B) $\frac{(x + 1)^2}{4} + y^2 = 1$



C) $(x + 1)^2 + \frac{y^2}{4} = 1$



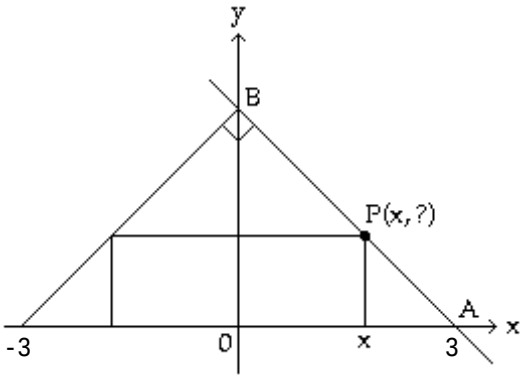
D) $\frac{(x + 1)^2}{4} + y^2 = 1$



Answer: D
Diff: 0 Type: BI

Solve the problem.

213) The figure shown here shows a rectangle inscribed in an isosceles right triangle whose hypotenuse is 6 units long. Express the area A of the rectangle in terms of x. 213) _____



A) A(x) = 2x(x - 3) B) A(x) = x(3 - x) C) $A(x) = 2x^2$ D) A(x) = 2x(3 - x)

Answer: D
Diff: 0 Type: BI

Find the formula for the function.

214) Express the perimeter of an isosceles triangle with side lengths x, 5x, and 5x as a function of the side length. 214) _____

A) p = 10x B) p = 11x C) $p = 25x^3$ D) $p = 10x^3$

Answer: B
Diff: 0 Type: BI

The problem tells by what factor and direction the graph of the given function is to be stretched or compressed. Give an equation for the stretched or compressed graph.

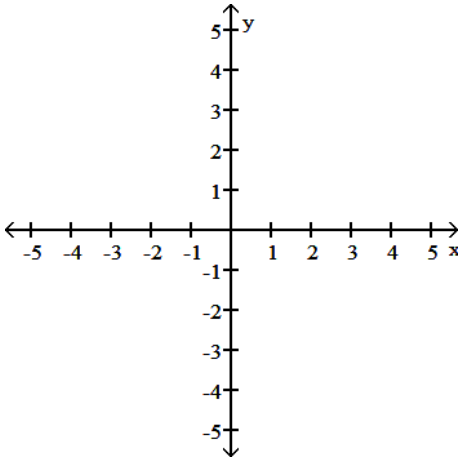
215) $y = 1 + \frac{1}{x^2}$ compressed horizontally by a factor of 2 215) _____

A) $y = 1 + \frac{4}{x^2}$ B) $y = 1 + \frac{1}{4x^2}$ C) $y = \frac{1}{2} + \frac{1}{2x^2}$ D) $y = 2 + \frac{2}{x^2}$

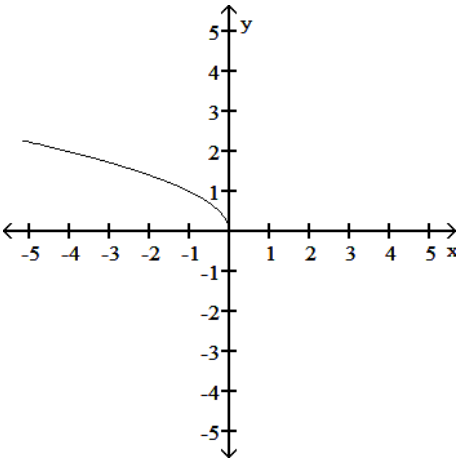
Answer: B
Diff: 0 Type: BI

Graph the function. Specify the intervals over which the function is increasing and the intervals where it is decreasing.

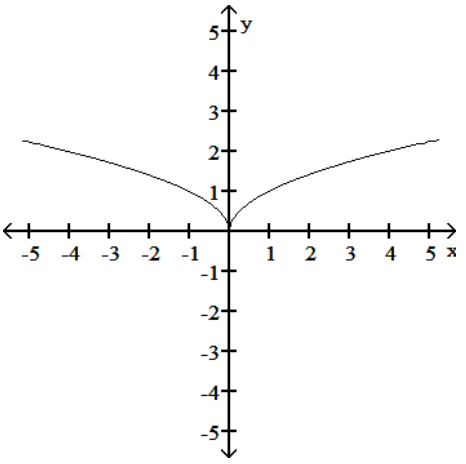
216) $y = \sqrt{-x}$ 216) _____



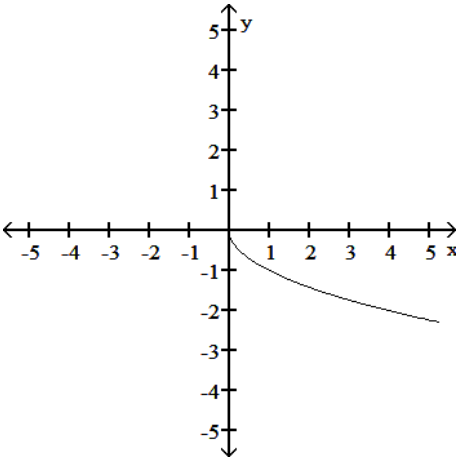
A) Increasing $-\infty < x \le 0$



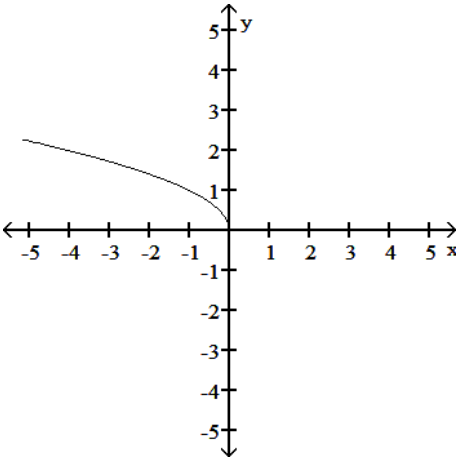
B) Decreasing $-\infty < x \le 0$
Increasing $0 \le x < \infty$



C) Decreasing $0 \le x < \infty$



D) Decreasing $-\infty < x \le 0$



Answer: D
Diff: 0 Type: BI

Find the domain and range for the indicated function.

217) $f(x) = 7, \quad g(x) = 7 + \sqrt{x}; \quad f/g$ 217) _____

A) D: $x \ge 0$
R: $y \ge 1$

B) D: $x \ge -7$
R: $y \ge 0$

C) D: $x \ge 0$
R: $y \le 1$

D) D: $x \ge 0$
R: $y \le 7$

Answer: C
Diff: 0 Type: BI

Determine if the function is even, odd, or neither.

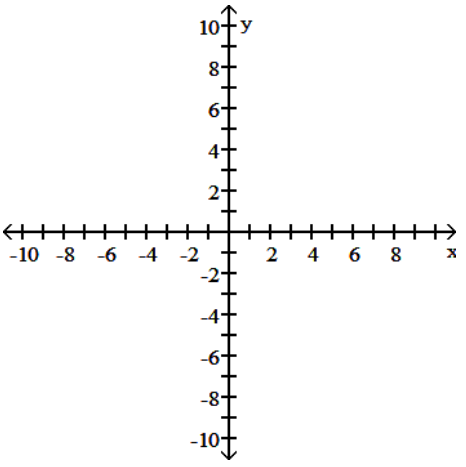
218) $f(x) = \dfrac{-1}{x + 6}$ 218) _____

A) Even B) Odd C) Neither

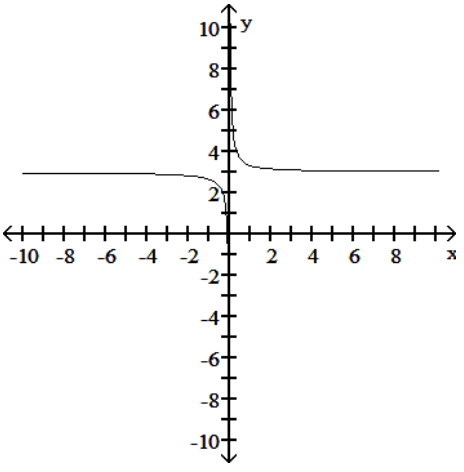
Answer: C
Diff: 0 Type: BI

Graph the function.

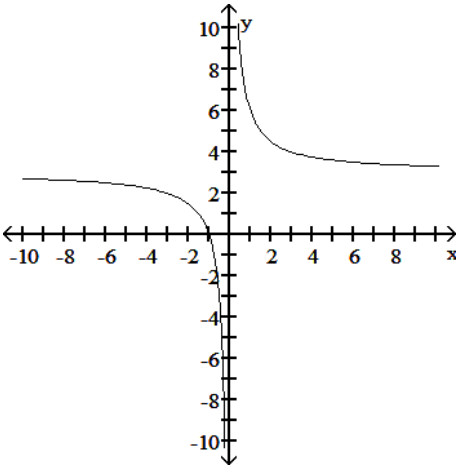
219) $y = \frac{1}{3x} - 3$ 219) _____



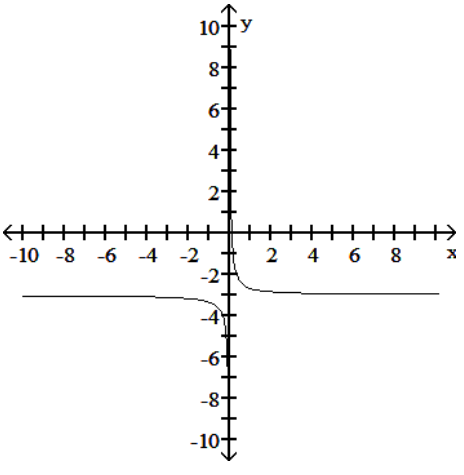
A)



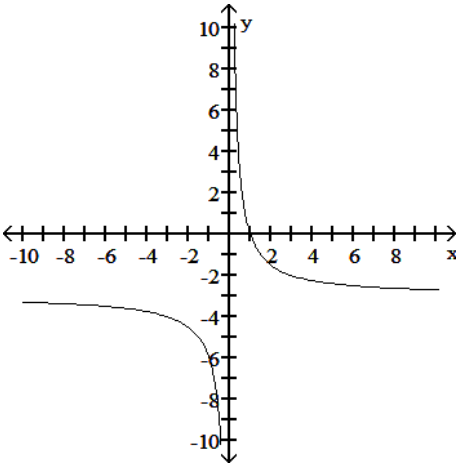
B)



C)



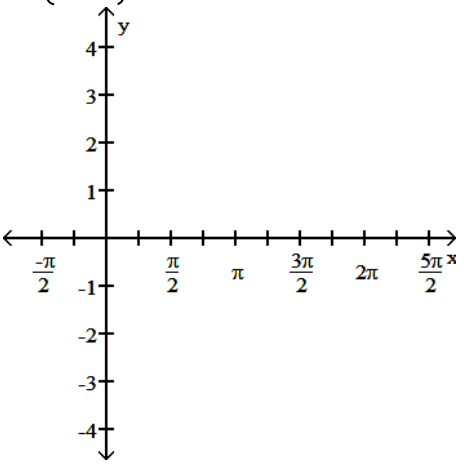
D)



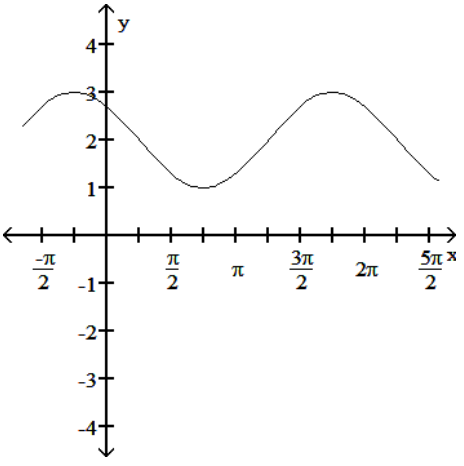
Answer: C
Diff: 0 Type: BI

State the period of the function and graph.

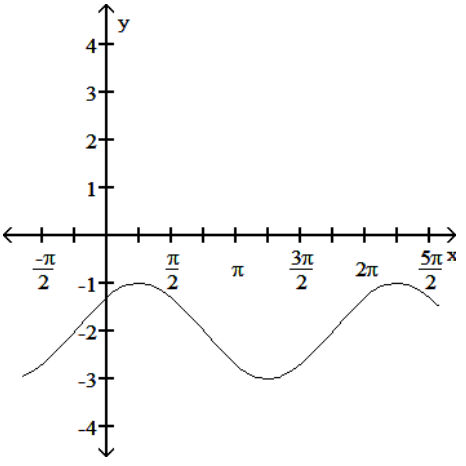
220) $\cos\left(x - \frac{\pi}{4}\right) + 2$ 220) _____



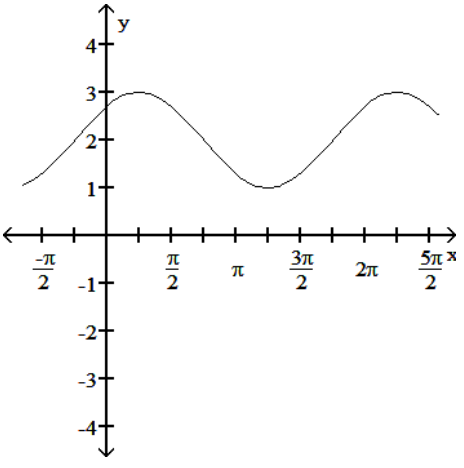
A) Period 2π



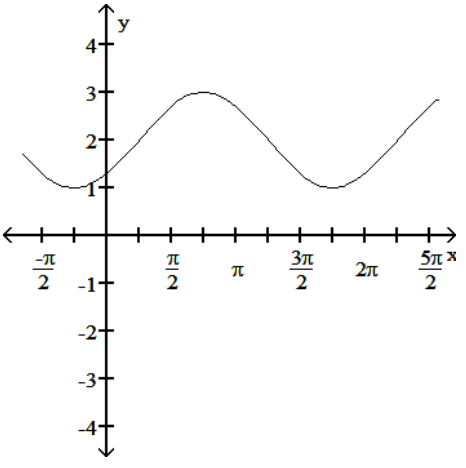
B) Period 2π



C) Period 2π



D) Period 2π



Answer: C
Diff: 0 Type: BI

Assume that f is an even function, g is an odd function, and both f and g are defined on the entire real line. State whether the combination of functions (where defined) is even or odd.

221) f/g 221) _____

A) Even B) Odd

Answer: B
Diff: 0 Type: BI

Use the appropriate addition formula to find the exact value of the expression.

222) $\cos\left(\frac{19\pi}{12}\right)$ 222) _____

A) $-\sqrt{6}-\sqrt{2}$ B) $\frac{\sqrt{6}-\sqrt{2}}{4}$ C) $\sqrt{2}-\sqrt{6}$ D) $\frac{\sqrt{2}-\sqrt{6}}{4}$

Answer: B
Diff: 0 Type: BI

Find the domain and range of the function.

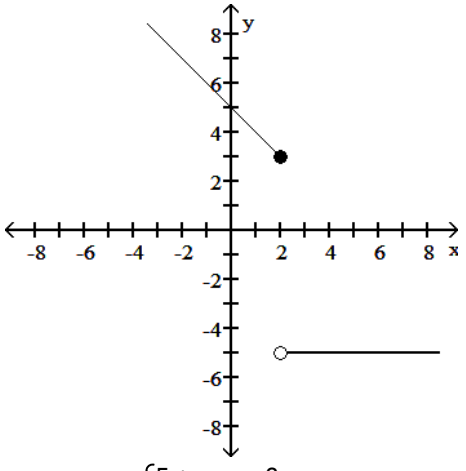
223) $F(t) = t^2 - 2$ 223) _____

A) D: $[-4,\infty)$, R: $[-2,\infty)$ B) D: $(-\infty,\infty)$, R: $[-2,\infty)$
C) D: $[0,\infty)$, R: $(-\infty,-2]$ D) D: $(-\infty,\infty)$, R: $(-\infty,\infty)$

Answer: B
Diff: 0 Type: BI

Find a formula for the function graphed.

224) 224) _____



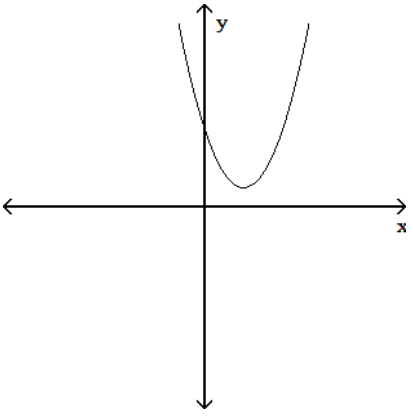
A) $f(x) = \begin{cases} 5+x, & x \le 2 \\ -5 & x > 2 \end{cases}$ B) $f(x) = \begin{cases} 5+x, & x < 2 \\ -5 & x > 2 \end{cases}$

C) $f(x) = \begin{cases} 5-x, & x \le 2 \\ -5 & x > 2 \end{cases}$ D) $f(x) = \begin{cases} 5-x, & x < 2 \\ -5 & x \ge 2 \end{cases}$

Answer: C
Diff: 0 Type: BI

Determine whether or not the graph is a graph of a function of x.

225) 225) _____



A) Function

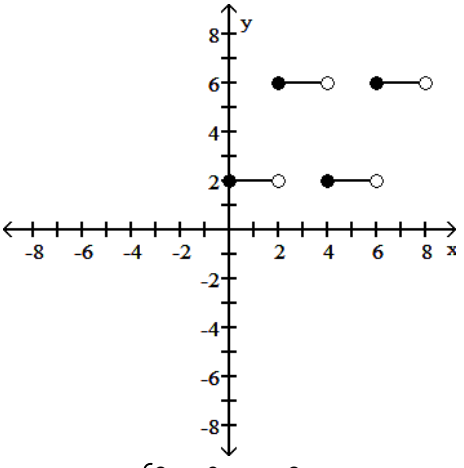
B) Not a function

Answer: A

Diff: 0 Type: BI

Find a formula for the function graphed.

226) 226) _____



A) $f(x) = \begin{cases} 2, & 0 \le x \le 2 \\ 6, & 2 < x \le 4 \\ 2, & 4 < x \le 6 \\ 6, & 6 < x \le 8 \end{cases}$

B) $f(x) = \begin{cases} 2, & 0 \le x < 2 \\ 6, & 2 \le x < 4 \\ 2, & 4 \le x < 6 \\ 6, & 6 \le x < 8 \end{cases}$

C) $f(x) = \begin{cases} 6, & 0 \le x < 6 \\ 2, & 2 \le x < 8 \end{cases}$

D) $f(x) = \begin{cases} 2, & 0 \le x < 6 \\ 6, & 2 \le x < 8 \end{cases}$

Answer: B

Diff: 0 Type: BI

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Use the addition formulas to derive the identity.

227) $\sin\left(x - \frac{\pi}{2}\right) = -\cos x$ 227) _____

Answer: $\sin\left(x - \frac{\pi}{2}\right) = \sin x \cos\left(-\frac{\pi}{2}\right) + \cos x \sin\left(-\frac{\pi}{2}\right)$

$= \sin x\,(0) + \cos x\,(-1)$

$= 0 - \cos x$

$= -\cos x$

Diff: 0 Type: SA

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the problem.

228) If $f(x) = \frac{x - 4}{7}$ and $g(x) = 7x + 4$, find $g(f(x))$. 228) _____

A) $x + 8$ B) $-\frac{4}{7}$ C) x D) $7x + 24$

Answer: C

Diff: 0 Type: BI

Assume that f is an even function, g is an odd function, and both f and g are defined on the entire real line. State whether the combination of functions (where defined) is even or odd.

229) f^2 229) _____

A) Even B) Odd

Answer: A

Diff: 0 Type: BI

Find the formula for the function.

230) Express the area of a circle as a function of its radius r. 230) _____

A) $A = 2\pi r$ B) $A = \pi r^2$ C) $A = \pi r$ D) $A = \pi r^3$

Answer: B

Diff: 0 Type: BI

For

$f(x) = A \sin\left(\frac{2\pi}{B}(x - C)\right) + D,$

identify either A, B, C, or D as indicated for the sine function.

231) $y = -\cos\left(\frac{1}{2}\theta + \frac{\pi}{2}\right)$ Find B. 231) _____

A) 4π B) $\frac{\pi}{2}$ C) 2 D) 1

Answer: A

Diff: 0 Type: BI

Provide an appropriate response.

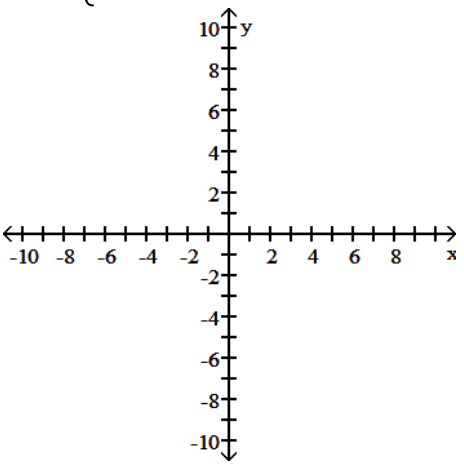
232) Consider the function $y = \sqrt{1 - \frac{1}{x}}$. Can x be greater than 0, but less than 1? 232) _____

A) Yes B) No

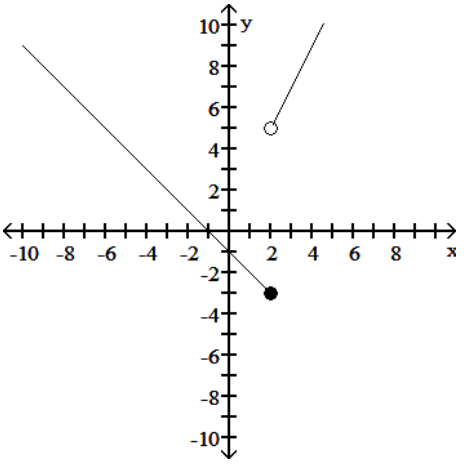
Answer: B
Diff: 0 Type: BI

Graph the function.

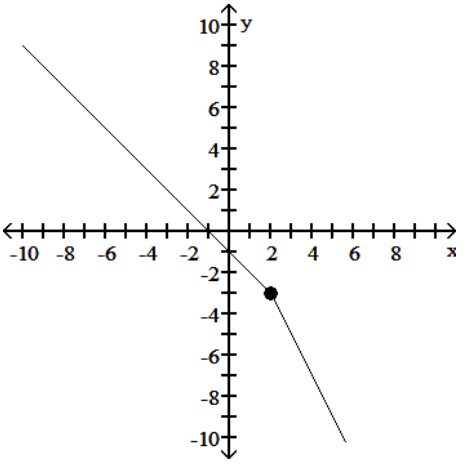
233) $F(x) = \begin{cases} -1 - x, & x \le 2 \\ 1 - 2x, & x > 2 \end{cases}$ 233) _____



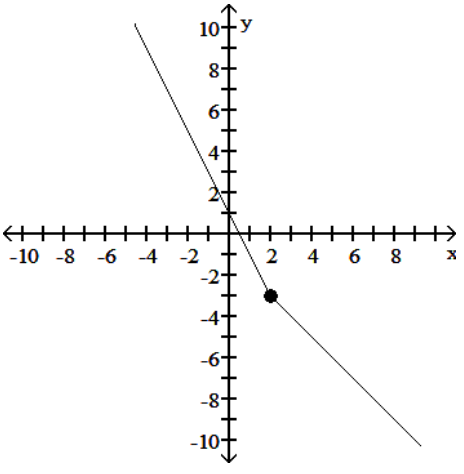
A)



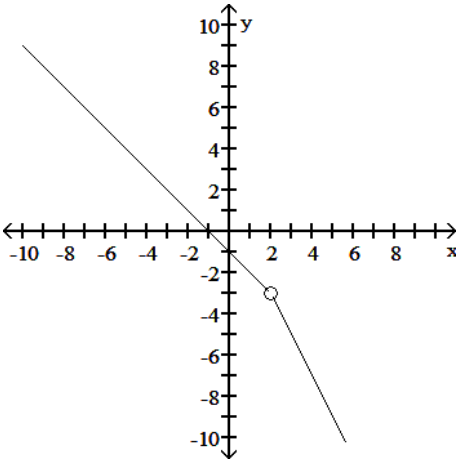
B)



C)



D)



Answer: B
Diff: 0 Type: BI

Find the domain and range of the function.

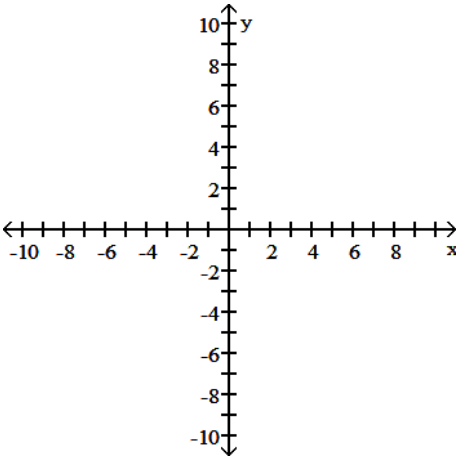
234) $f(x) = \dfrac{8}{8 + \sqrt{x}}$ 234) _____

A) D: $[0,\infty)$, R: $(-\infty,\infty)$
B) D: $(-\infty,\infty)$, R: $(0,1]$
C) D: $(-\infty,0]$, R: $(-\infty,0]$
D) D: $[0,\infty)$, R: $(0,1]$

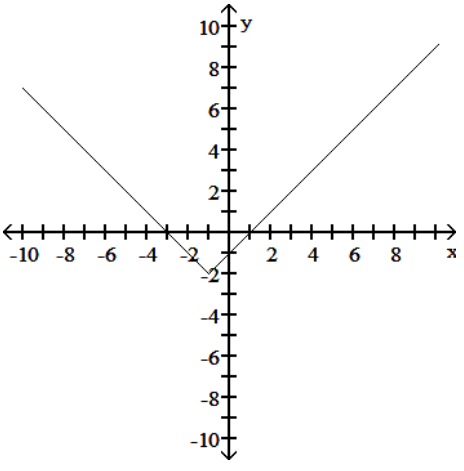
Answer: D
Diff: 0 Type: BI

Graph the function.

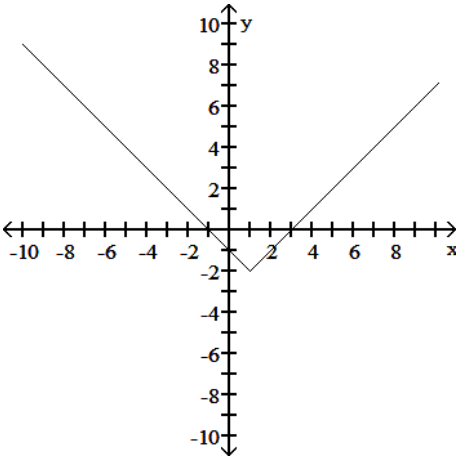
235) $y = |x + 1| + 2$ 235) _____



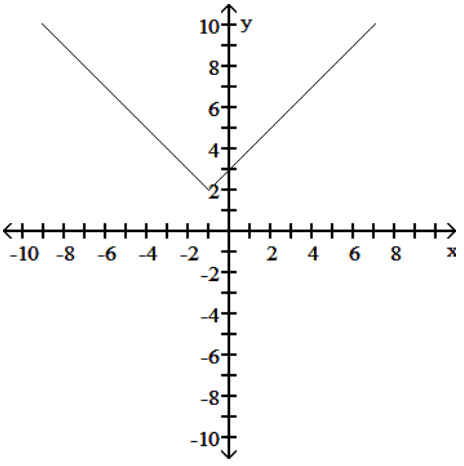
A)



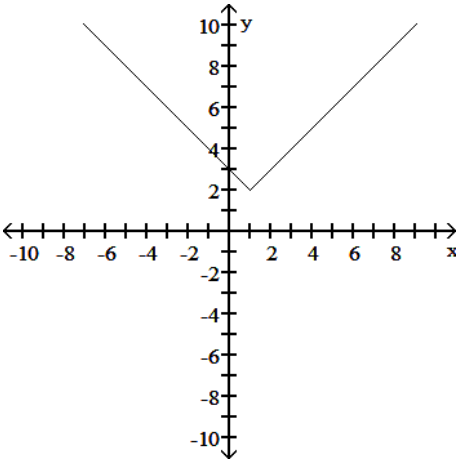
B)



C)



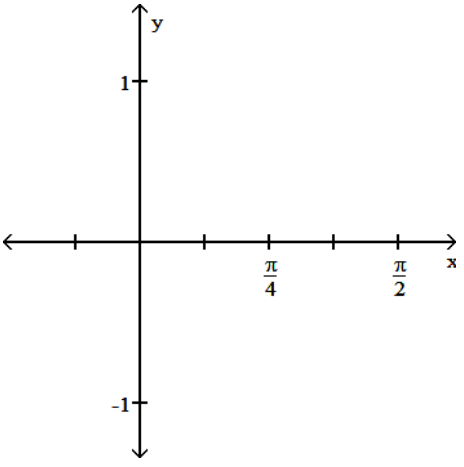
D)



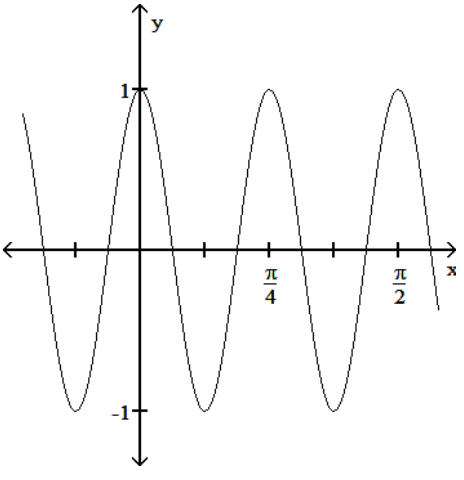
Answer: C
Diff: 0 Type: BI

State the period of the function and graph.

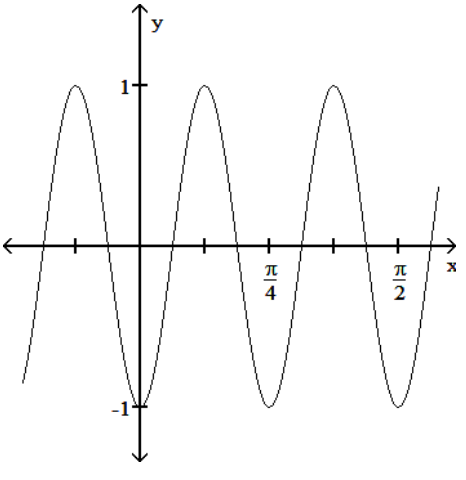
236) -sin 8x 236) _____



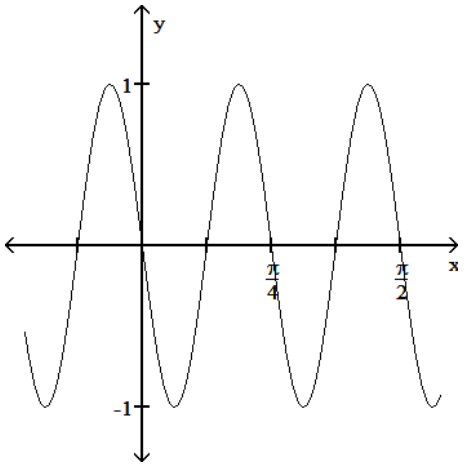
A) Period $\frac{\pi}{4}$



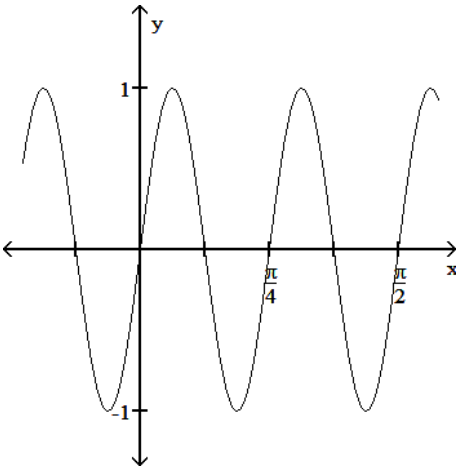
B) Period $\frac{\pi}{4}$



C) Period $\frac{\pi}{4}$



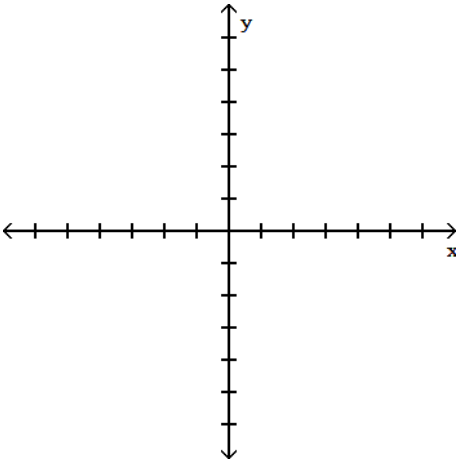
D) Period $\frac{\pi}{4}$



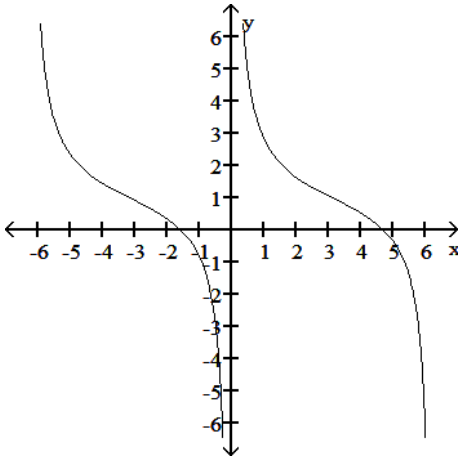
Answer: C
Diff: 0 Type: BI

Graph the function.

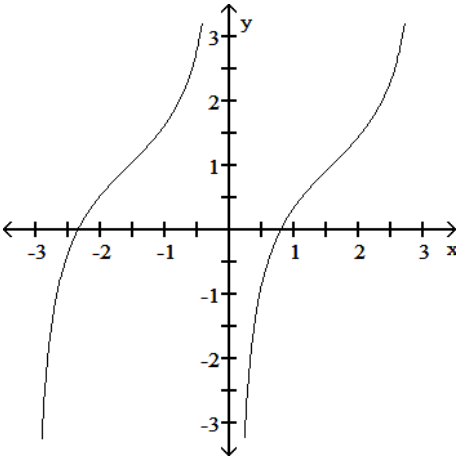
237) Graph two periods of the function $f(x) = -\cot \frac{x}{2} + 1$. 237) _____



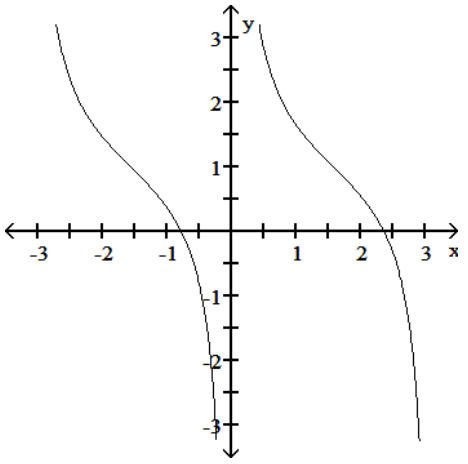
A)



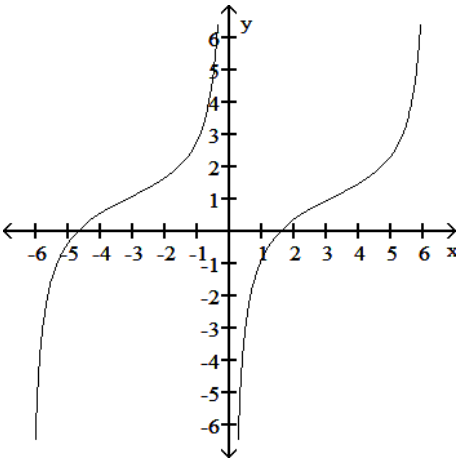
B)



C)



D)



Answer: D
Diff: 0 Type: BI

For

$$f(x) = A \sin\left[\frac{2\pi}{B}(x - C)\right] + D,$$

identify either A, B, C, or D as indicated for the sine function.

238) $y = 4 \sin\left[2x + \frac{\pi}{3}\right]$ Find A. 238) _____

A) 8 B) 2 C) $\frac{\pi}{3}$ D) 4

Answer: D
Diff: 0 Type: BI

Use the appropriate addition formula to find the exact value of the expression.

239) $\sin\left[\frac{19\pi}{12}\right]$ 239) _____

A) $\frac{\sqrt{6} - \sqrt{2}}{4}$ B) $\frac{\sqrt{2} - \sqrt{6}}{4}$ C) $\frac{\sqrt{6} + \sqrt{2}}{4}$ D) $-\frac{\sqrt{6} + \sqrt{2}}{4}$

Answer: D
Diff: 0 Type: BI

Use a graphing calculator or computer to determine which of the given viewing windows displays the most appropriate graph of the specified function.

240) $f(x) = 2 \cos 60x$ 240) _____

A) [-10, 10] by [-10, 10]
B) [-0.2, 0.2] by [-4, 4]
C) [-1, 1] by [-4, 4]
D) [-0.2, 0.2] by [-1, 1]

Answer: B
Diff: 0 Type: MC

241) $f(x) = |x^2 - 4|$ 241) _____

A) [-5, 5] by [-2, 10]
B) [-10, 10] by [-15, 15]
C) [0, 5] by [-2, 10]
D) [-5, 5] by [-15, 15]

Answer: A
Diff: 0 Type: MC

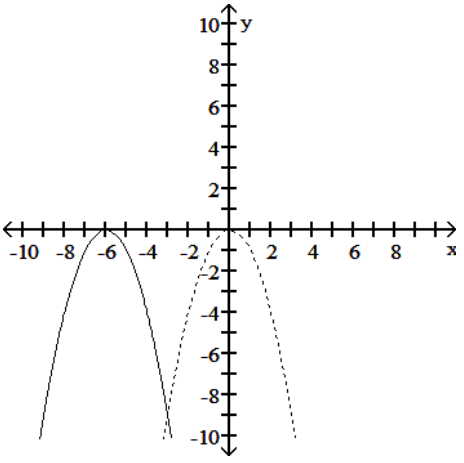
Solve the problem.

242) Boyle's Law says that volume V of a gas at constant temperature increases whenever the pressure P decreases, so that V and P are inversely proportional. If P = 14.5 lbs/in^2 when V = 800 in^3, then what is V when P = 22 lbs/in^2? 242) _____

A) $\frac{800}{319}$ in^3 B) $\frac{5800}{11}$ in^3 C) $\frac{35200}{29}$ in^3 D) $\frac{319}{800}$ in^3

Answer: B
Diff: 0 Type: BI

243) The accompanying figure shows the graph of $y = -x^2$ shifted to a new position. Write the equation for the new graph. 243) _____



A) $y = -x^2 + 6$ B) $y = -x^2 - 6$ C) $y = -(x - 6)^2$ D) $y = -(x + 6)^2$

Answer: D
Diff: 0 Type: BI

Solve for the angle θ, where $0 \le \theta \le 2\pi$

244) $\sin 2\theta - \cos\theta = 0$ 244) _____

A) $\theta = \frac{\pi}{2}, \frac{3\pi}{2}, \frac{\pi}{6}, \frac{5\pi}{6}$ B) $\frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{6}, \frac{11\pi}{6}$

C) $\theta = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$ D) $0, \frac{\pi}{2}, \pi, \frac{3\pi}{2}, 2\pi$

Answer: A
Diff: 0 Type: BI

Find the exact value of the trigonometric function. Do not use a calculator or tables.

245) $\csc(2\pi)$ 245) _____

A) -1 B) 0 C) 1 D) Undefined

Answer: D
Diff: 0 Type: BI

Solve the problem.

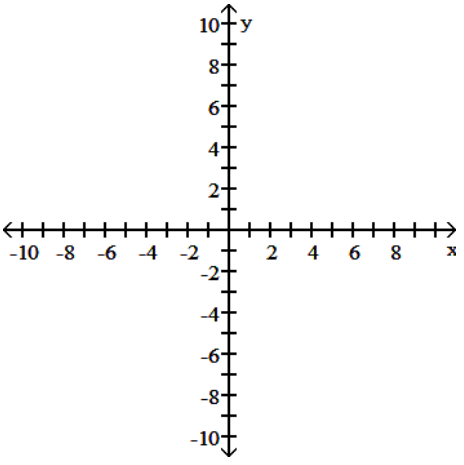
246) Let $g(x) = \sqrt{x}$. Find a function $y = f(x)$ so that $(f \circ g)(x) = |x|$. 246) _____

A) $f(x) = x^2$ B) $f(x) = \frac{1}{x}$ C) $f(x) = \frac{1}{x^2}$ D) $f(x) = x$

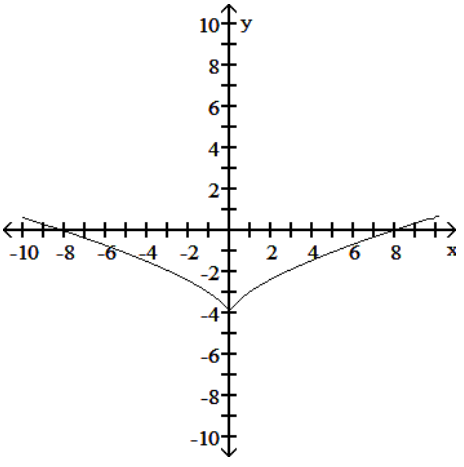
Answer: A
Diff: 0 Type: BI

Graph the function.

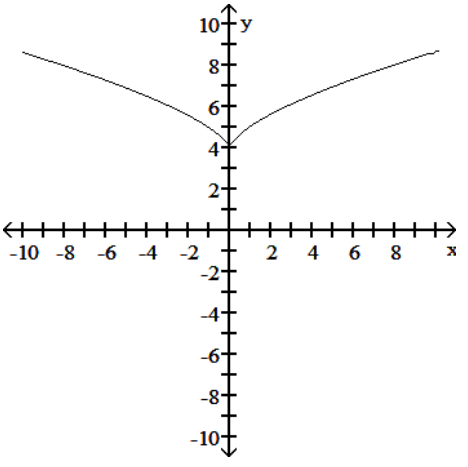
247) $y + 4 = x^{2/3}$ 247) _____



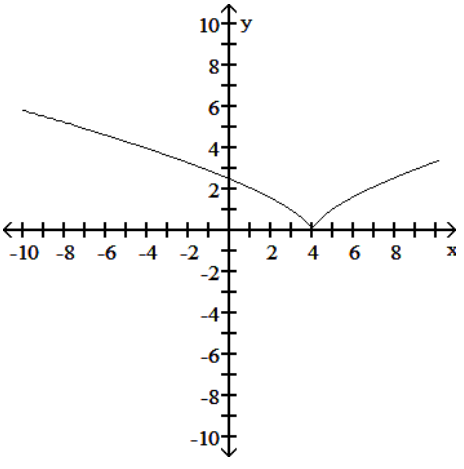
A)



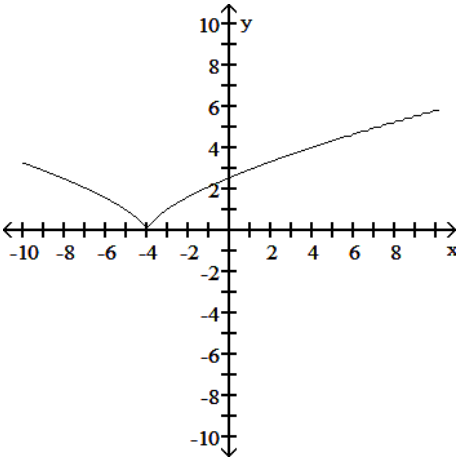
B)



C)



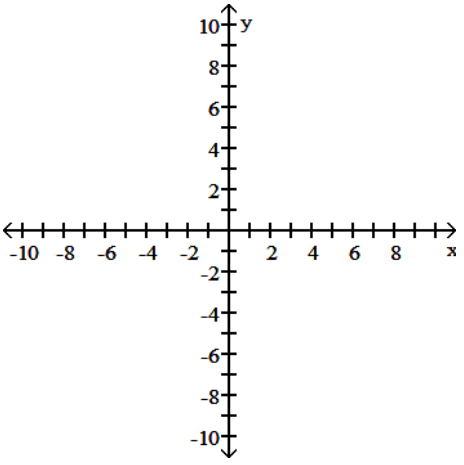
D)



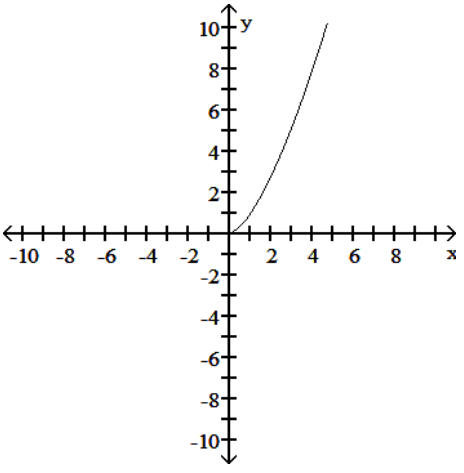
Answer: A
Diff: 0 Type: BI

Graph the function. Determine the symmetry, if any, of the function.

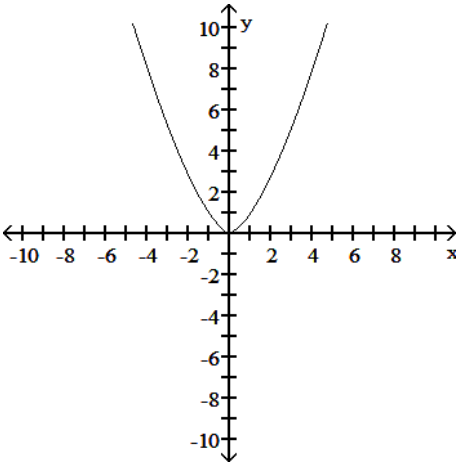
248) $y = (-x)^{3/2}$ 248) _____



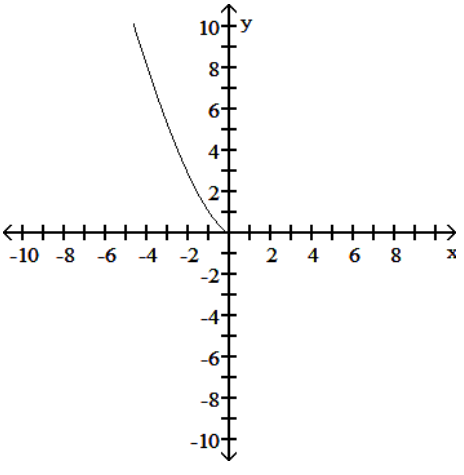
A) No symmetry



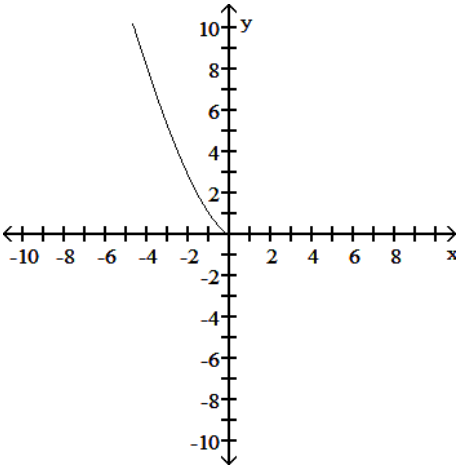
B) Symmetric about the y-axis



C) No symmetry



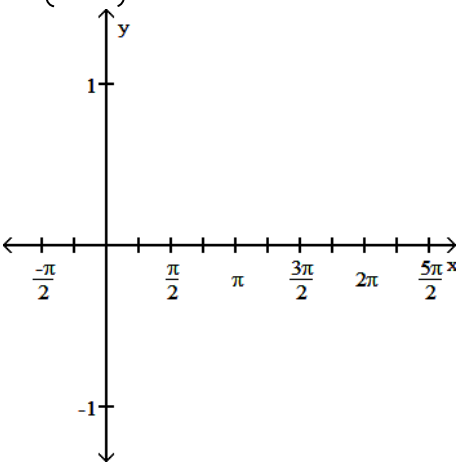
D) Symmetric about the y-axis



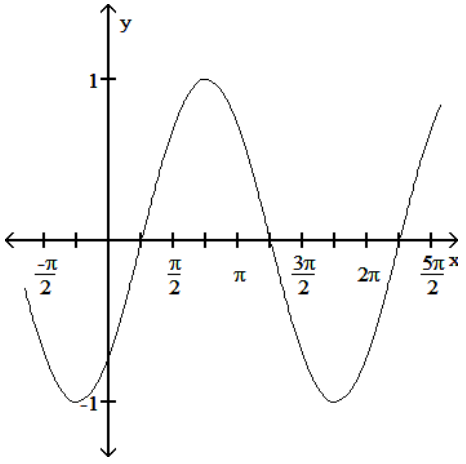
Answer: C
Diff: 0 Type: BI

State the period of the function and graph.

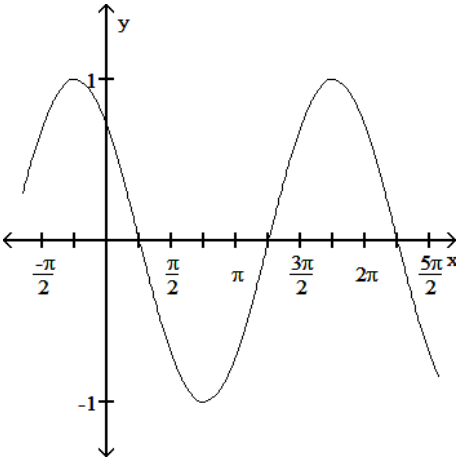
249) $\cos\left(x + \frac{\pi}{4}\right)$ 249) _____



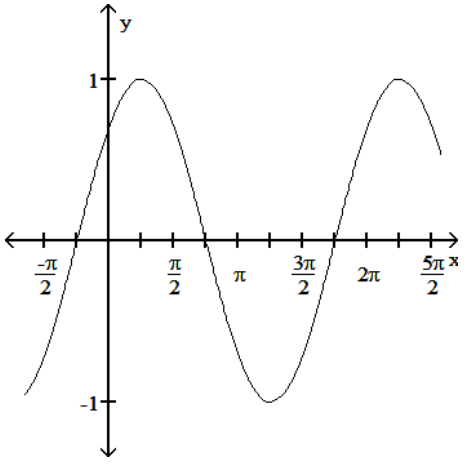
A) Period 2π



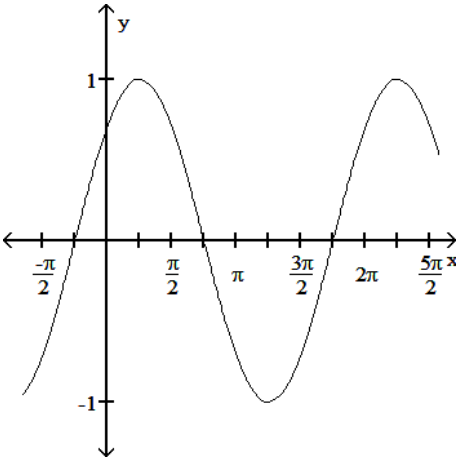
B) Period 2π



C) Period 2π



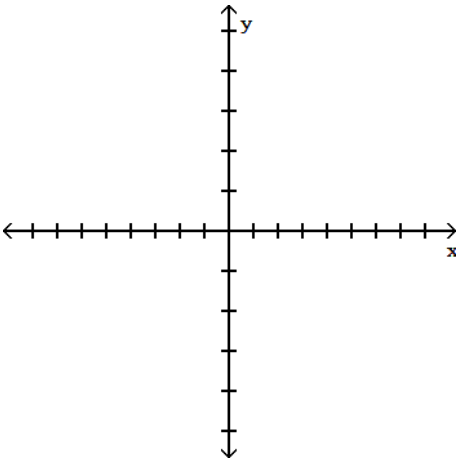
D) Period 2π



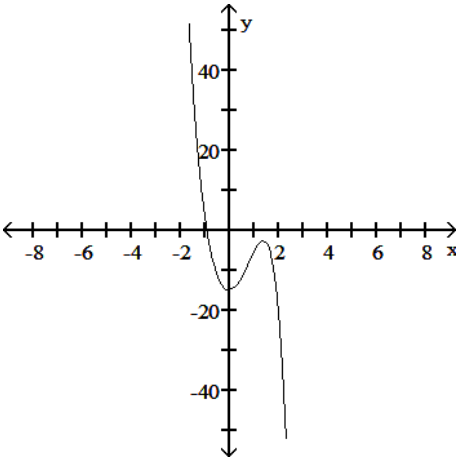
Answer: B
Diff: 0 Type: BI

Determine an appropriate viewing window for the given function and use it to display its graph.

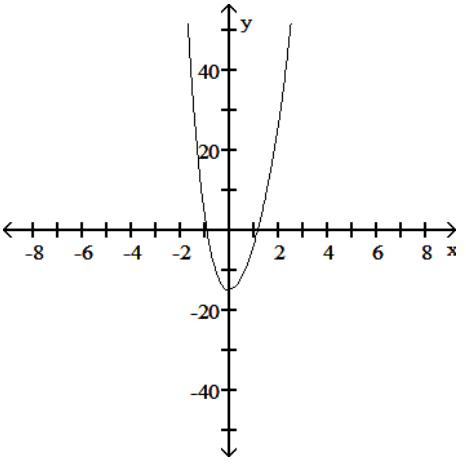
250) $f(x) = x^4 - 4x^3 + 14x^2 + x - 15$ 250) _____



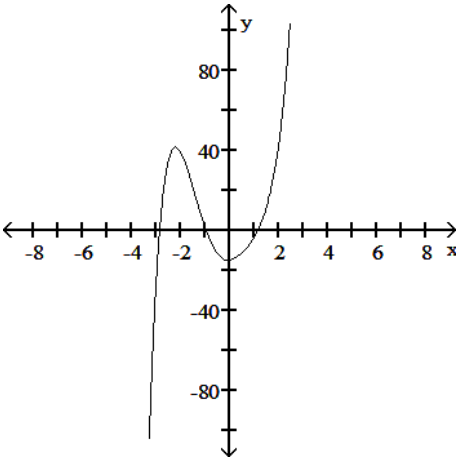
A)



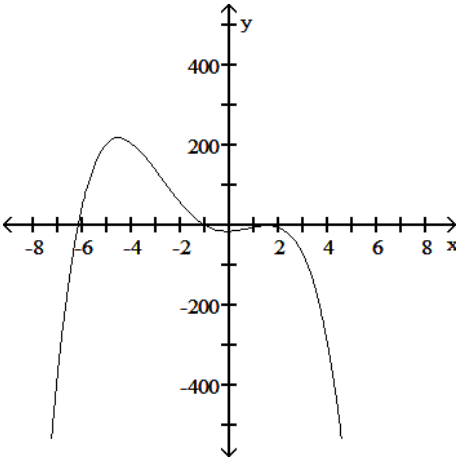
B)



C)



D)



Answer: B
Diff: 0 Type: BI

Solve the problem.

251) If $f(x) = -3x + 5$ and $g(x) = 5x + 8$, find $g(f(x))$. 251) _____

A) $-15x + 29$ B) $15x + 33$ C) $-15x + 33$ D) $-15x - 17$

Answer: C
Diff: 0 Type: BI

252) If $f(x) = \sqrt{x}$, $g(x) = \frac{x}{4}$, and $h(x) = 4x + 16$, find $f(g(h(x)))$. 252) _____

A) $4\sqrt{x} + 16$ B) $\sqrt{x + 16}$ C) $\sqrt{x} + 4$ D) $\sqrt{x + 4}$

Answer: D
Diff: 0 Type: BI

253) On a circle of radius 16 meters, how long is an arc that subtends a central angle of $\frac{3\pi}{4}$ radians? 253) _____

A) 12 m B) 48 m C) 4π m D) 12π m

Answer: D
Diff: 0 Type: BI

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Use the addition formulas to derive the identity.

254) $\sin\left(x + \frac{\pi}{2}\right) = \cos x$ 254) _____

Answer: $\sin\left(x + \frac{\pi}{2}\right) = \sin x \cos\frac{\pi}{2} + \cos x \sin\frac{\pi}{2}$

$= \sin x\,(0) + \cos x\,(1)$

$= 0 + \cos x$

$= \cos x$

Diff: 0 Type: SA

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find the domain and range of the function.

255) $f(x) = -10 - x^2$ 255) _____

A) D: $(-\infty, \infty)$, R: $(-\infty, \infty)$ B) D: $(-\infty, -10]$, R: $(-\infty, \infty)$

C) D: $(-\infty, \infty)$, R: $(-\infty, -10]$ D) D: $(-\infty, \infty)$, R: $[-10, \infty)$

Answer: C
Diff: 0 Type: BI

Find the formula for the function.

256) A point P in the fourth quadrant lies on the graph of the function $f(x) = -x^2$. Express the slope of the line joining P to the origin as a function of x. 256) _____

A) $m = -2x$ B) $m = x$ C) $m = -x$ D) $m = \frac{1}{x}$

Answer: C
Diff: 0 Type: BI

257) Express the length d of a square's diagonal as a function of its side length x. 257) _____

A) $d = x\sqrt{2}$ B) $d = 2x$ C) $d = x\sqrt{3}$ D) $d = x$

Answer: A
Diff: 0 Type: BI

Determine if the function is even, odd, or neither.

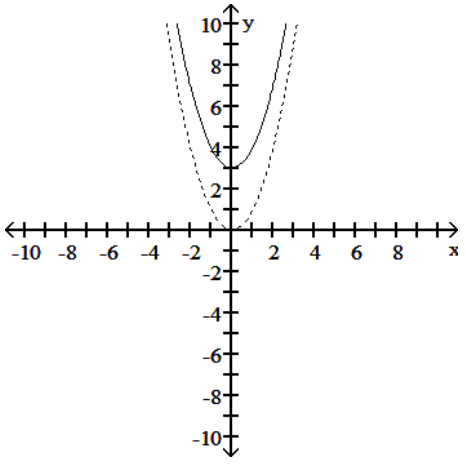
258) $g(x) = |3x^3|$ 258) _____

A) Even B) Odd C) Neither

Answer: A
Diff: 0 Type: BI

Solve the problem.

259) The accompanying figure shows the graph of $y = x^2$ shifted to a new position. Write the equation for the new graph. 259) _____



A) $y = x^2 - 3$ B) $y = x^2 + 3$ C) $y = (x - 3)^2$ D) $y = (x + 3)^2$

Answer: B
Diff: 0 Type: BI

Solve for the angle θ, where $0 \le \theta \le 2\pi$

260) $\sin^2\theta = \frac{3}{4}$ 260) _____

A) $\theta = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$ B) $\theta = \frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}$

C) $\theta = \frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$ D) $\theta = 0, \pi, 2\pi$

Answer: B
Diff: 0 Type: BI

Solve the problem.

261) Let $f(x) = \frac{x}{x - 8}$. Find a function $y = g(x)$ so that $(f \circ g)(x) = x$. 261) _____

A) $g(x) = \frac{8x}{x - 1}$ B) $g(x) = x(x - 8)$ C) $g(x) = \frac{x - 8}{8}$ D) $g(x) = \frac{1}{x - 8}$

Answer: A
Diff: 0 Type: BI

Solve for the angle θ, where $0 \le \theta \le 2\pi$

262) $\cos^2\theta = \frac{1}{4}$ 262) _____

A) $\theta = \frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}$

B) $\theta = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$

C) $\theta = \frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$

D) $\theta = 0, \pi, 2\pi$

Answer: A
Diff: 0 Type: BI

One of sin x, cos x, and tan x is given. Find the other two if x lies in the specified interval.

263) $\cos x = -\frac{1}{5}, \quad x \text{ in } \left[\pi, \frac{3\pi}{2}\right]$ 263) _____

A) $\sin x = -\frac{2\sqrt{6}}{5}, \tan x = 2\sqrt{6}$

B) $\sin x = \frac{2\sqrt{6}}{5}, \tan x = -2\sqrt{6}$

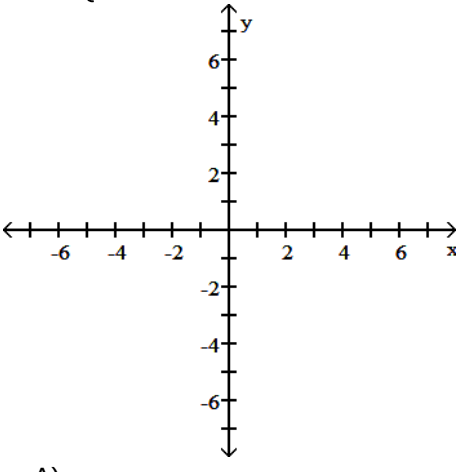
C) $\sin x = -\frac{2\sqrt{6}}{5}, \tan x = -2\sqrt{6}$

D) $\sin x = \frac{2\sqrt{6}}{5}, \tan x = 2\sqrt{6}$

Answer: A
Diff: 0 Type: BI

Graph the function.

264) $g(x) = \begin{cases} 4 & x \le 0 \\ x + 1, & x > 0 \end{cases}$ 264) _____



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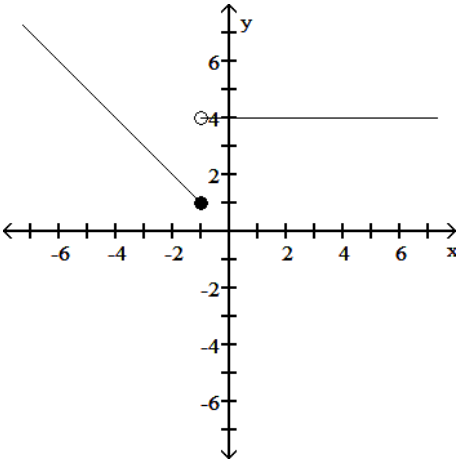

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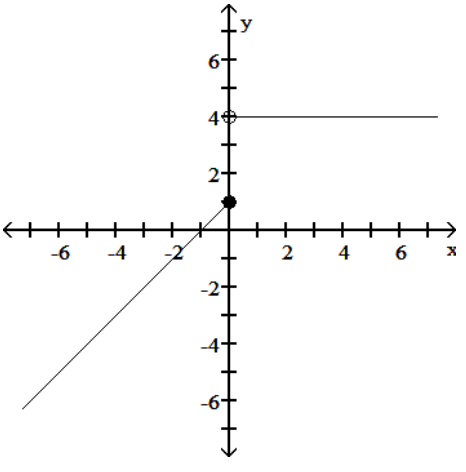

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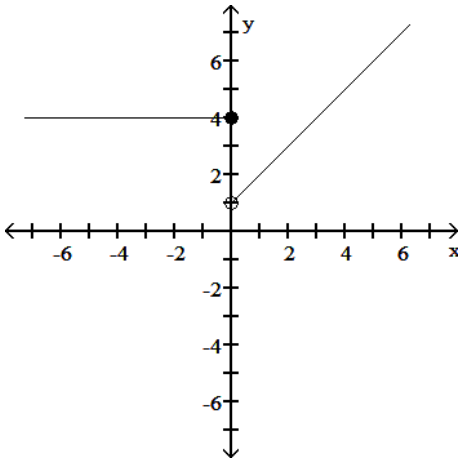

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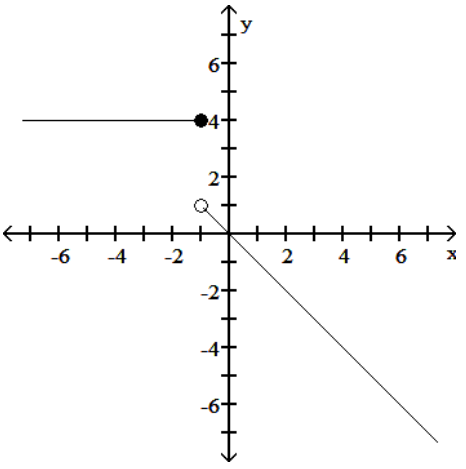


Answer: C
Diff: 0 Type: BI

Express the given quantity in terms of sin x or cos x.

265) sin $(3\pi + x)$ 265) _____

A) -sin x B) cos x + sin x C) sin x D) cos x - sin x

Answer: A
Diff: 0 Type: BI

Solve the problem.

266) If f(x) = 3x + 5 and g(x) = 2x - 1, find f(g(x)). 266) _____

A) 6x + 2 B) 6x + 9 C) 6x + 8 D) 6x + 4

Answer: A
Diff: 0 Type: BI

Express the given quantity in terms of sin x or cos x.

267) cos $(6\pi + x)$ 267) _____

A) -cos x B) cos x - sin x C) -sin x D) cos x

Answer: D
Diff: 0 Type: BI

Provide an appropriate response.

268) For what values of x is $\lceil x \rceil = 1$? 268) _____

A) $0 < x \leq 1$ B) $1 \leq x < 2$ C) $1 < x \leq 2$ D) $0 \leq x < 1$

Answer: A
Diff: 0 Type: BI

One of sin x, cos x, and tan x is given. Find the other two if x lies in the specified interval.

269) $\tan x = \frac{5}{12}$, x in $\left[\pi, \frac{3\pi}{2}\right]$ 269) _____

A) $\sin x = \frac{5}{13}, \cos x = \frac{12}{13}$

B) $\sin x = -\frac{12}{13}, \cos x = -\frac{5}{13}$

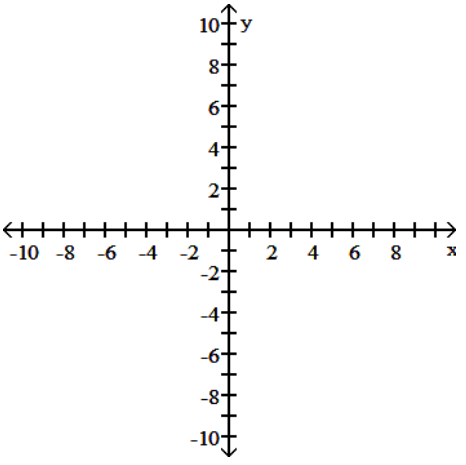
C) $\sin x = \frac{12}{13}, \cos x = \frac{5}{13}$

D) $\sin x = -\frac{5}{13}, \cos x = -\frac{12}{13}$

Answer: D
Diff: 0 Type: BI

Graph the function.

270) $y = \frac{1}{x} - 2$ 270) _____



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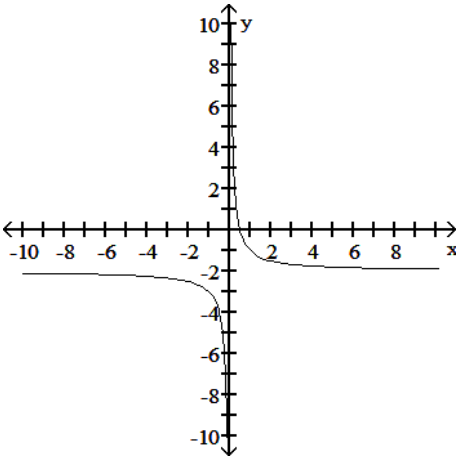

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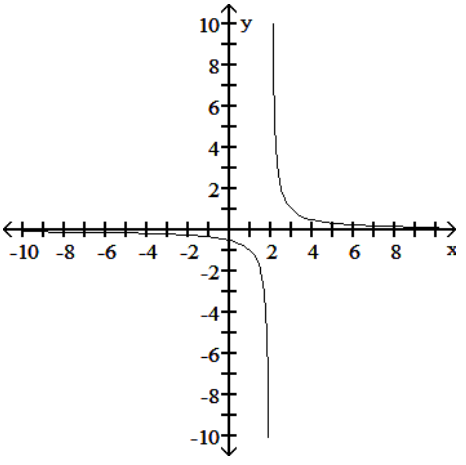

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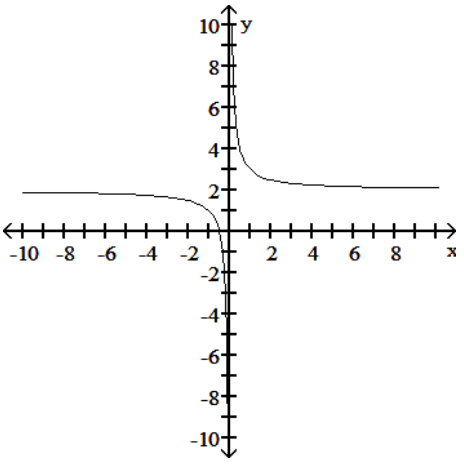
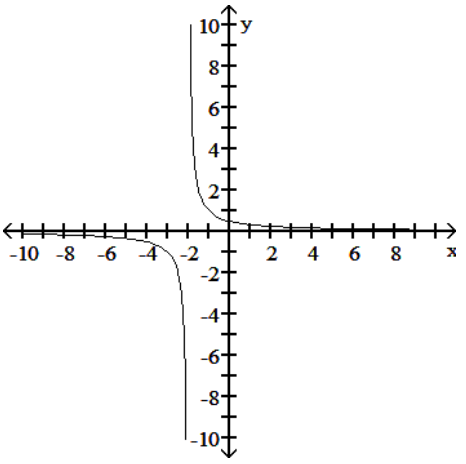


D)



Answer: A
Diff: 0 Type: BI

Express the given quantity in terms of sin x or cos x.

271) $\sin\left(\frac{3\pi}{2} - x\right)$ 271) _____

A) cos x B) -cos (-x) C) -cos x D) -cos x - sin x

Answer: C
Diff: 0 Type: BI

Find the domain and range of the function.

272) $g(z) = \sqrt{1 - z^2}$ 272) _____

A) D: (-1,1), R: (-1,1)
B) D: [0,∞), R: (-∞,∞)
C) D: [-1,1], R: [0,1]
D) D: (-∞,∞), R: (0, 1)

Answer: C
Diff: 0 Type: BI

Answer Key
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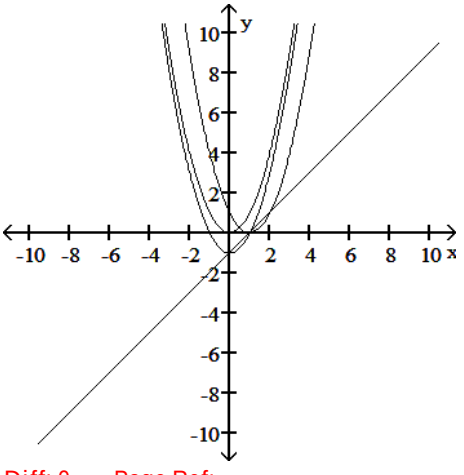

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111) C
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113) $\cos\left(x - \frac{\pi}{2}\right) = \cos x \cos\left(-\frac{\pi}{2}\right) - \sin x \sin\left(-\frac{\pi}{2}\right)$
$= \cos x\,(0) - \sin x\,(-1)$
$= 0 + \sin x$
$= \sin x$
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114) D
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116) A
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121) $\cos\left(x + \frac{\pi}{2}\right) = \cos x \cos\frac{\pi}{2} - \sin x \sin\frac{\pi}{2}$
$= \cos x\,(0) - \sin x\,(1)$
$= 0 - \sin x$
$= -\sin x$
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122) B
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151) When $y = \sin \frac{x}{2}$ is at a maximum point, which is at $x = (4n + 1)\pi$ for all integers n, $y = \csc \frac{x}{2}$ is at a minimum point.

Similarly, when $y = \sin \frac{x}{2}$ is at minimum point, , which is at $x = (4n - 1)\pi$ for all integers n, $y = \csc \frac{x}{2}$ is at a maximum point.
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152) A
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153) B
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155) A
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156) A
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157) C
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158) sin (A - B)
= sin (A + (-B))
= sin A cos (-B) + cos A sin (-B)
= sin A cos B - cos A sin B
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159) B
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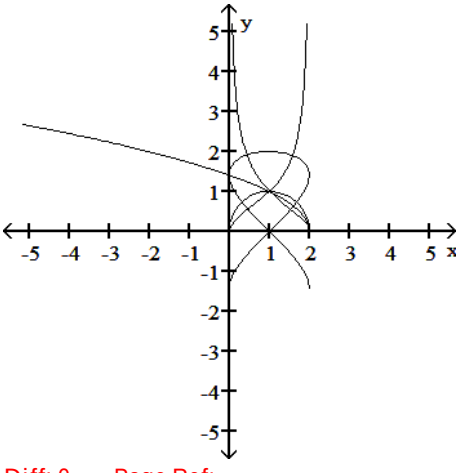

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175) A
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181) D
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182) $\tan (A - B) = \frac{\sin (A - B)}{\cos (A - B)} = \frac{\sin A \cos B - \sin B \cos A}{\cos A \cos B + \sin A \sin B} =$

$\frac{(\cos A \cos B)^{-1}(\sin A \cos B - \sin B \cos A)}{(\cos A \cos B)^{-1}(\cos A \cos B + \sin A \sin B)} = \frac{\tan A - \tan B}{1 + \tan A \tan B}.$

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183) D
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186) B
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187) A
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188) D
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189) When y = cos 2x is at a maximum point, which is at any multiple of π, y = sec 2x is a minimum point. Similarly, when cos (2x) is at a minimum point, which is at any odd multiple of $\frac{\pi}{2}$, y = sec 2x is a at maximum point.

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209) If B = -2π, then cos (A + B) = cos A and sin (A + B) = sin A. Because the period of both of the sine and cosine functions is 2π, if B is replaced by a multiple of 2π the angle sum formulas must produce the same value as the sine or cosine function.
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210) D
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224) C
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225) A
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226) B
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227) $\sin\left(x - \frac{\pi}{2}\right) = \sin x \cos\left(-\frac{\pi}{2}\right) + \cos x \sin\left(-\frac{\pi}{2}\right)$
$= \sin x\,(0) + \cos x\,(-1)$
$= 0 - \cos x$
$= -\cos x$
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228) C
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229) A
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230) B
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231) A
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254) $\sin\left(x + \frac{\pi}{2}\right) = \sin x \cos\frac{\pi}{2} + \cos x \sin\frac{\pi}{2}$
$= \sin x\,(0) + \cos x\,(1)$
$= 0 + \cos x$
$= \cos x$
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255) C
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272) C
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