

Exam
Name _____

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

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

1) $\tan\left(\frac{13\pi}{12}\right)$ 1) _____

A) $2 - \sqrt{3}$

B) $\frac{2 + \sqrt{3}}{4}$

C) $\frac{2 - \sqrt{3}}{4}$

D) $2 + \sqrt{3}$

Answer: A

Diff: 0 Type: BI

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

2) $\sin\left(\frac{7\pi}{4}\right)$ 2) _____

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

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

C) $\frac{\sqrt{2}}{2}$

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

Answer: A

Diff: 0 Type: BI

Solve the problem.

3) If $f(x) = 8x + 7$ and $g(x) = 6x^2 - 4x - 7$, find $g(f(3))$. 3) _____

A) 55

B) -1

C) 5635

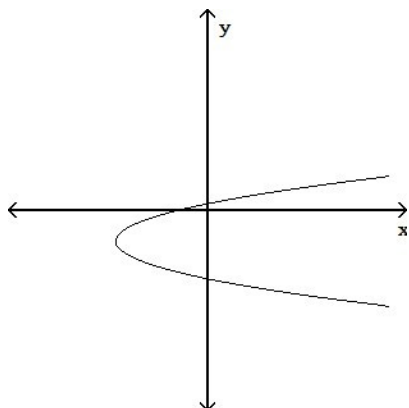
D) 287

Answer: C

Diff: 0 Type: BI

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

4) 4) _____



A) Not a function

B) Function

Answer: A

Diff: 0 Type: BI

Solve the problem.

- 5) A box with an open top is to be constructed from a rectangular piece of cardboard with dimensions 13 inches by 23 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 .

$$\begin{array}{|c|} \hline 13 \\ \hline \end{array}$$

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A) $V(x) = (13 - 2x)(23 - 2x)$

B) $V(x) = x(13 - x)(23 - x)$

C) $V(x) = (13 - x)(23 - x)$

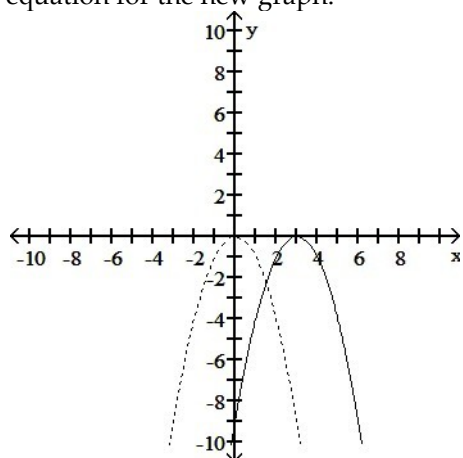
D) $V(x) = x(13 - 2x)(23 - 2x)$

Answer: D

Diff: 0 Type: BI

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

6) _____



A) $y = -x^2 - 3$

B) $y = -x^2 + 3$

C) $y = -(x - 3)^2$

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

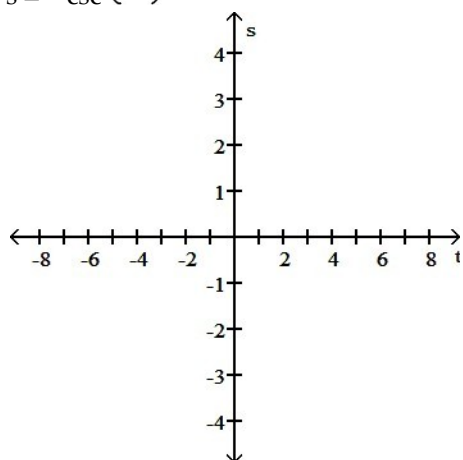
Answer: C

Diff: 0 Type: BI

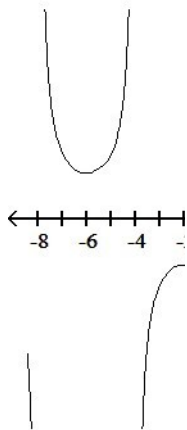
Graph the function in the ts -plane (t -axis horizontal, s -axis vertical). State the period and symmetry of the function.

7) $s = -\csc\left(\frac{\pi t}{4}\right)$

7) _____



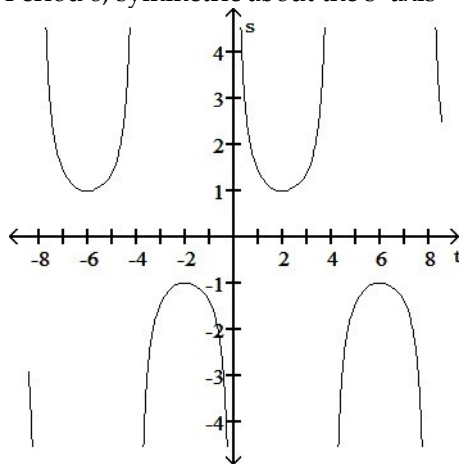
A) Period 8, symmetric about the origin



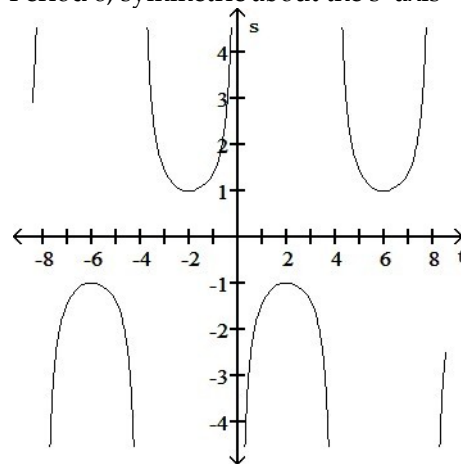
B) Period 8, symmetric about the s-axis



C) Period 8, symmetric about the s-axis



D) Period 8, symmetric about the s-axis



Answer: B

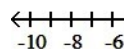
Diff: 0 Type: BI

Find the domain and graph the function.

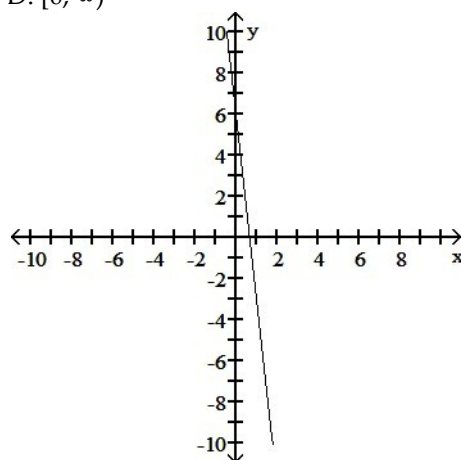
8) $f(x) = -9x + 6$

8)

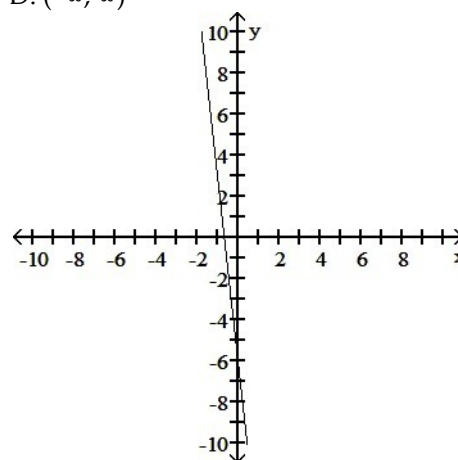
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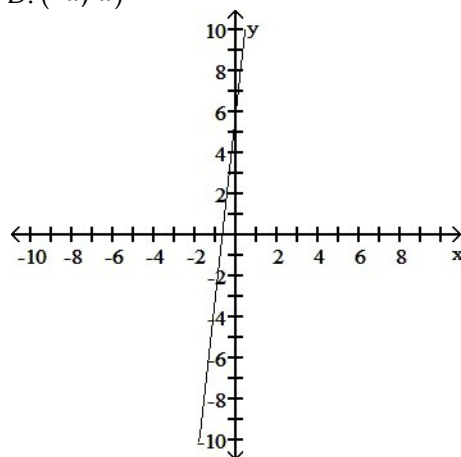
A) D: $[0, \infty)$



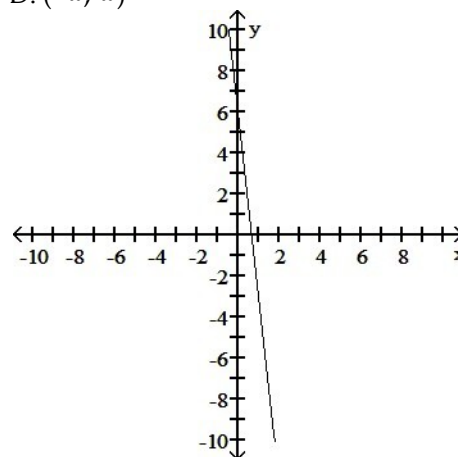
B) D: $(-\infty, \infty)$



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



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



Answer: D

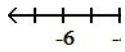
Diff: 0 Type: BI

Graph the function.

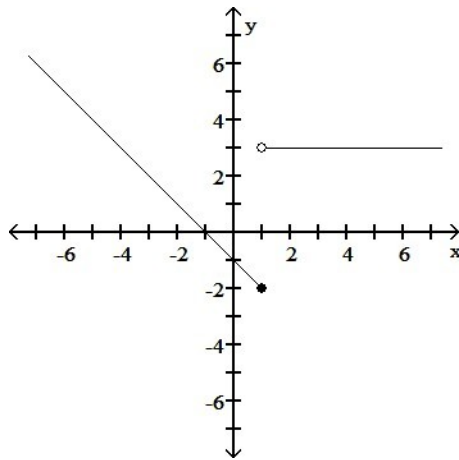
$$9) \quad f(x) = \begin{cases} -1 - x, & x < 1 \\ 3, & x \geq 1 \end{cases}$$

9)

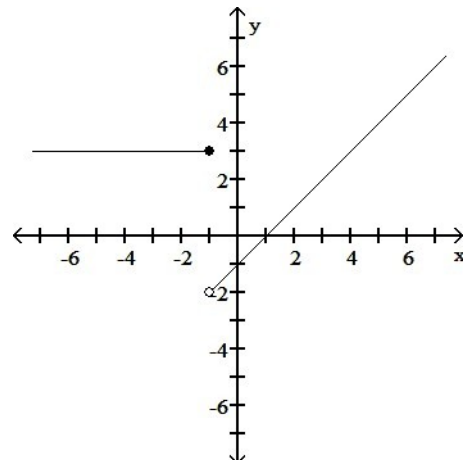
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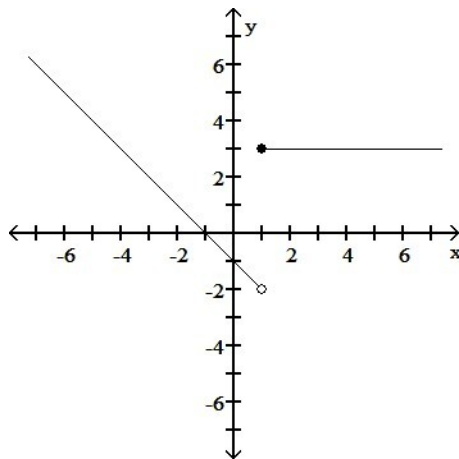
A)



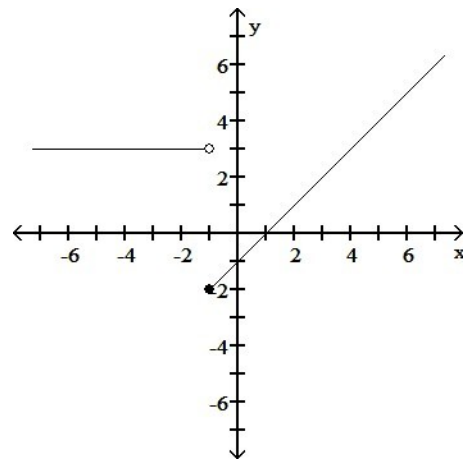
B)



C)



D)



Answer: C

Diff: 0 Type: BI

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

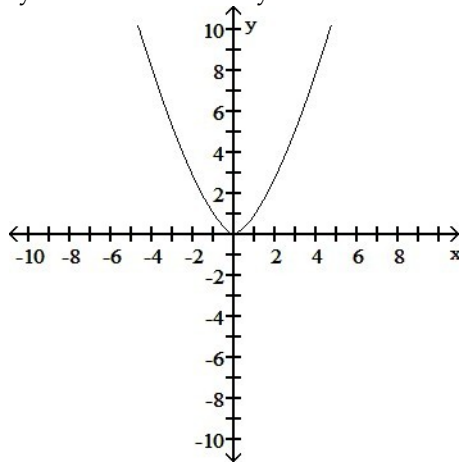
10) $y = (-x)^{3/2}$

10)

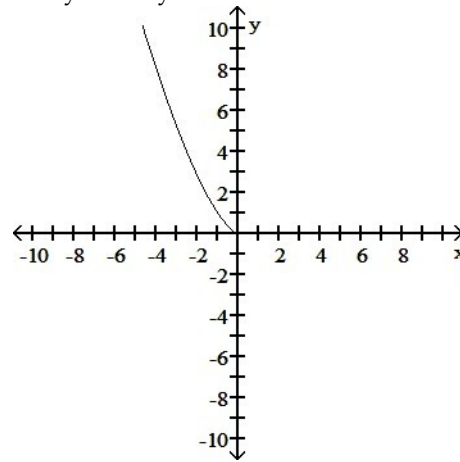
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← + + + + +
-10 -8 -6

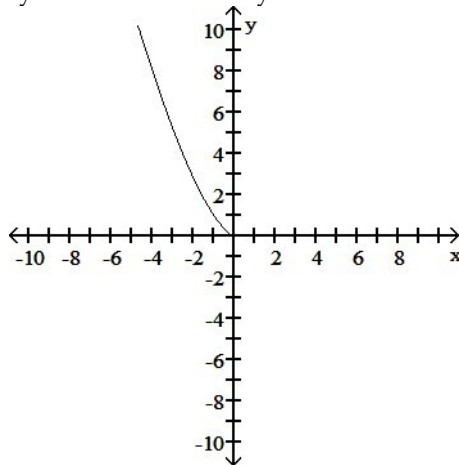
A) Symmetric about the y-axis



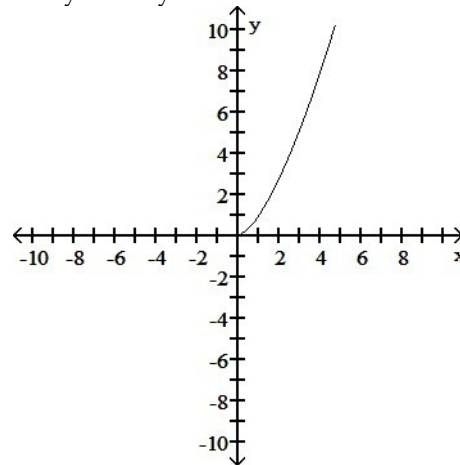
B) No symmetry



C) Symmetric about the y-axis



D) No symmetry



Answer: B

Diff: 0 Type: BI

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

11) $\sin(4\pi + x)$

A) $\cos x + \sin x$

B) $\cos x - \sin x$

C) $-\sin x$

D) $\sin x$

11) _____

Answer: D

Diff: 0 Type: BI

Find the formula for the function.

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

A)

V

=

12) _____

$$\frac{2}{3}\pi r^2$$

B)
$$V = \frac{\pi}{r^3}$$

C)
$$V = \frac{\frac{3}{4}\pi}{r^3}$$

D)
$$V = \frac{\frac{4}{3}\pi}{r^3}$$

Answer: D

Diff: 0 Type: BI

Provide an appropriate response.

13) Graph the functions $f(x) = \frac{x}{3}$ and $g(x) = 3 + \frac{10}{3x}$ together to identify the values of x for which $\frac{x}{3} > 3 + \frac{10}{3x}$. 13) _____

Confirm your findings algebraically.

A) $(-1, 0) \cup (10, \infty)$

B) $(-\infty, -1) \cup (0, 10)$

C) $(10, \infty)$

D) $(-1, 10)$

Answer: A

Diff: 0 Type: BI

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

14) $\cos\left(\frac{5\pi}{6}\right)$ 14) _____

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

Answer: C

Diff: 0 Type: BI

Solve the problem.

15) If $f(x) = \sqrt{x+5}$ and $g(x) = 8x - 9$, find $f(g(x))$. 15) _____

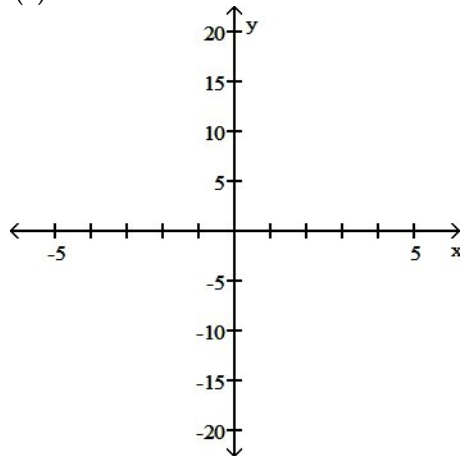
A) $8\sqrt{x-4}$ B) $2\sqrt{2x-1}$ C) $8\sqrt{x+5} - 9$ D) $2\sqrt{2x+1}$

Answer: B

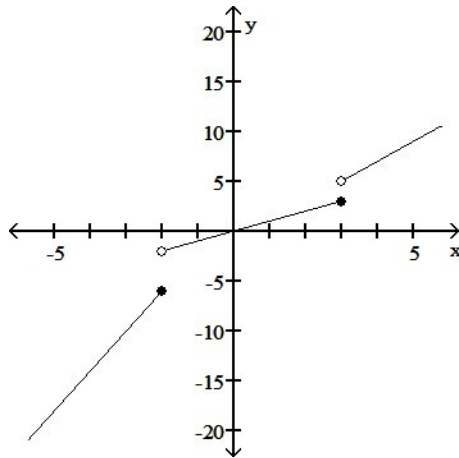
Diff: 0 Type: BI

Graph the function.

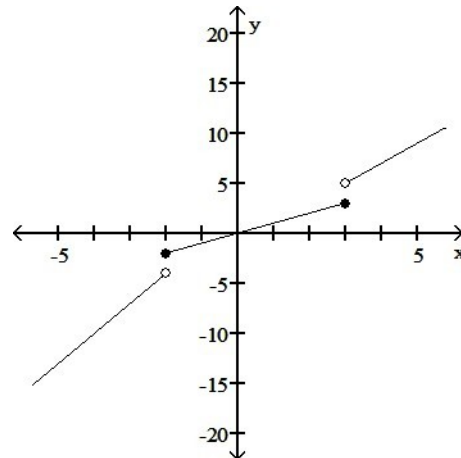
16)
$$f(x) = \begin{cases} 3x + 2, & x < -2 \\ x, & -2 \leq x \leq 3 \\ 2x - 1, & x > 3 \end{cases}$$
 16) _____



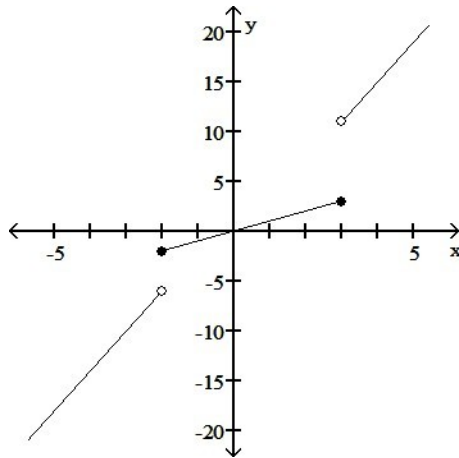
A)



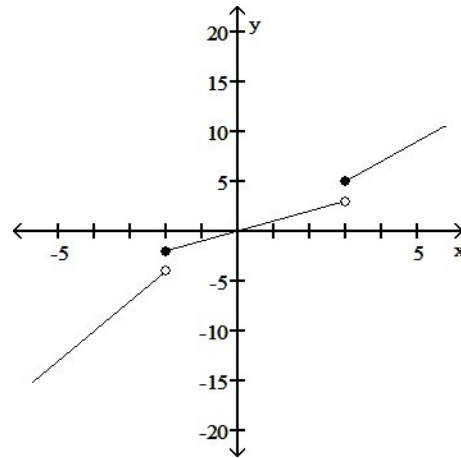
B)



C)



D)



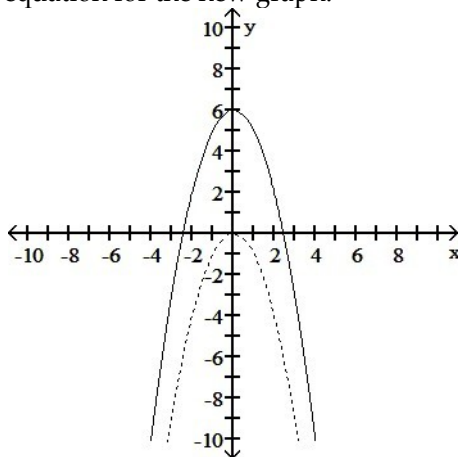
Answer: B

Diff: 0 Type: BI

Solve the problem.

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

17) _____



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

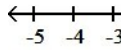
Graph the function. Determine the symmetry, if any, of the function.

18)

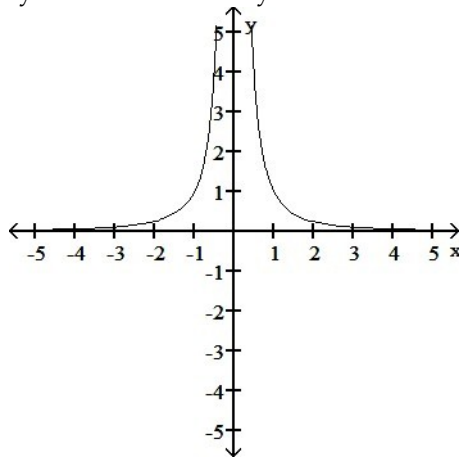
y =

$$-\frac{1}{x^2} \quad 18)$$

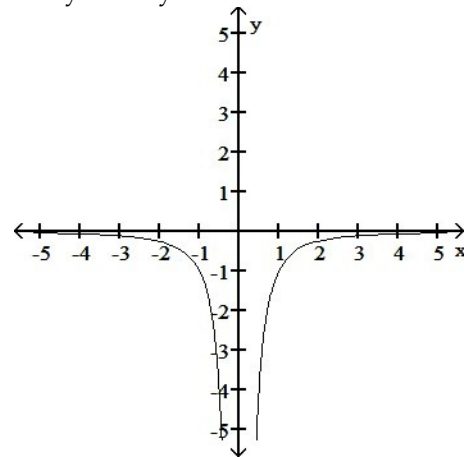
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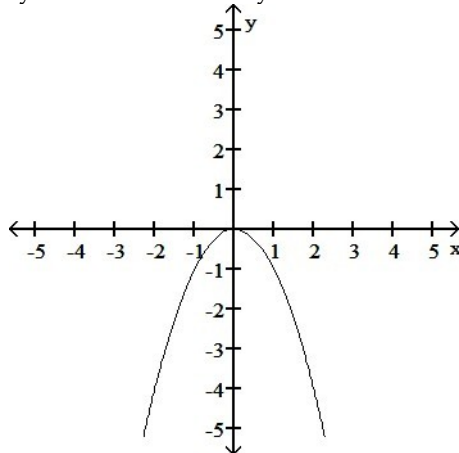
A) Symmetric about the y-axis



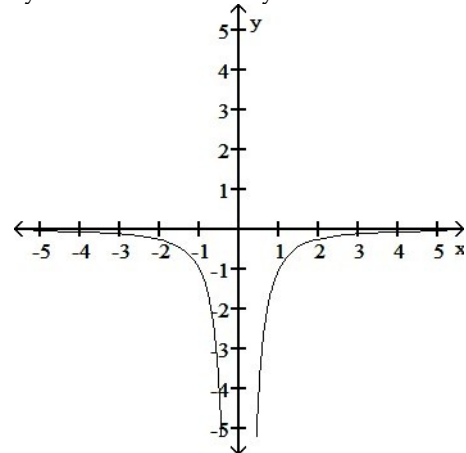
B) No symmetry



C) Symmetric about the y-axis



D) Symmetric about the y-axis



Answer: D

Diff: 0 Type: BI

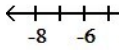
Find a formula for the function graphed.

19)

19)

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A) $f(x) = \begin{cases} 3, & x < 0 \\ x, & x \geq 0 \end{cases}$
 C) $f(x) = \begin{cases} 3, & x \leq 0 \\ -x, & x > 0 \end{cases}$

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

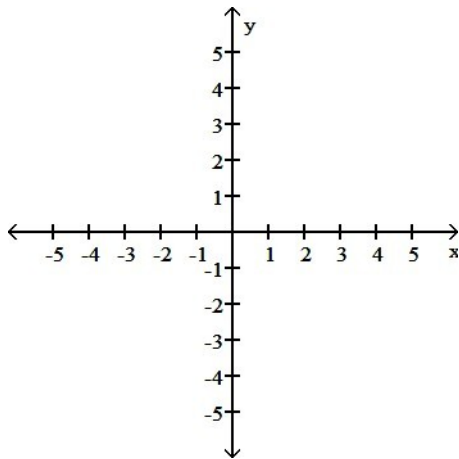
Answer: D

Diff: 0 Type: BI

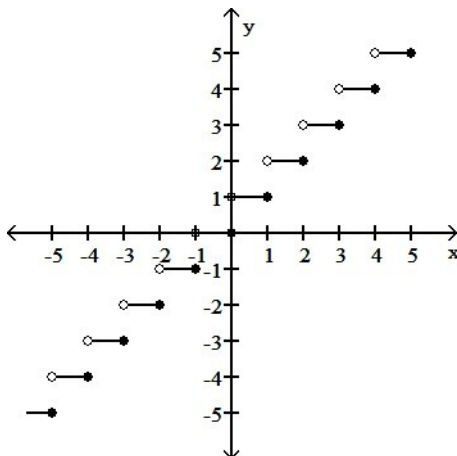
Provide an appropriate response.

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

20) _____

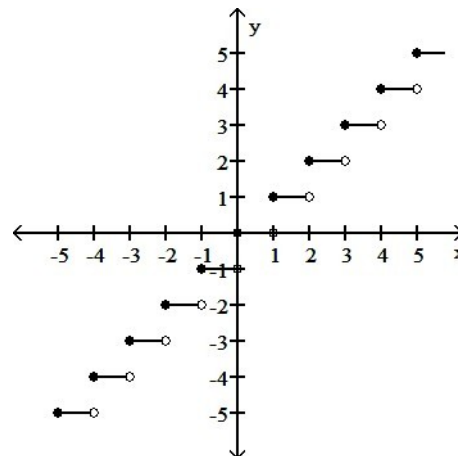


A)

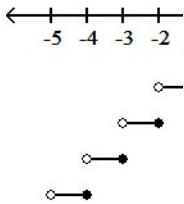


C)

B)



D)



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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.

21) $\sin x = -\frac{1}{2}$, x in $\left[-\frac{\pi}{2}, 0\right]$

21) _____

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

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

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

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

Answer: B

Diff: 0 Type: BI

Solve the problem.

22) You want to make an angle measuring 140° by marking an arc on the perimeter of a disk with a diameter of 12 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?

22) _____

A) 7.3 in.

B) 29.3 in.

C) 14.7 in.

D) 58.6 in.

Answer: C

Diff: 0 Type: BI

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

23) $f(x) = 4x^2 + 1$

23) _____

A) Even

B) Odd

C) Neither

Answer: A

Diff: 0 Type: BI

24) $f(x) = 9x^5 - 3x^3$

24) _____

A) Even

B) Odd

C) Neither

Answer: B

Diff: 0 Type: BI

Solve the problem.

25) If you roll a 1-m-diameter wheel forward 40 centimeters over level ground, through what angle (to the nearest degree) will the wheel turn?

25) _____

A) 23°

B) 1°

C) 46°

D) 80°

Answer: C

Diff: 0 Type: BI

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

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

26) _____

A) $\sin x$

B) $\sin(-x)$

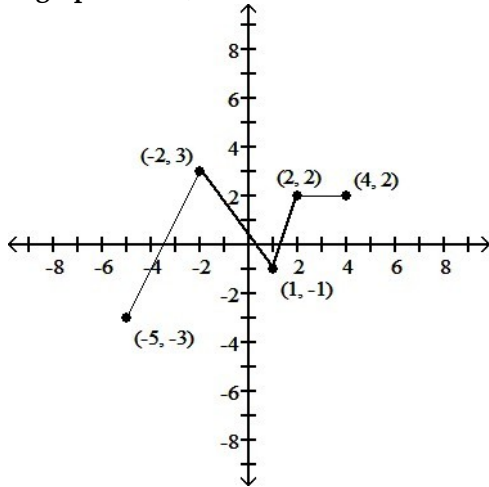
C) $\cos x + \sin x$

D) $-\sin x$

Answer: D

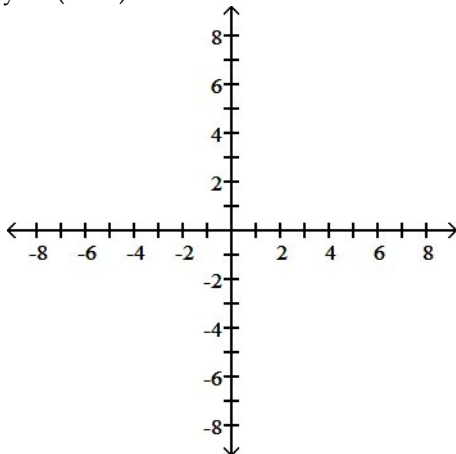
Diff: 0 Type: BI

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



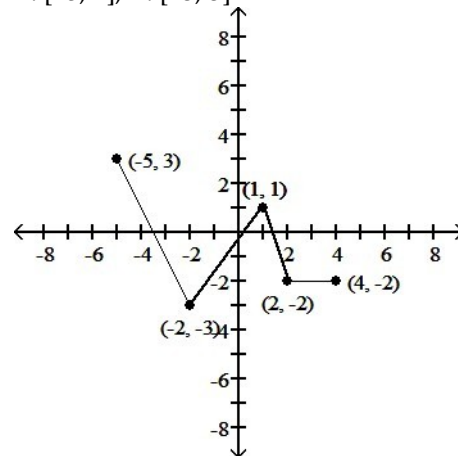
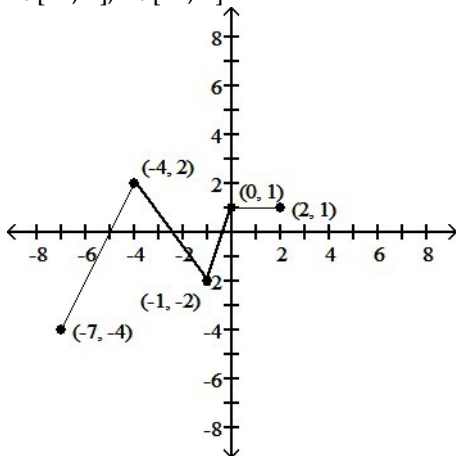
27) $y = f(x + 2) - 1$

27) _____

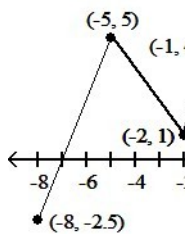


A) D: $[-7, 2]$; R: $[-4, 2]$

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



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



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

←
-1

Answer: A

Diff: 0 Type: BI

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

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

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

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

Answer: A

Diff: 0 Type: BI

Provide an appropriate response.

29) Graph the functions $f(x) = \frac{5}{x-1}$ and $g(x) = \frac{3}{x+1}$ together to identify the values of x for which

29) _____

$\frac{5}{x-1} < \frac{3}{x+1}$.

Confirm your findings algebraically.

A) $(-\infty, -4)$

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

C) $(-4, \infty)$

D) $(-4, -1) \cup (1, \infty)$

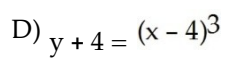
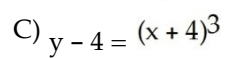
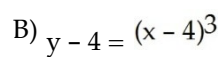
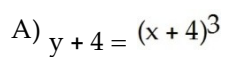
Answer: A

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.

30) $y = x^3$

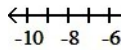
Down 4, left 4



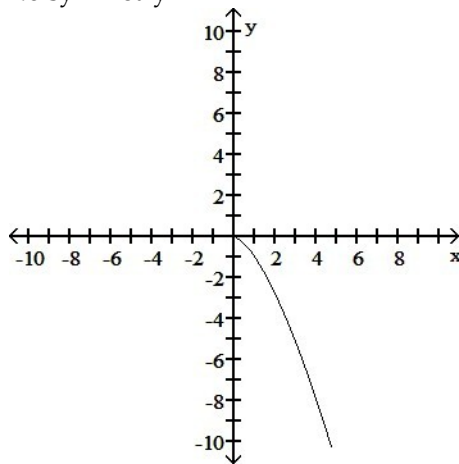
31) $y = -x^{2/3}$

31)

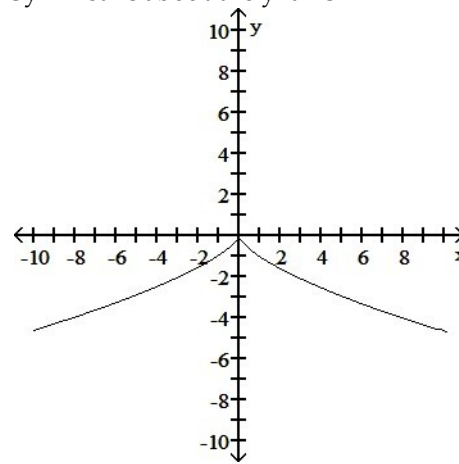
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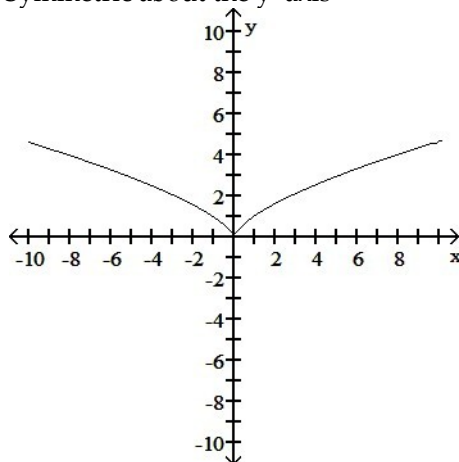
A) No symmetry



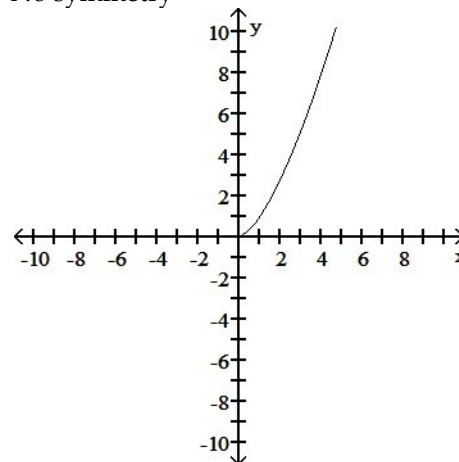
B) Symmetric about the y-axis



C) Symmetric about the y-axis



D) No symmetry



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.

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

Answer: $\sin \left(x + \frac{\pi}{2} \right) = \sin x \cos \frac{\pi}{2} + \cos x \sin \frac{\pi}{2}$
 $= \sin x (0) + \cos x (1)$
 $= 0 + \cos x$

32) _____

$$= \cos x$$

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.

- 33) $f \circ f$

A) Even

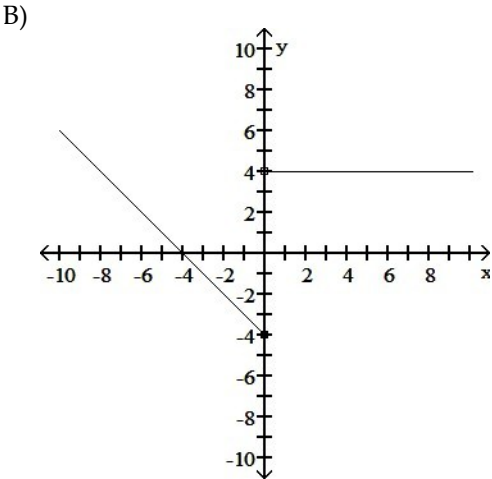
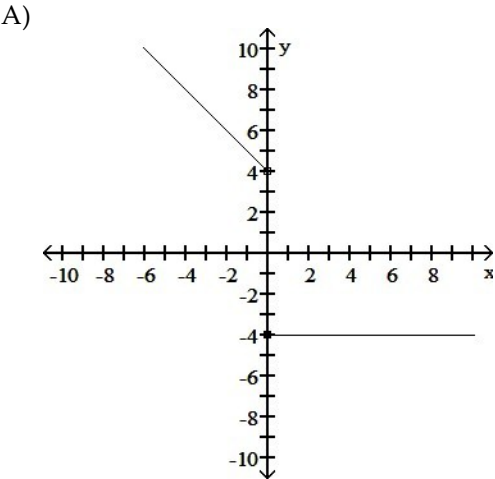
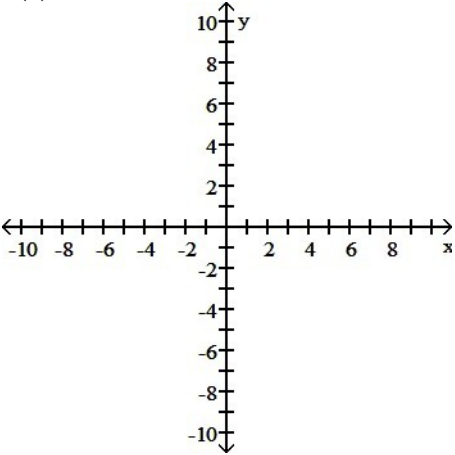
B) Odd
- 33) _____

Answer: A
 Diff: 0 Type: BI

Graph the function.

- 34)
$$G(x) = \begin{cases} |x| - 4, & x < 0 \\ -4, & x \geq 0 \end{cases}$$

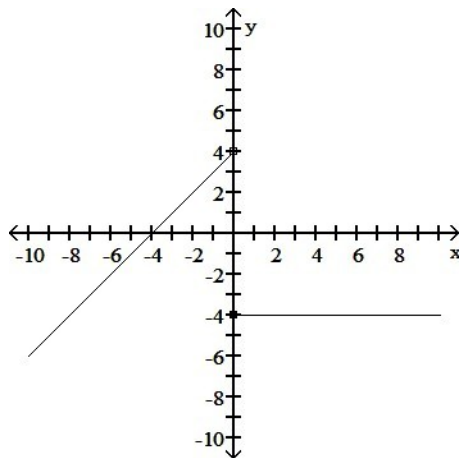
34) _____



C)

↖

D)



Answer: C

Diff: 0 Type: BI

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

35) $\sin 2\theta - \cos \theta = 0$

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

$\theta =$, , ,

C) $\frac{\pi}{2}, \frac{3\pi}{2}, \frac{\pi}{6}, \frac{5\pi}{6}$

$\theta =$, , ,

Answer: C

Diff: 0 Type: BI

B) $\frac{\pi}{2}, \frac{3\pi}{2}$

$0, \pi, 2\pi$

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

35) _____

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

36) $\cos(3\pi + x)$

A) $\cos x$

B) $-\sin x$

C) $-\cos x$

D) $\sin x - \cos x$

Answer: C

Diff: 0 Type: BI

36) _____

Solve the problem.

37) If $f(x) = 4x + 13$ and $g(x) = 5x - 1$, find $f(g(x))$.

A) $20x + 64$

B) $20x + 12$

C) $20x + 9$

D) $20x + 17$

Answer: C

Diff: 0 Type: BI

37) _____

Find the domain and range for the indicated function.

38) $f(x) = \sqrt{x+2}$, $g(x) = \sqrt{x-2}$; $f \cdot g$

A) D: $x > 2$

B) D: $x \geq 2$

C) D: $x \geq 2$

D) D: $x \geq 2$

R: $y \geq 0$

R: $y > 0$

R: $y \geq 0$

R: $-\infty < y < \infty$

Answer: C

Diff: 0 Type: BI

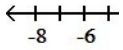
38) _____

Find a formula for the function graphed.

39)

39)

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—



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

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

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

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

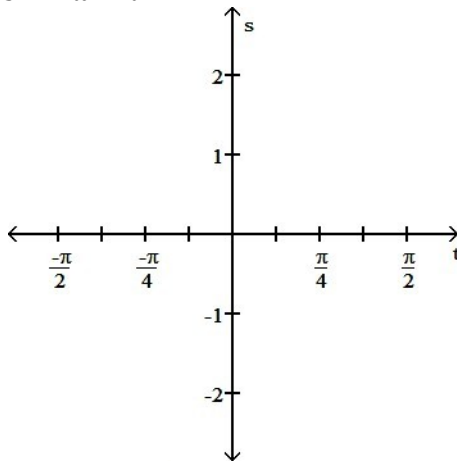
Answer: B

Diff: 0 Type: BI

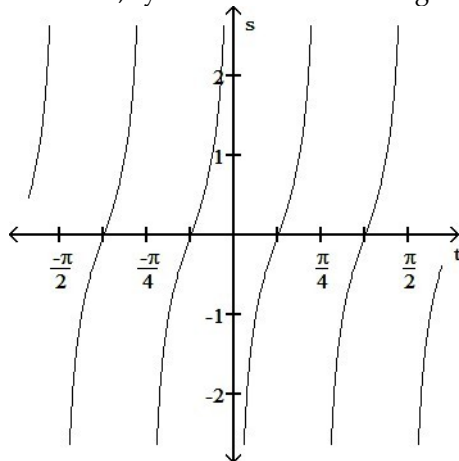
Graph the function in the ts -plane (t -axis horizontal, s -axis vertical). State the period and symmetry of the function.

40) $s = -\tan 4t$

40) _____

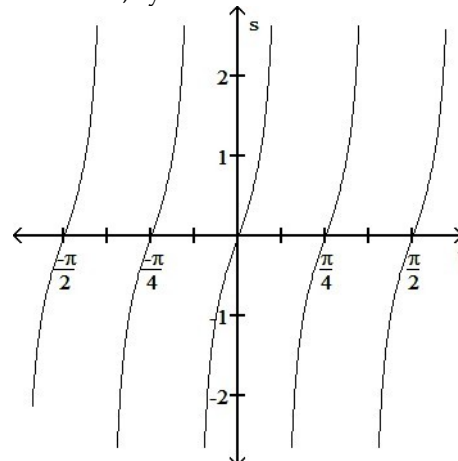


A) Period $\frac{\pi}{4}$, symmetric about the origin



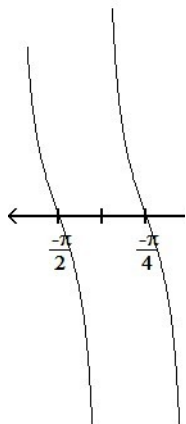
C)

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



Pe

period $\frac{\pi}{4}$,
symmetric
about the
origin



D) Periodic
about the
origin

←



Answer: C
Diff: 0 Type: BI

Find the domain and range of the function.

41) $f(x) = -2 + \sqrt{x}$

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

Answer: D
Diff: 0 Type: BI

- B) D: $(-\infty, \infty)$, R: $[-2, \infty)$
D) D: $[0, \infty)$, R: $[-2, \infty)$

41) _____

Match the equation with its graph.

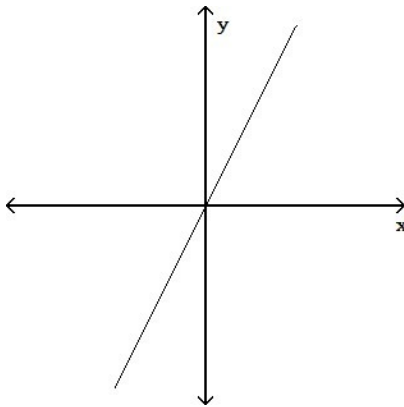
42) $y = 2x$
A)

42) _____

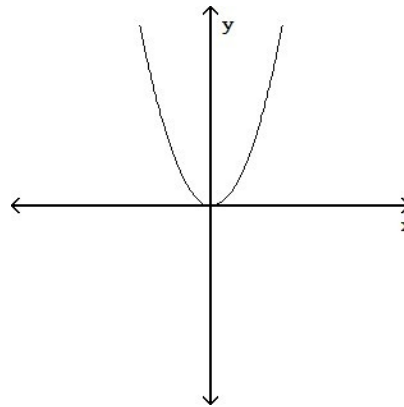
B)



C)



D)



Answer: C

Diff: 0 Type: MC

Find the domain and range of the function.

43) $F(t) = t^2 + 10$

A) D: $[0, \infty)$, R: $(-\infty, 10]$

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

Answer: D

Diff: 0 Type: BI

B) D: $[-100, \infty)$, R: $[10, \infty)$

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

43) _____

Find the formula for the function.

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

A) $p = 11x$

B) $p = 10x$

C) $p = 10x^3$

D) $p = 25x^3$

Answer: A

Diff: 0 Type: BI

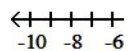
44) _____

Graph the function.

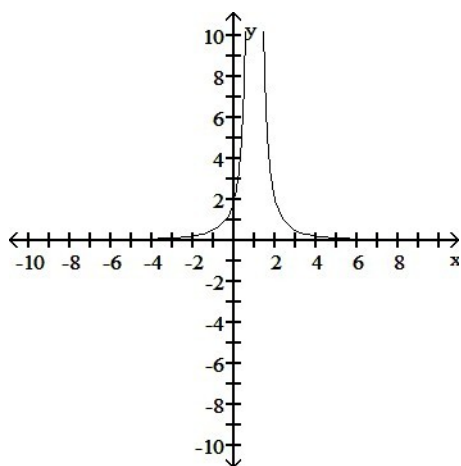
45) $y = \frac{2}{x^2} - 1$

45)

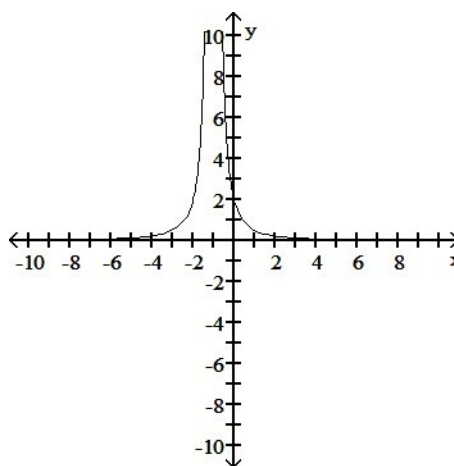
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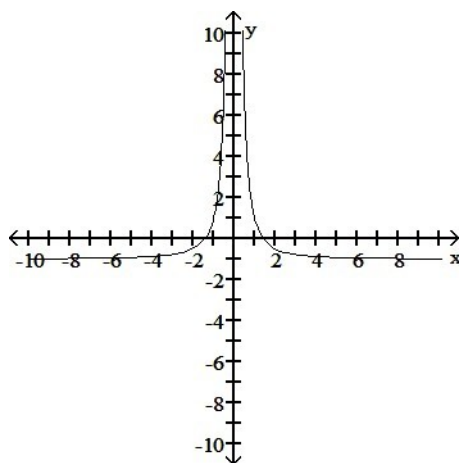
A)



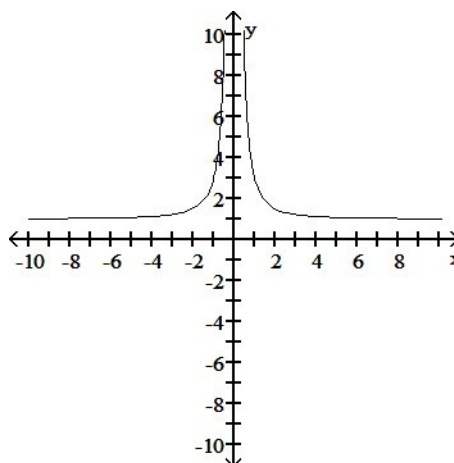
B)



C)



D)



Answer: C

Diff: 0 Type: BI

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

46)

46)

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A) Function

B) Not a function

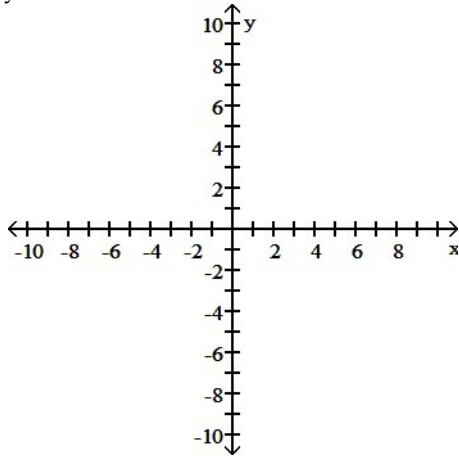
Answer: B

Diff: 0 Type: BI

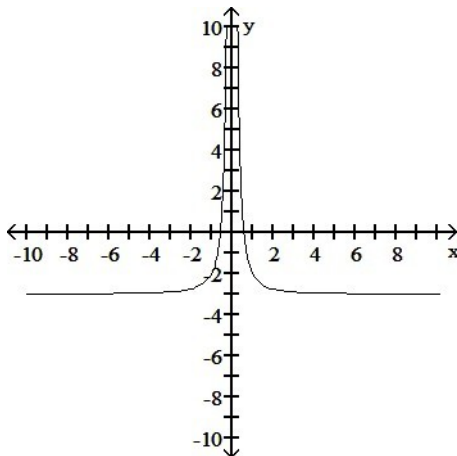
Graph the function.

47) $y = \frac{1}{(x+3)^2}$

47) _____

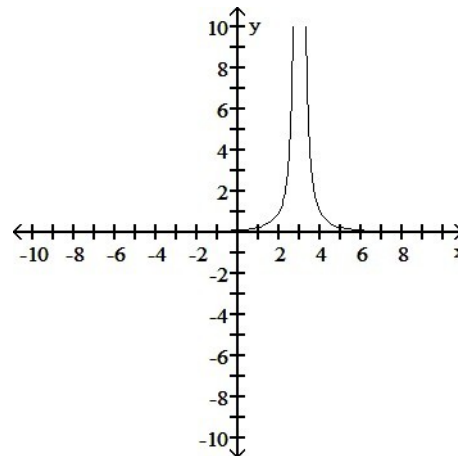


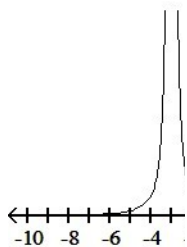
A)



C)

B)





D)

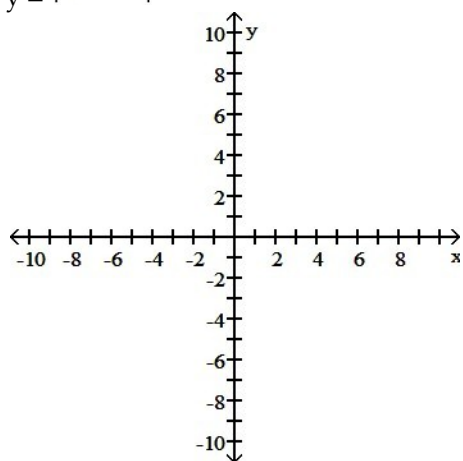


Answer: C

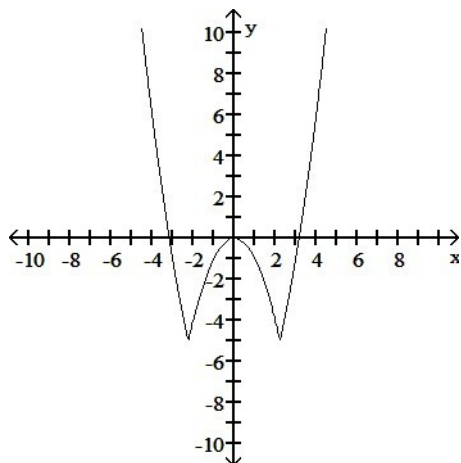
Diff: 0 Type: BI

48) $y = |x^2 - 5|$

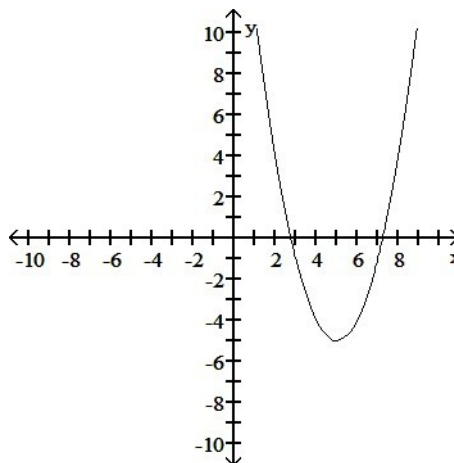
48) _____



A)

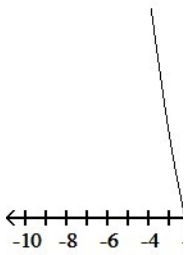


B)



C)

D)



←
-10

Answer: D

Diff: 0 Type: BI

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

49) $\sin\left(\frac{\pi}{6}\right)$

49) _____

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

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

C) $\frac{\sqrt{3}}{3}$

D) $\frac{1}{2}$

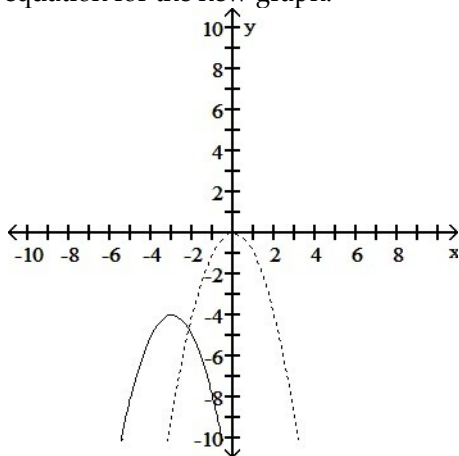
Answer: D

Diff: 0 Type: BI

Solve the problem.

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

50) _____



A) $y = -(x - 4)^2 - 3$

B) $y = -(x + 3)^2 + 4$

C) $y = -(x + 3)^2 - 4$

D) $y = -(x - 3)^2 - 4$

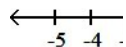
Answer: C

Diff: 0 Type: BI

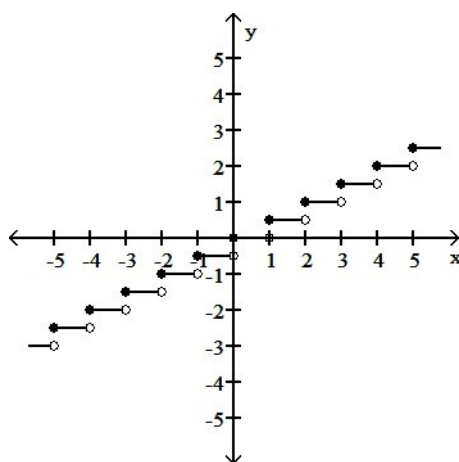
Provide an appropriate response.

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

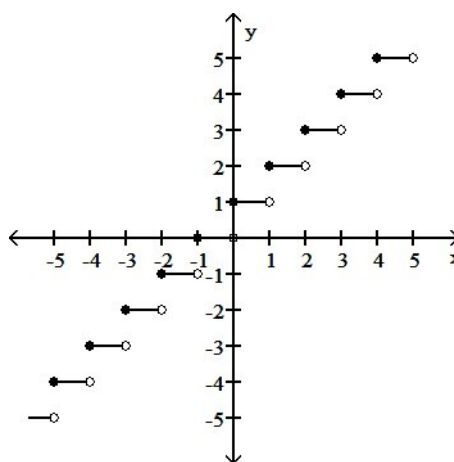
51)



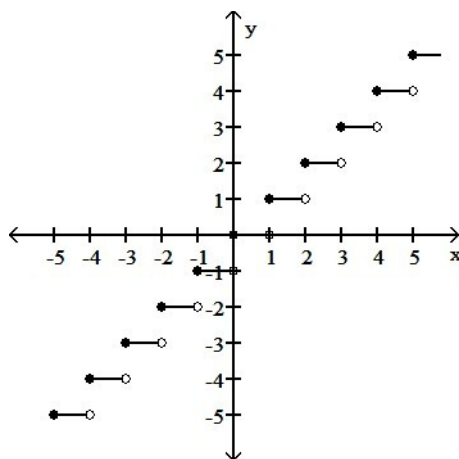
A)



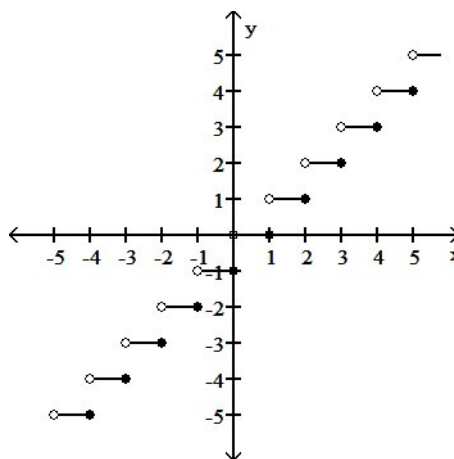
B)



C)



D)



Answer: C

Diff: 0 Type: BI

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

52)

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← + + +

A) Function

B) Not a Function

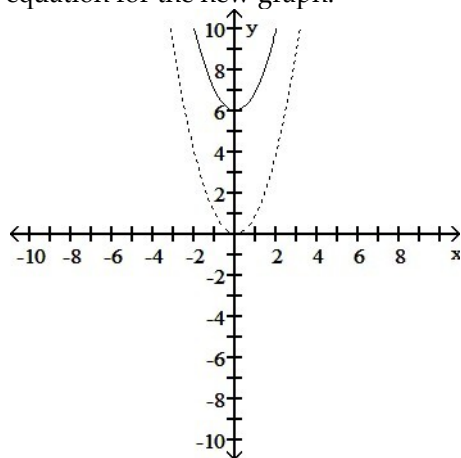
Answer: B

Diff: 0 Type: BI

Solve the problem.

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

53) _____



A) $y = (x - 6)^2$

B) $y = x^2 + 6$

C) $y = (x + 6)^2$

D) $y = x^2 - 6$

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.

- 54) $y = \sqrt{x + 1}$ compressed vertically by a factor of 5

54) _____

A) $y = 5\sqrt{x + 1}$

B) $y = \sqrt{5x + 1}$

C) $y = \frac{\sqrt{x + 1}}{5}$

D) $y = \sqrt{5x + 5}$

y =

Answer: C

Diff: 0 Type: BI

Find the domain and range of the function.

- 55) $g(z) = \sqrt{16 - z^2}$

55) _____

A) D: $[-4, 4]$, R: $[0, 4]$

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

C) D: $(-\infty, \infty)$, R: $(0, 4)$

D) D: $(-4, 4)$, R: $(-4, 4)$

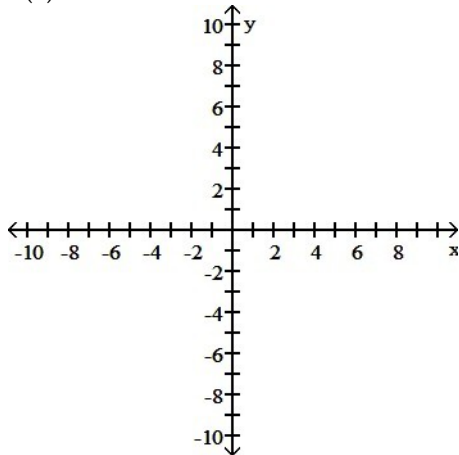
Answer: A

Diff: 0 Type: BI

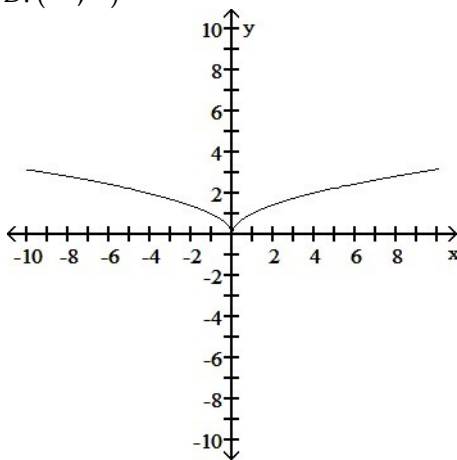
Find the domain and graph the function.

56) $G(x) = \sqrt{|x|}$

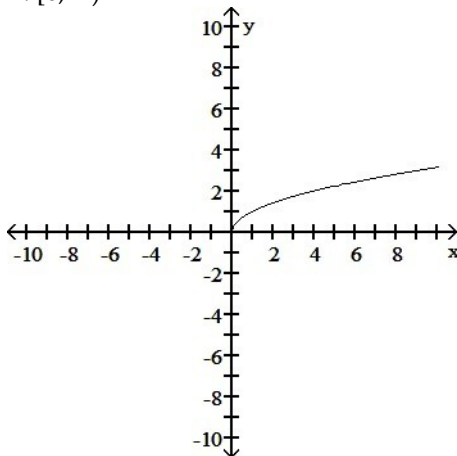
56) _____



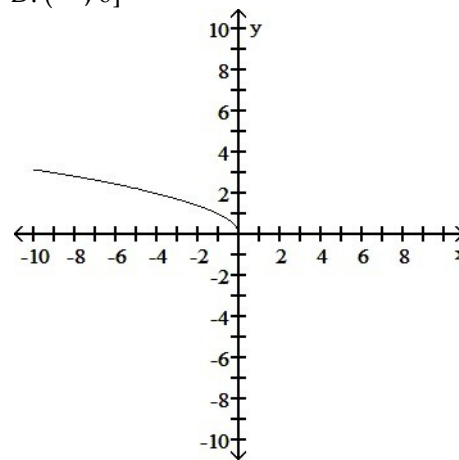
A) $D: (-\infty, \infty)$



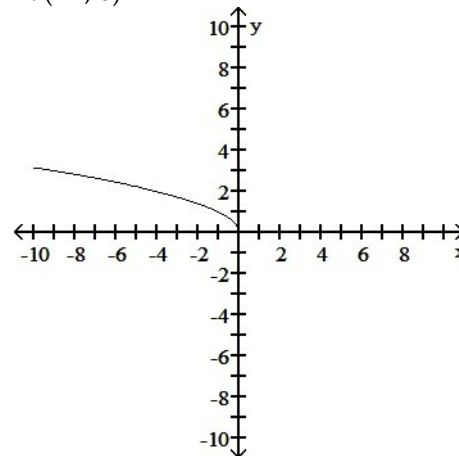
C) $D: [0, \infty)$



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



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



Answer: A

Diff: 0 Type: BI

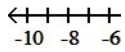
The problem tells how many units and in what direction the graph of the given equation is to be shifted. Give an equation for the shifted graph. Then sketch the original graph with a dashed line and the shifted graph with a solid line.

57) $x^2 + y^2 = 16$

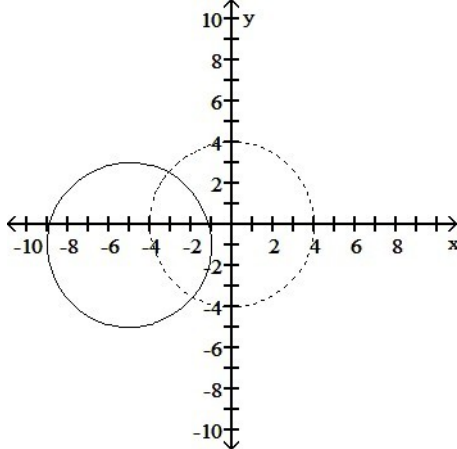
Up 1, right 5

57)

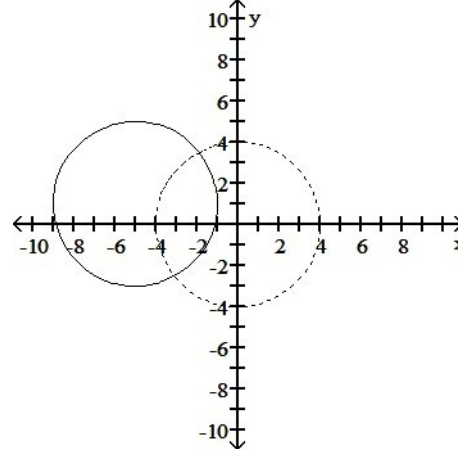
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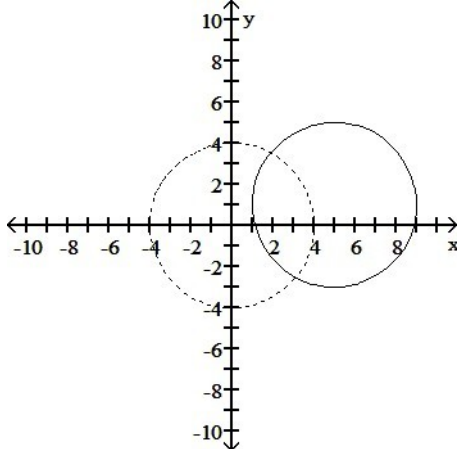
A) $(x + 5)^2 + (y + 1)^2 = 16$



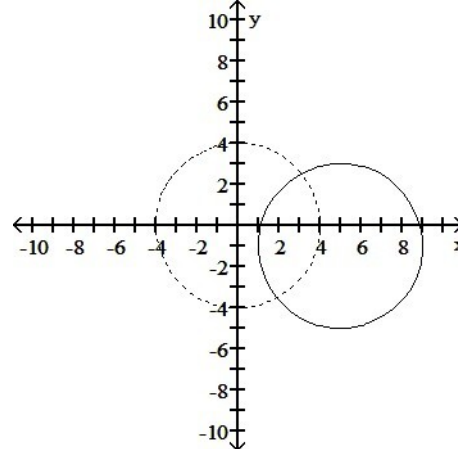
B) $(x + 5)^2 + (y - 1)^2 = 16$



C) $(x - 5)^2 + (y - 1)^2 = 16$



D) $(x - 5)^2 + (y + 1)^2 = 16$



Answer: C

Diff: 0 Type: BI

Provide an appropriate response.

58) For what values of x is $\lceil x \rceil = -2$?

A) $-2 \leq x < -1$

B) $-2 < x \leq -1$

C) $-3 \leq x < -2$

D) $-3 < x \leq -2$

58) _____

Answer: D

Diff: 0 Type: BI

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

59)

59)

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A) Not a function

B) Function

Answer: B

Diff: 0 Type: BI

Find the formula for the function.

60) 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. 60) _____

A) $m = x$

B) $m = 2x$

C) $m = \frac{2}{x}$

D) $m = \frac{1}{x}$

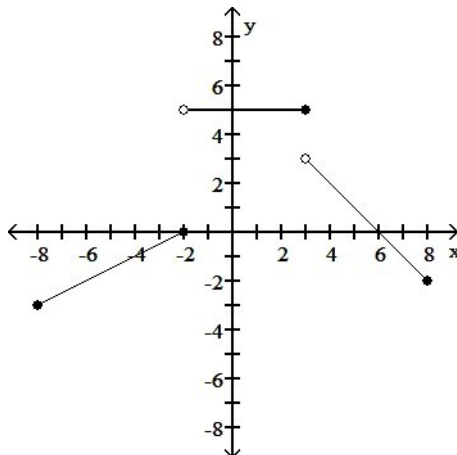
Answer: A

Diff: 0 Type: BI

Find a formula for the function graphed.

61)

61) _____



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

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

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

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

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.

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

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

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

Answer: D

Diff: 0 Type: BI

62) _____

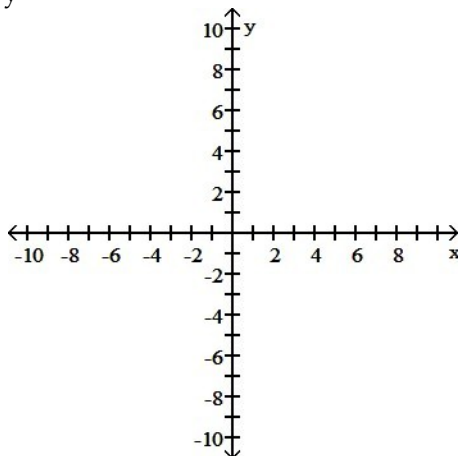
B) $\cos x = -\frac{1}{2}$, $\tan x = -\sqrt{3}$

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

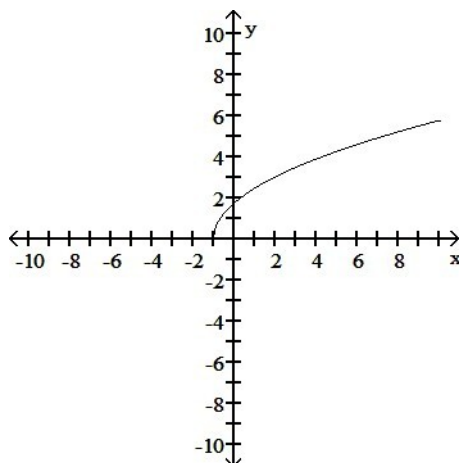
Graph the function.

63) $y = \sqrt{3x - 3}$

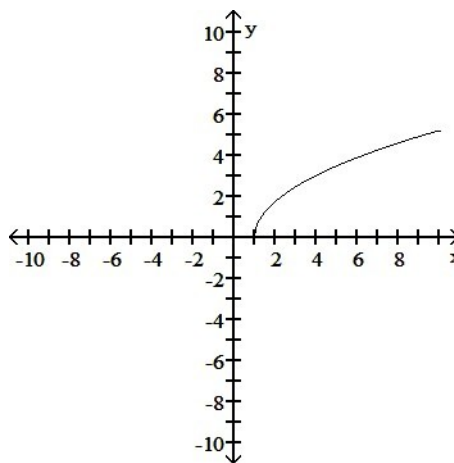
63) _____



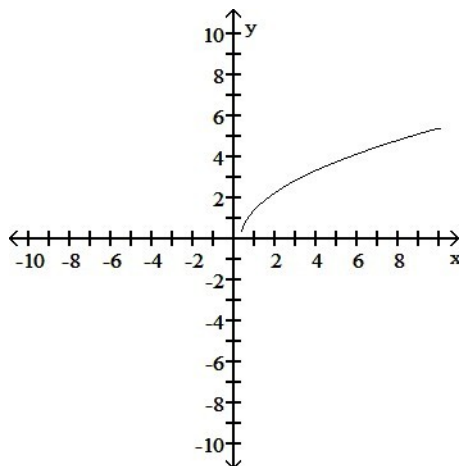
A)



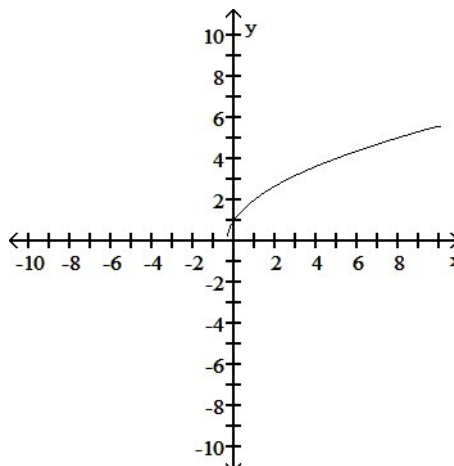
B)



C)



D)



Answer: B

Diff: 0 Type: BI

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

64) $y = \frac{6}{x^2} + 3$

64) _____

A) $f(x) = \frac{6}{x^2}$

B) $f(x) = x + 3, g(x) = \frac{6}{x^2}$

C) $f(x) = x, g(x) = \frac{6}{x} + 3$

D) $f(x) = \frac{1}{x}, g(x) = \frac{6}{x} + 3$

Answer: B

Diff: 0 Type: BI

Provide an appropriate response.

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

65) _____

A) Yes

B) No

Answer: B

Diff: 0 Type: BI

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

66) $y = |5x + 8|$

66) _____

A) $f(x) = x, g(x) = 5x + 8$

B) $f(x) = |-x|, g(x) = 5x - 8$

C) $f(x) = |x|, g(x) = 5x + 8$

D) $f(x) = -|x|, g(x) = 5x + 8$

Answer: C

Diff: 0 Type: BI

Solve the problem.

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

67) _____

A) $\sqrt{x+16}$

B) $4\sqrt{x} + 16$

C) $\sqrt{x+4}$

D) $\sqrt{x} + 4$

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.

68) $y = x^3 + 1$ stretched vertically by a factor of 3

68) _____

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

B) $y = 27x^3 + 1$

C) $y = 3x^3 + 1$

D) $y = \frac{x^3}{3} + \frac{1}{3}$

Answer: A

Diff: 0 Type: BI

Find the function value.

69) $\sin^2 \frac{\pi}{8}$

69) _____

A) $2 - \sqrt{2}$

B) $\frac{2 + \sqrt{2}}{4}$

C) $\frac{2 - \sqrt{2}}{4}$

D) $\frac{1 - \sqrt{2}}{2}$

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.

- 70) $y = x^2 - 4$ stretched horizontally by a factor of 3 70) _____
- A) $y = 9x^2 - 4$ B) $y = \frac{x^2}{3} - 4$ C) $y = 3x^2 - 12$ D) $y = \frac{x^2}{9} - 4$

Answer: D

Diff: 0 Type: BI

Find the formula for the function.

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

Answer: A

Diff: 0 Type: BI

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

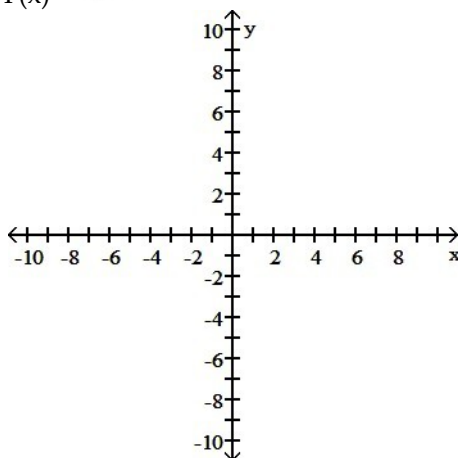
- 72) $\sin\left(\frac{11\pi}{12}\right)$ 72) _____
- A) $\frac{\sqrt{2} - \sqrt{6}}{4}$ B) $\frac{\sqrt{6} - \sqrt{2}}{4}$ C) $\frac{\sqrt{6} + \sqrt{2}}{4}$ D) $\frac{\sqrt{6} + \sqrt{2}}{4}$

Answer: B

Diff: 0 Type: BI

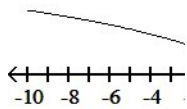
Find the domain and graph the function.

- 73) $F(x) = \sqrt{-x}$ 73) _____



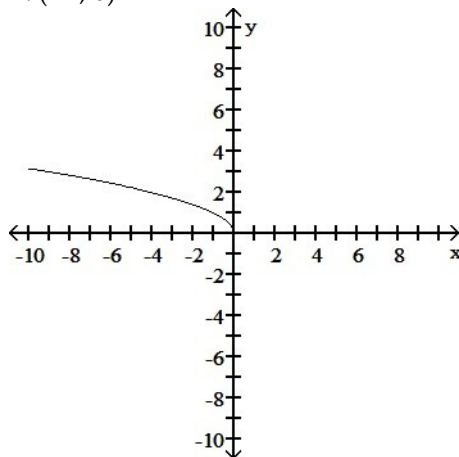
- A) D: $(-\infty, 0]$

B) D:
 (-
 ∞ ,
 ∞)

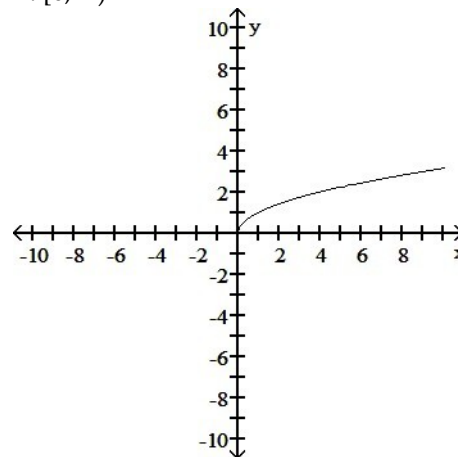


-
 \leftarrow
 -10

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



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



Answer: A

Diff: 0 Type: BI

Find the domain and range for the indicated function.

74) $f(x) = 8$, $g(x) = 8 + \sqrt{x}$, g/f
 A) D: $x \geq -8$ B) D: $x \geq 0$
 R: $y \geq 0$ R: $y \leq 8$

Answer: D

Diff: 0 Type: BI

C) D: $x \geq 0$
 R: $y \leq 1$

D) D: $x \geq 0$
 R: $y \geq 1$

74) _____

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

75) $\cos^2 \theta = \frac{1}{4}$
 A) $\frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$
 $\theta = , , , ,$
 C) $\frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$
 $\theta = , , , ,$

Answer: B

Diff: 0 Type: BI

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

75) _____

Provide an appropriate response.

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

76) _____

A) $\{x \mid x \in \text{integers}\}$

B) $\{x \mid x = 0\}$

C) $\{x \mid x \in \text{real numbers}\}$

D) \emptyset

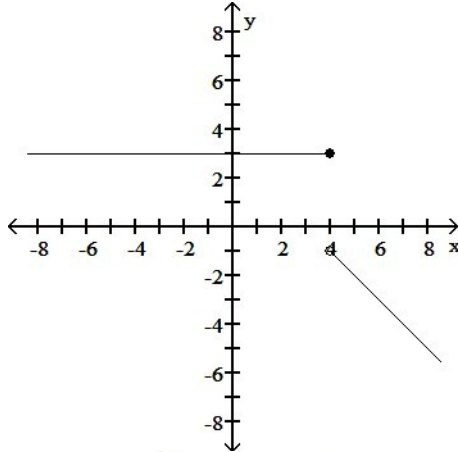
Answer: A

Diff: 0 Type: BI

Find a formula for the function graphed.

77)

77) _____



A) $f(x) = \begin{cases} 3, & x < 4 \\ x - 3, & x \geq 4 \end{cases}$

B) $f(x) = \begin{cases} 3, & x \leq 4 \\ 3 - x, & x > 4 \end{cases}$

C) $f(x) = \begin{cases} 3, & x < 4 \\ 3 - x, & x > 4 \end{cases}$

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

Answer: B

Diff: 0 Type: BI

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

78) $y = (-3x + 17)^6$

78) _____

A) $f(x) = -3x^6, g(x) = x + 17$

B) $f(x) = (-3x)^6, g(x) = 17$

C) $f(x) = x^6, g(x) = -3x + 17$

D) $f(x) = -3x + 17, g(x) = x^6$

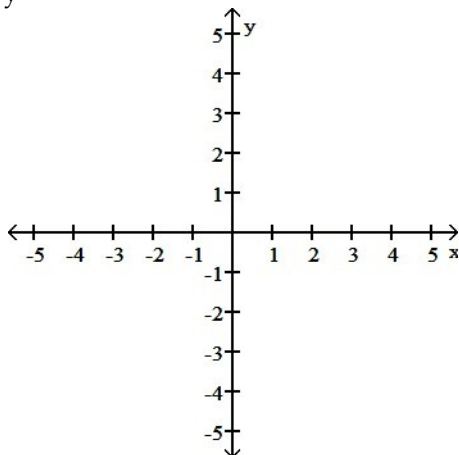
Answer: C

Diff: 0 Type: BI

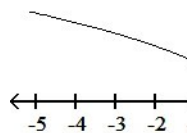
Graph the function. Specify the intervals over which the function is increasing and the intervals where it is decreasing.

79) $y = \sqrt{-x}$

79) _____



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

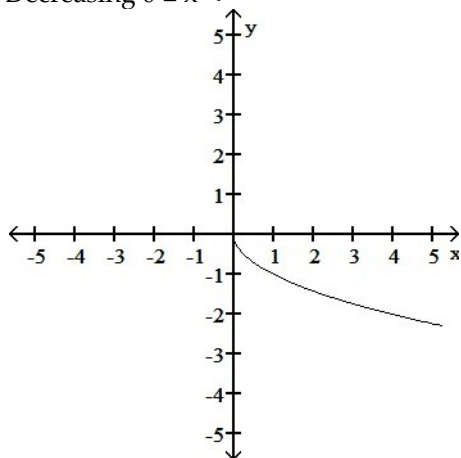


B) Decreasing $-\infty < x \leq 0$

~

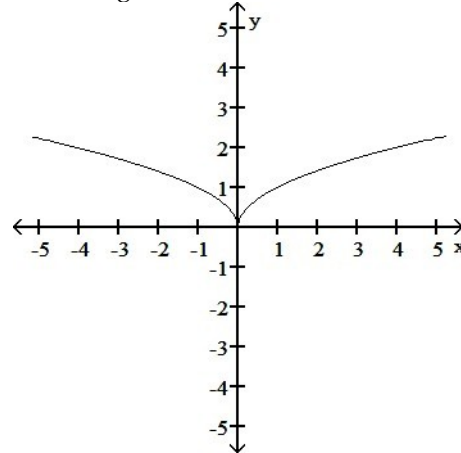


C) Decreasing $0 \leq x < \infty$



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

Increasing $0 \leq x < \infty$

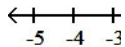


Answer: B

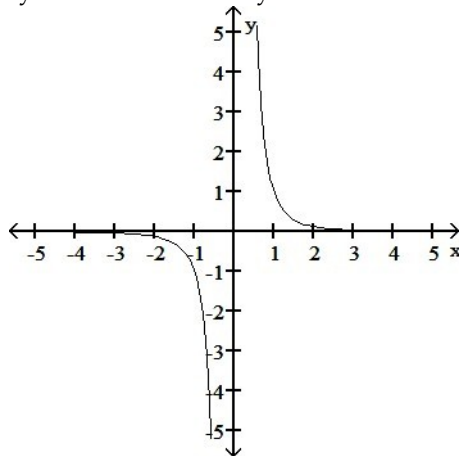
Diff: 0 Type: BI

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

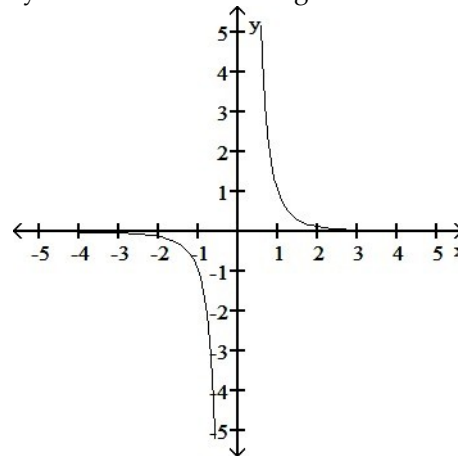
80) $y = \frac{1}{x^3}$



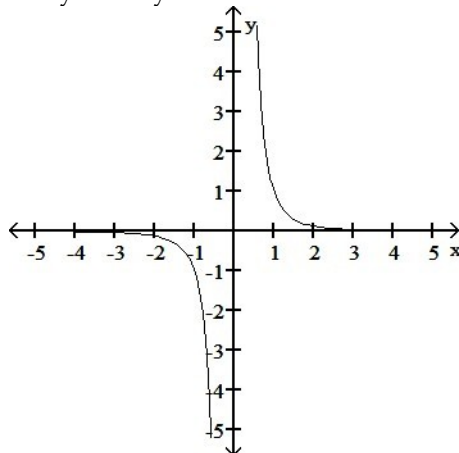
A) Symmetric about the y-axis



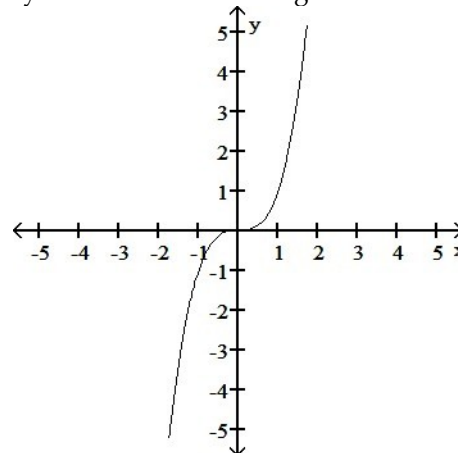
B) Symmetric about the origin



C) No symmetry



D) Symmetric about the origin



Answer: B

Diff: 0 Type: BI

Solve the problem.

- 81) A power plant is located on a river that is 600 feet wide. To lay a new cable from the plant to a location in a city 2 miles downstream on the opposite side costs \$175 per foot across the river and \$100 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

81)

A) $C(x) = 175(600 - x) + 100(2 - x)$

B) $C(x) = 175\sqrt{x^2 + 600^2} + 100(10,560 - x)$

C) $C(x) = 100\sqrt{x^2 + 600^2} + 175(10,560 - x)$

D) $C(x) = 175\sqrt{x^2 + 600^2} + 100(2 - x)$

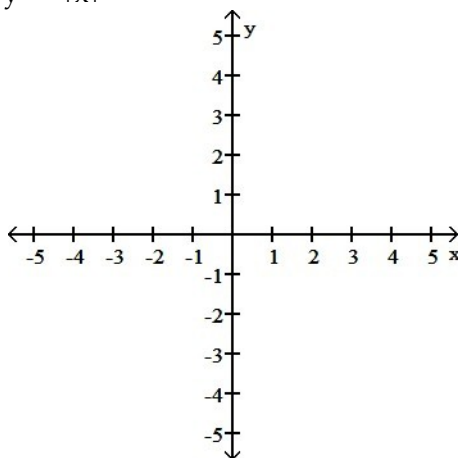
Answer: B

Diff: 0 Type: BI

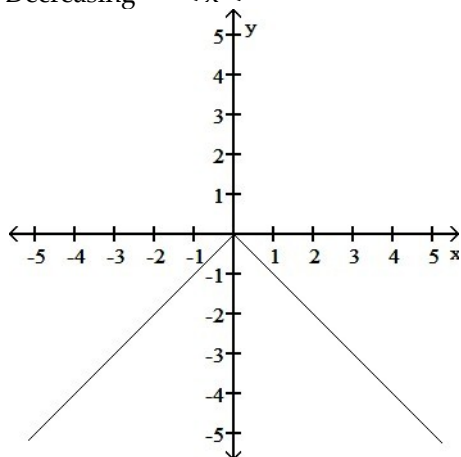
Graph the function. Specify the intervals over which the function is increasing and the intervals where it is decreasing.

82) $y = -|x|$

82) _____

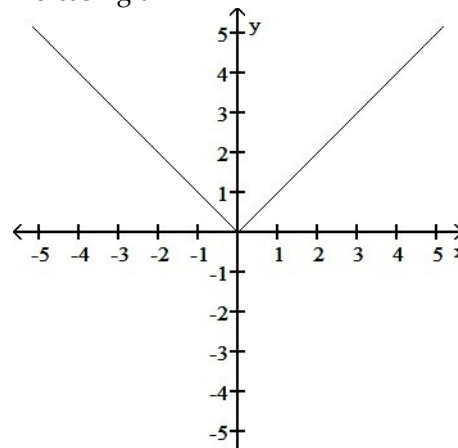


A) Decreasing $-\infty < x < \infty$

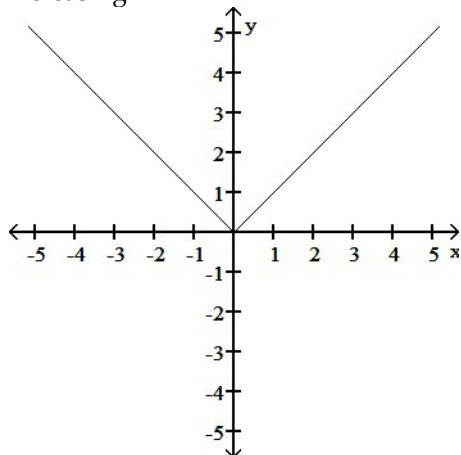


B) Decreasing $-\infty < x \leq 0$

Increasing $0 \leq x < \infty$

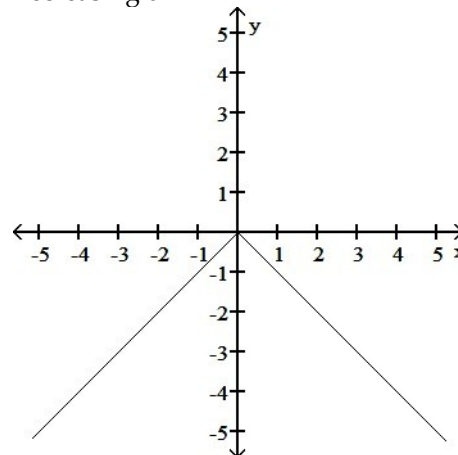


C) Increasing $-\infty < x < \infty$



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

Decreasing $0 \leq x < \infty$



Answer: D

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.

- 83) $y = x^2 + 1$ compressed vertically by a factor of 2 83) _____
- A) $y = 2x^2 + 2$ B) $y = \frac{x^2}{2} + 1$ C) $y = 4x^2 + 1$ D) $y = \frac{x^2}{2} + \frac{1}{2}$

Answer: D

Diff: 0 Type: BI

- 84) $y = 1 + \frac{1}{x^2}$ stretched vertically by a factor of 7 84) _____
- A) $y = 1 + \frac{49}{x^2}$ B) $y = 1 + \frac{7}{x^2}$ C) $y = 7 + \frac{7}{x^2}$ D) $y = \frac{1}{7} + \frac{1}{7x^2}$

Answer: C

Diff: 0 Type: BI

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

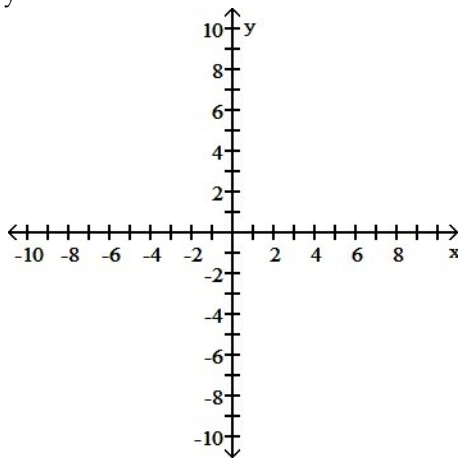
- 85) $\cos\left(\frac{\pi}{4}\right)$ 85) _____
- A) $\frac{1}{2}$ B) $\frac{\sqrt{3}}{2}$ C) $\frac{\sqrt{2}}{2}$ D) $\sqrt{2}$

Answer: C

Diff: 0 Type: BI

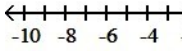
Graph the function.

- 86) $y = (5 - x)^3 - 4$ 86) _____

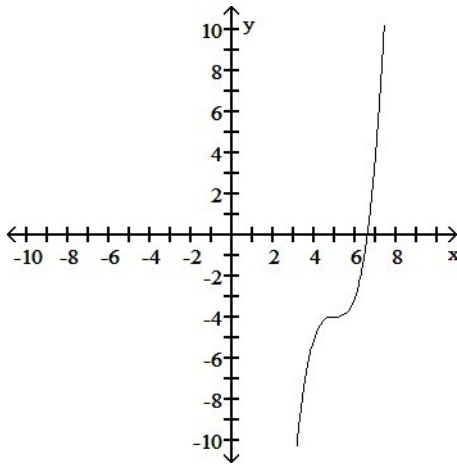


A)

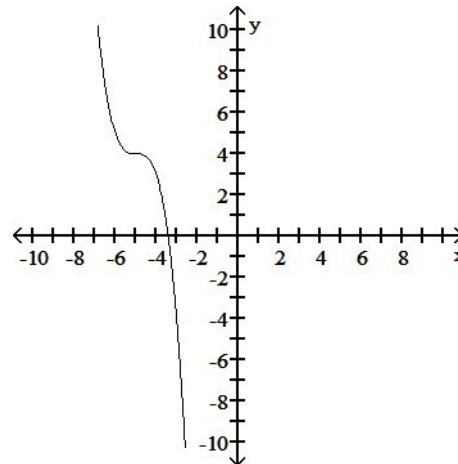
B)



C)



D)



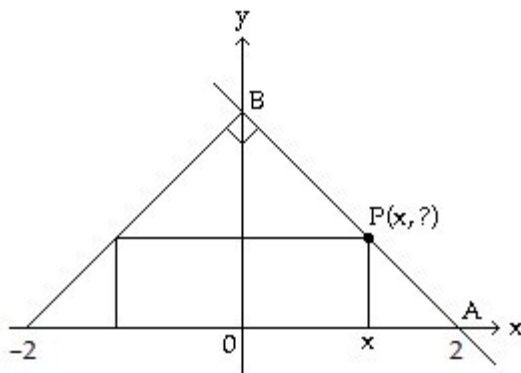
Answer: A

Diff: 0 Type: BI

Solve the problem.

87) The figure shown here shows a rectangle inscribed in an isosceles right triangle whose hypotenuse is 4 units long. Express the area A of the rectangle in terms of x .

87) _____



A) $A(x) = 2x^2$

B) $A(x) = 2x(2 - x)$

C) $A(x) = 2x(x - 2)$

D) $A(x) = x(2 - x)$

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.

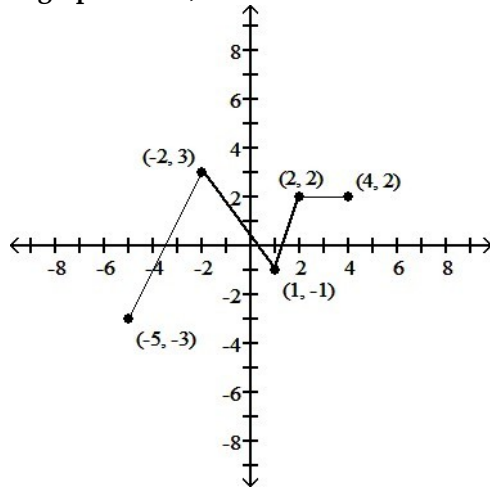
88) $g \circ f$

88) _____

A) Even
 Answer: A
 Diff: 0 Type: BI

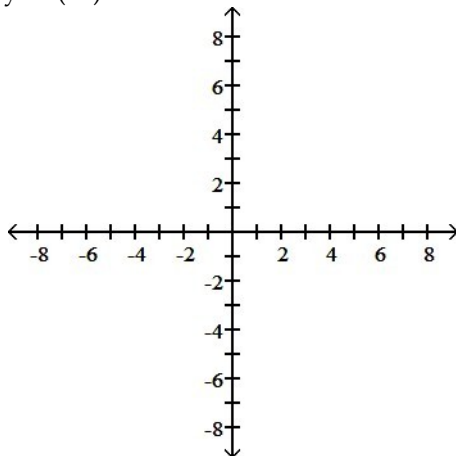
B) Odd

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



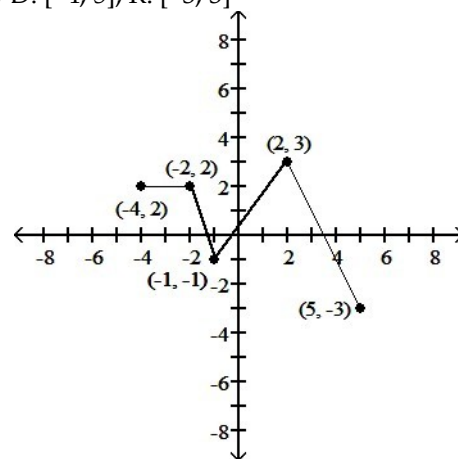
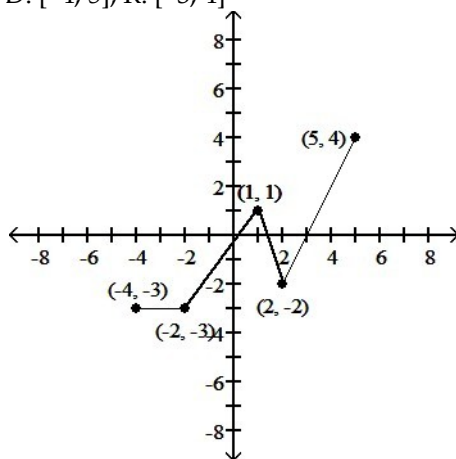
89) $y = f(-x)$

89) _____

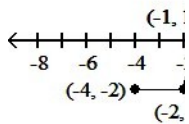


A) D: $[-4, 5]$; R: $[-3, 4]$

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



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



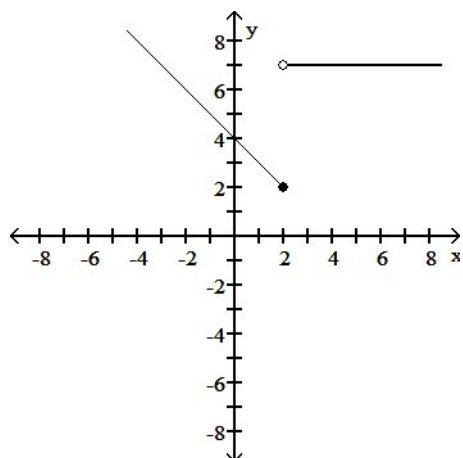
D) D:
 [-
 5,
 4];
 R:
 [-
 3,
 3]

←
 -1

Answer: B
 Diff: 0 Type: BI

Find a formula for the function graphed.

90)



90) _____

A) $f(x) = \begin{cases} 4 - x, & x < 2 \\ 7 & x \geq 2 \end{cases}$
 C) $f(x) = \begin{cases} 4 + x, & x \leq 2 \\ 7 & x > 2 \end{cases}$

B) $f(x) = \begin{cases} 4 + x, & x < 2 \\ 7 & x > 2 \end{cases}$
 D) $f(x) = \begin{cases} 4 - x, & x \leq 2 \\ 7 & x > 2 \end{cases}$

Answer: D
 Diff: 0 Type: BI

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

91)

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

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

91) _____

B) $\theta = 0, \pi, 2\pi$
 D) θ

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

$$\begin{aligned} \text{D) } \theta &= \frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4} \end{aligned}$$

Answer: A
Diff: 0 Type: BI

$$92) \sin 2\theta + \cos \theta = 0$$

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

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

Answer: C
Diff: 0 Type: BI

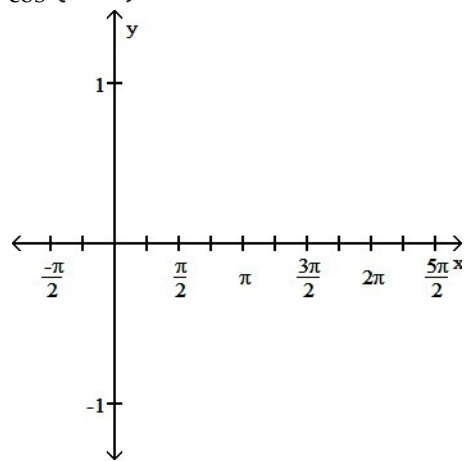
$$\text{B) } \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{6}, \frac{11\pi}{6}$$

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

92) _____

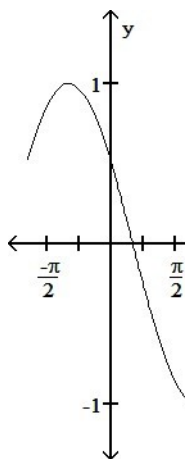
State the period of the function and graph.

$$93) \cos \left(x + \frac{\pi}{3} \right)$$



A) Period 2π

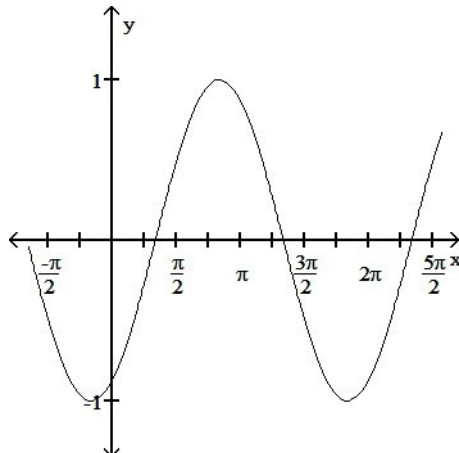
93) _____



B) Period 2π

←

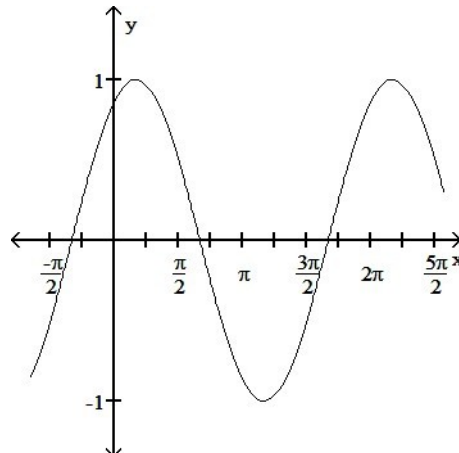
C) Period 2π



Answer: A

Diff: 0 Type: BI

D) Period 2π



Solve the problem.

94) 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 $P = 14.3 \text{ lbs/in}^2$ when $V = 1100 \text{ in}^3$, then what is V when $P = 25 \text{ lbs/in}^2$?

94) _____

A) $\frac{3146}{5} \text{ in}^3$

B) $\frac{13}{40} \text{ in}^3$

C) $\frac{25000}{13} \text{ in}^3$

D) $\frac{40}{13} \text{ in}^3$

Answer: A

Diff: 0 Type: BI

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

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

95) _____

A) $-\sqrt{6} - \sqrt{2}$

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

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

D) $\sqrt{2} - \sqrt{6}$

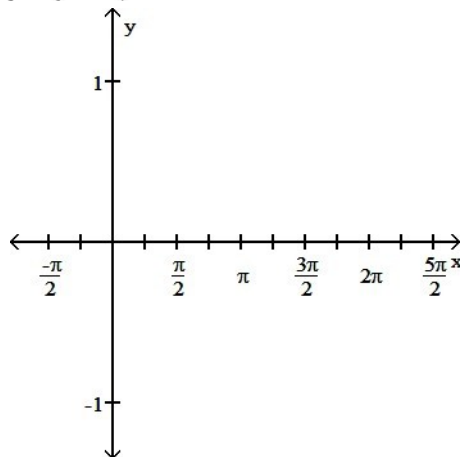
Answer: B

Diff: 0 Type: BI

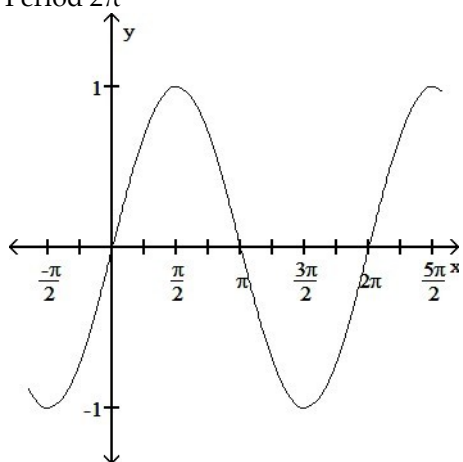
State the period of the function and graph.

96) $\sin\left(x - \frac{\pi}{2}\right)$

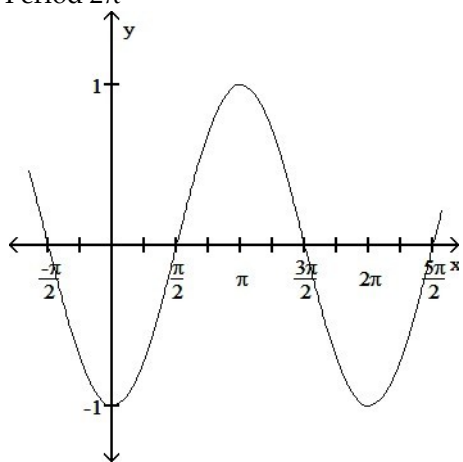
96) _____



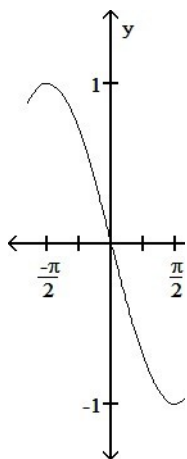
A) Period 2π



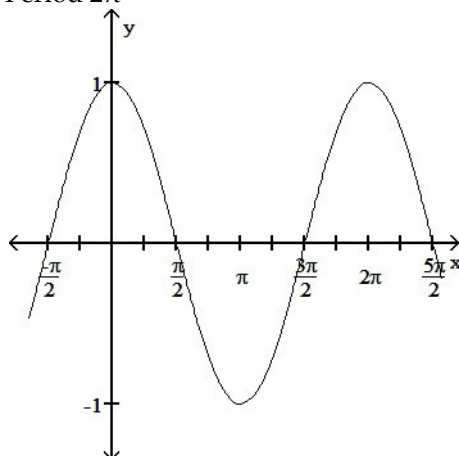
B) Period 2π



C) Period 2π



D) Period 2π



Answer: B

Diff: 0 Type: BI

Solve the problem.

97) $\frac{x-2}{9}$

If $f(x) = \frac{x-2}{9}$ and $g(x) = 9x + 2$, find $g(f(x))$.

A) $x + 4$

B) $9x + 16$

C) $\frac{2}{9}$

D) x

Answer: D

Diff: 0 Type: BI

98) The variable s is proportional to t , and $s = 35$ when $t = 105$. Determine t when $s = 60$.

A) 3

B) 170

C) 180

D) 240

Answer: C

Diff: 0 Type: BI

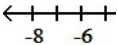
Find the domain and graph the function.

99) $\frac{|t+1|}{t+1}$

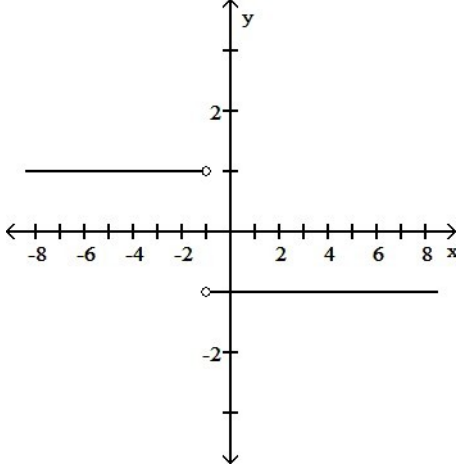
$F(t) =$

97) _____

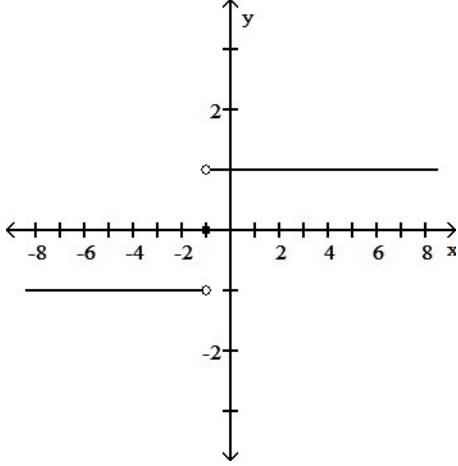
98) _____



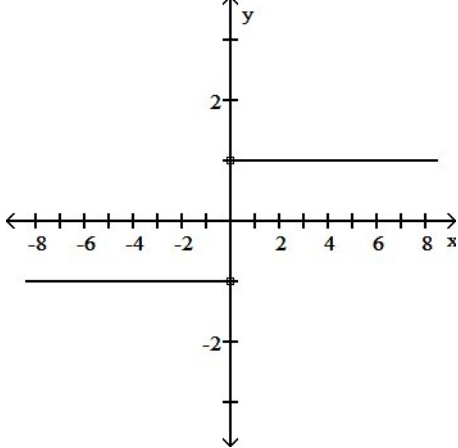
A) $D: (-\infty, -1) \cup (-1, \infty)$



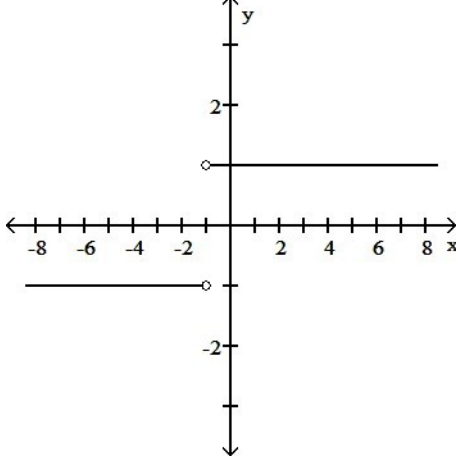
B) $D: (-\infty, \infty)$



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



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



Answer: D
Diff: 0 Type: BI

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

100) $f(x) = 9$

A) Even

B) Odd

C) Neither

100) _____

Answer: A

Diff: 0 Type: BI

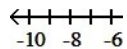
Graph the function.

101)

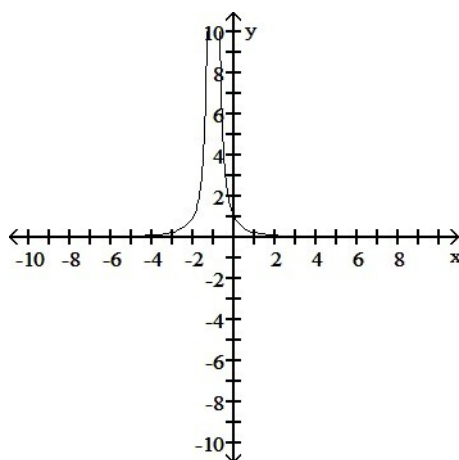
y =

$$\frac{1}{x^2} + 1 \quad 101)$$

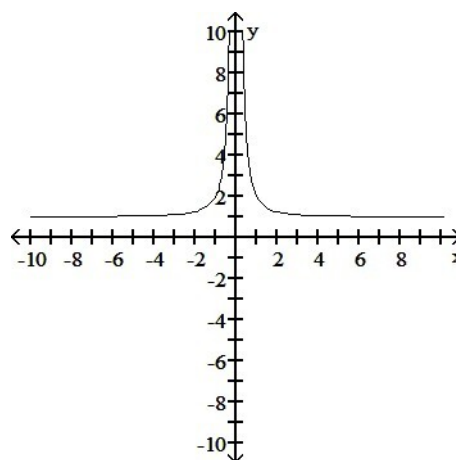
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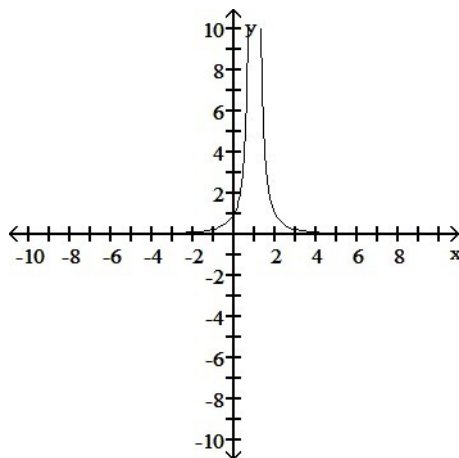
A)



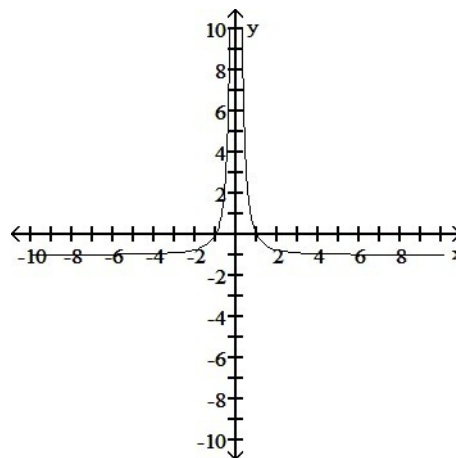
B)



C)



D)

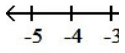


Answer: B

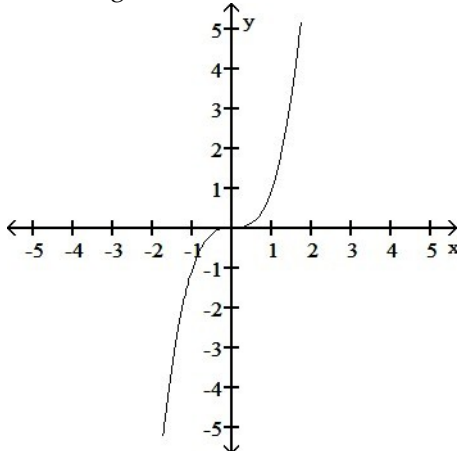
Diff: 0 Type: BI

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

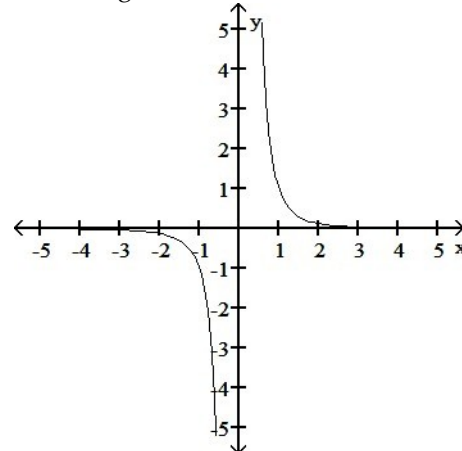
$$102) \quad y = \frac{1}{x^3}$$



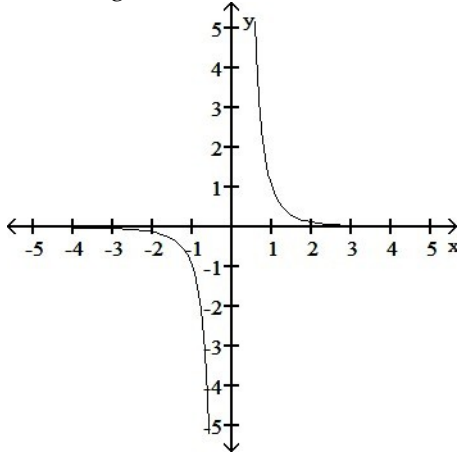
A) Increasing $-\infty < x < \infty$



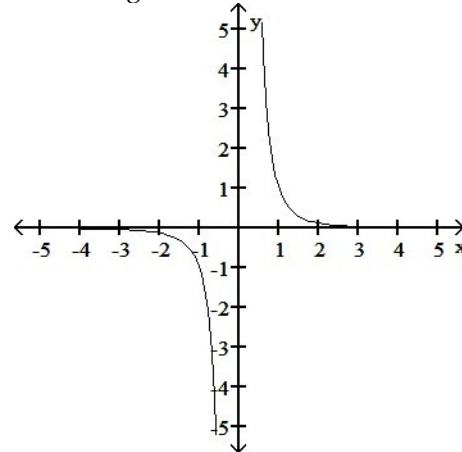
B) Increasing $-\infty < x < 0$ and $0 < x < \infty$



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



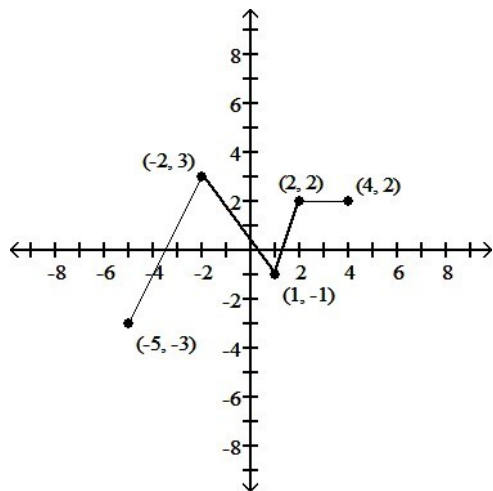
D) Decreasing $-\infty < x < 0$ and $0 < x < \infty$



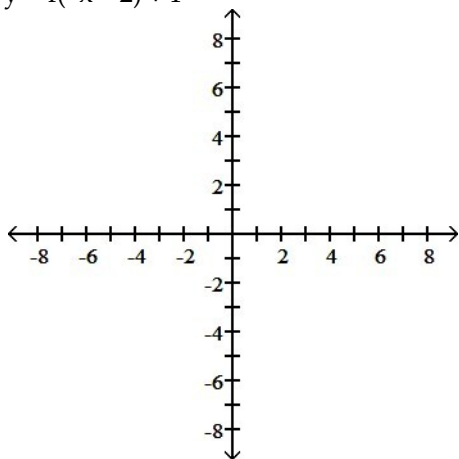
Answer: D

Diff: 0 Type: BI

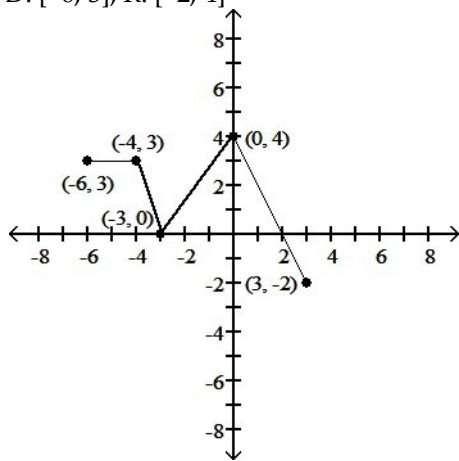
Using the graph below, find the domain and range of the given function, and sketch the graph.



103) $y = f(-x - 2) + 1$



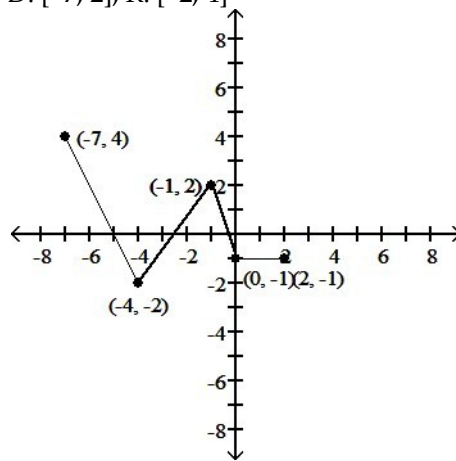
A) D: $[-6, 3]$; R: $[-2, 4]$

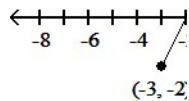


C) D: $[-3, 6]$; R: $[-2, 4]$

103) _____

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





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

←
-1

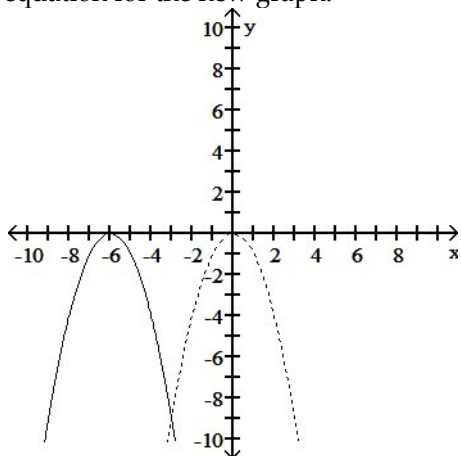
Answer: A

Diff: 0 Type: BI

Solve the problem.

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

104) _____



A) $y = -x^2 - 6$

B) $y = -x^2 + 6$

C) $y = -(x - 6)^2$

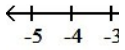
D) $y = -(x + 6)^2$

Answer: D

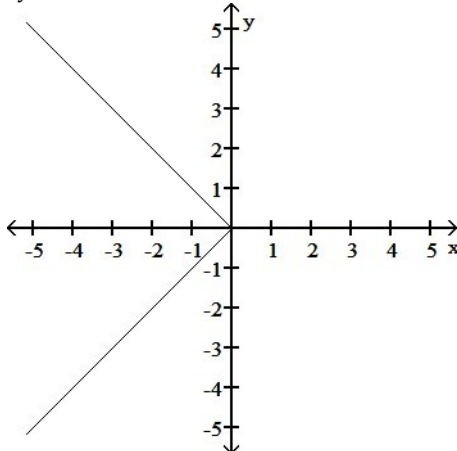
Diff: 0 Type: BI

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

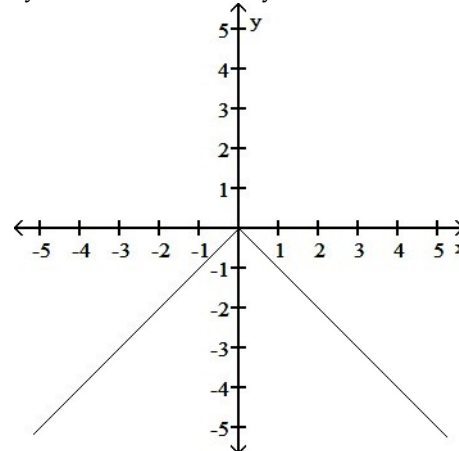
- 105) $y = -|x|$



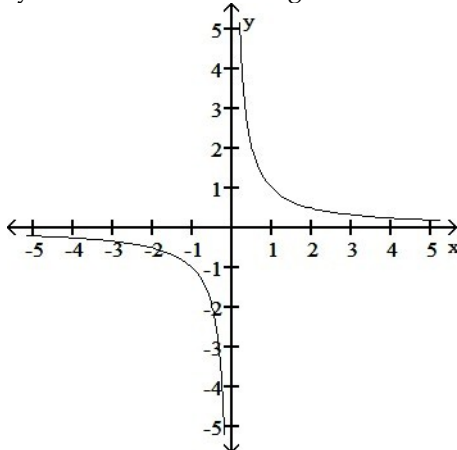
A) Symmetric about the x-axis



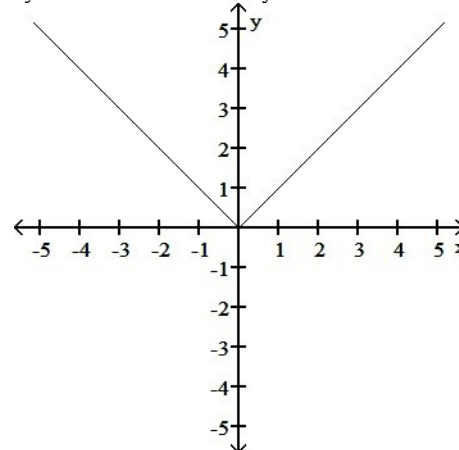
B) Symmetric about the y-axis



C) Symmetric about the origin



D) Symmetric about the y-axis



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.

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

Answer:
$$\begin{aligned}\sin\left(x - \frac{\pi}{2}\right) &= \sin x \cos\left(-\frac{\pi}{2}\right) + \cos x \sin\left(-\frac{\pi}{2}\right) \\ &= \sin x (0) + \cos x (-1) \\ &= 0 - \cos x\end{aligned}$$

106) _____

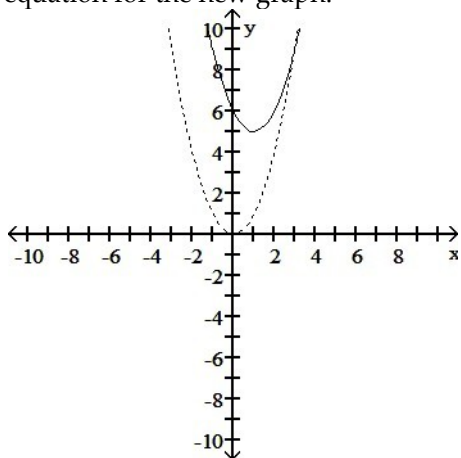
$$= -\cos x$$

Diff: 0 Type: SA

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

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

107) _____



A) $y = (x - 5)^2 - 1$

B) $y = (x - 1)^2 + 5$

C) $y = (x - 1)^2 - 5$

D) $y = (x + 1)^2 + 5$

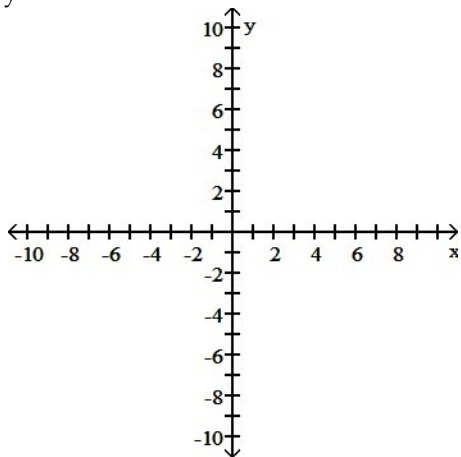
Answer: B

Diff: 0 Type: BI

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

- 108) $y = -x^{2/5}$

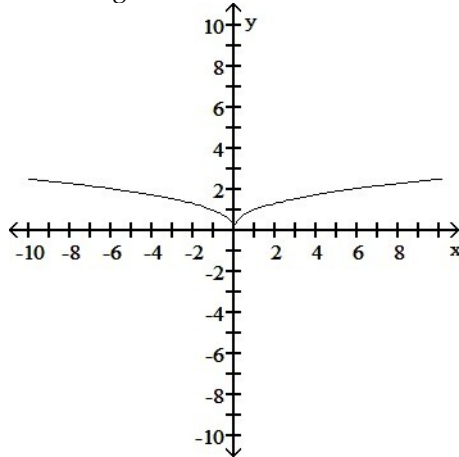
108) _____



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

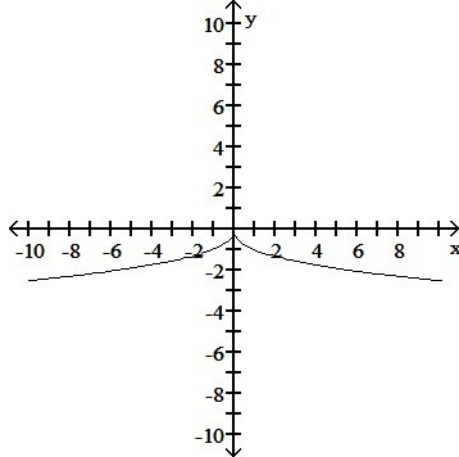
Increasing $0 \leq x < \infty$

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

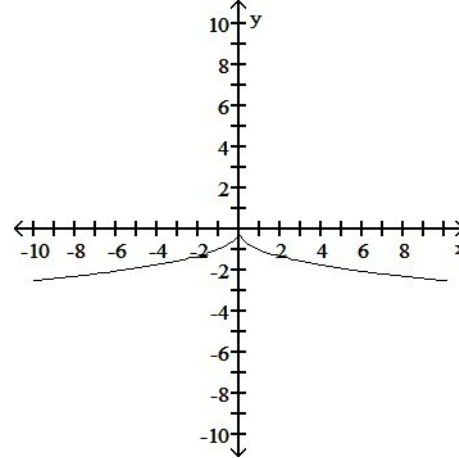


C) Increasing $-\infty < x < 0$

Decreasing $0 < x < \infty$



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



Answer: C

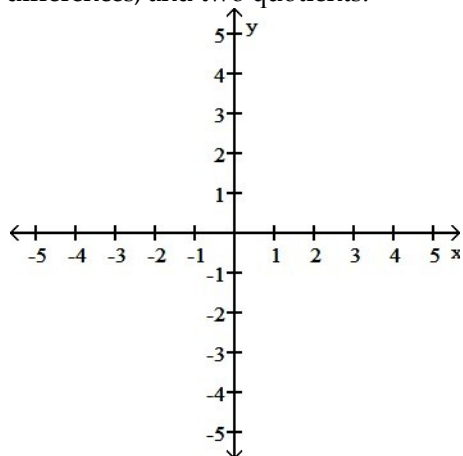
Diff: 0 Type: BI

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

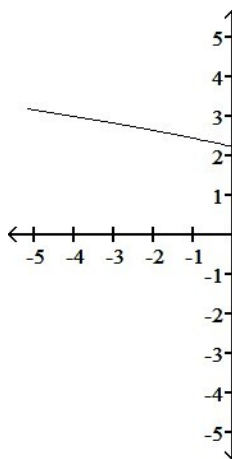
Solve the problem.

109) Graph the functions $f(x) = \sqrt{x}$ and $g(x) = \sqrt{5-x}$ together with their sum, product, two differences, and two quotients.

109) _____



Answer:

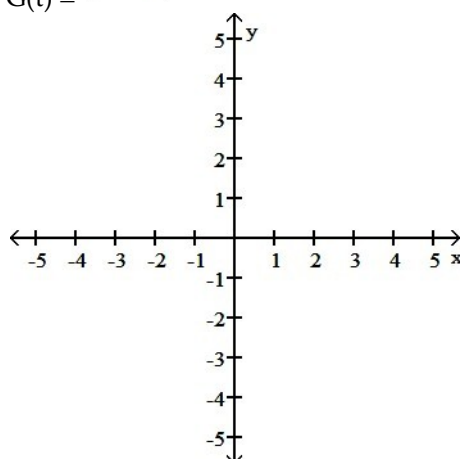


Diff: 0 Type: SA

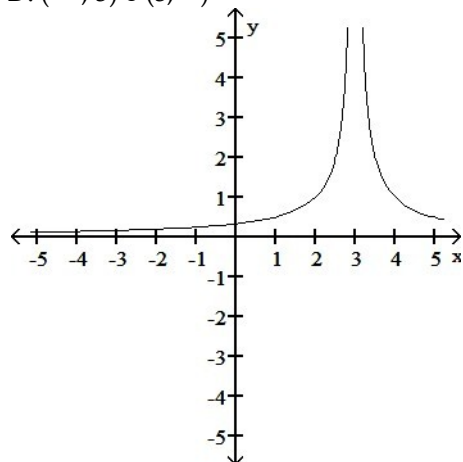
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.
Find the domain and graph the function.

110) $G(t) = \frac{1}{|t - 3|}$

110) _____

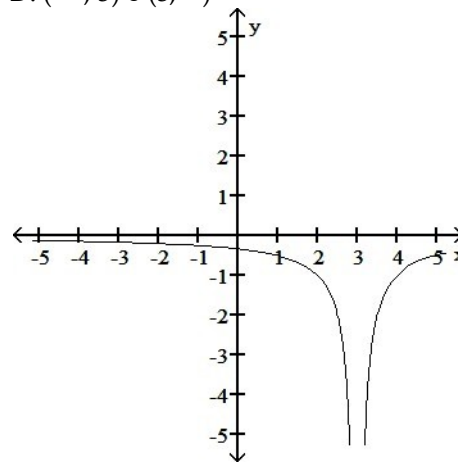


A) D: $(-\infty, 3) \cup (3, \infty)$

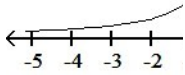


C) D: $(-\infty, 0) \cup (0, \infty)$

B) D: $(-\infty, 3) \cup (3, \infty)$



D) D:
 (-
 ∞ ,
 ∞)



Answer: A
 Diff: 0 Type: BI

Provide an appropriate response.

- 111) For what values of x is $\lfloor x \rfloor = 0$? 111) _____
 A) $-1 < x \leq 0$ B) $0 < x \leq 1$ C) $-1 \leq x < 0$ D) $0 \leq x < 1$

Answer: D
 Diff: 0 Type: BI

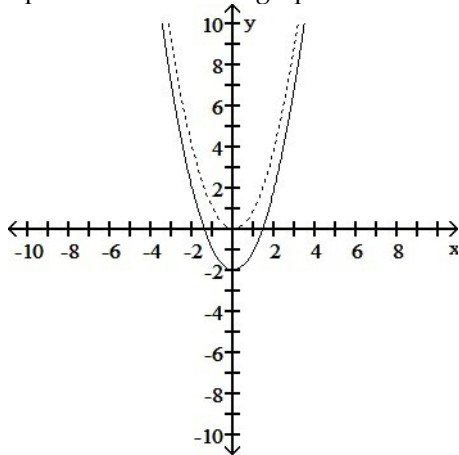
Find the domain and range of the function.

- 112) $f(x) = 3 - x^2$ 112) _____
 A) D: $(-\infty, \infty)$, R: $[3, \infty)$ B) D: $(-\infty, 3]$, R: $(-\infty, \infty)$
 C) D: $(-\infty, \infty)$, R: $(-\infty, 3]$ D) D: $(-\infty, \infty)$, R: $(-\infty, \infty)$

Answer: C
 Diff: 0 Type: BI

Solve the problem.

- 113) The accompanying figure shows the graph of $y = x^2$ shifted to a new position. Write the equation for the new graph. 113) _____



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

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.

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

114) _____

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

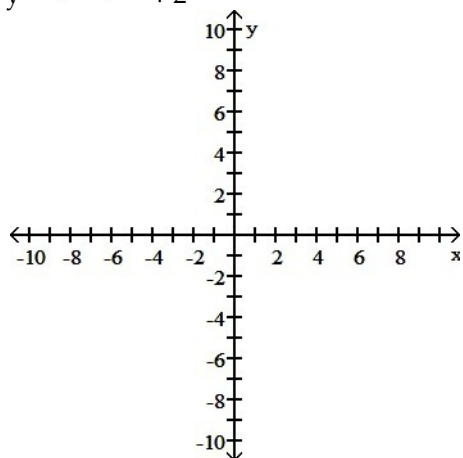
Answer: B

Diff: 0 Type: BI

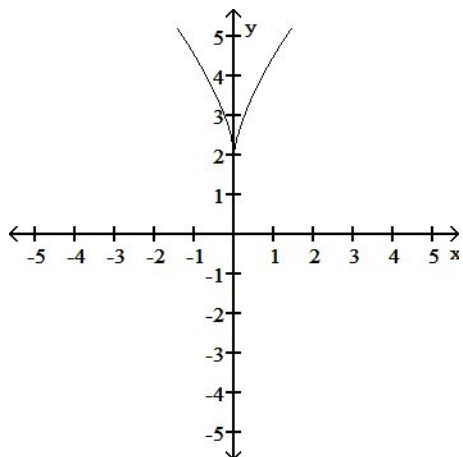
Graph the function.

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

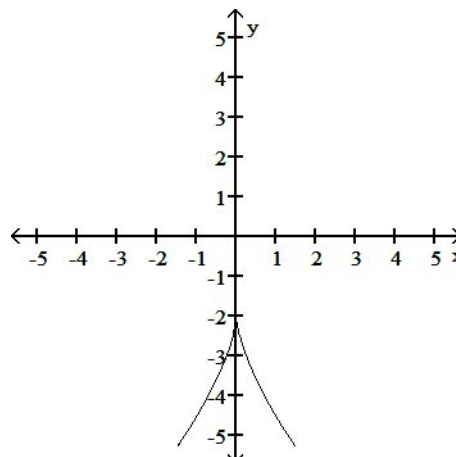
115) _____



A)

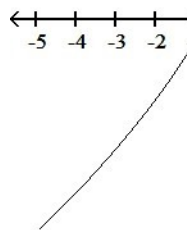


B)



C)

D)

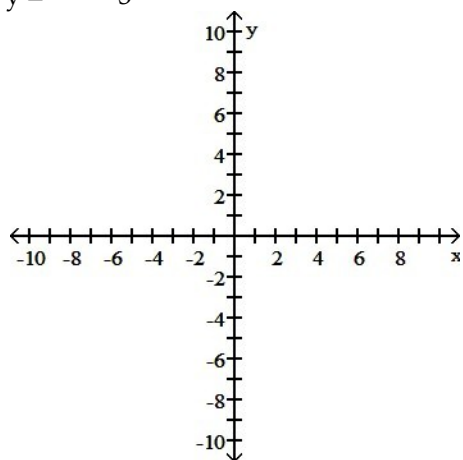


Answer: A

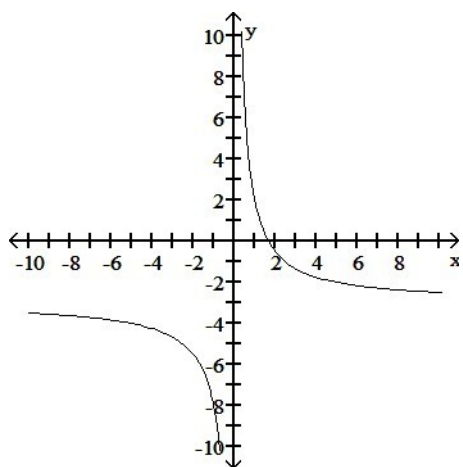
Diff: 0 Type: BI

116) $y = \frac{1}{5x} - 3$

116) _____

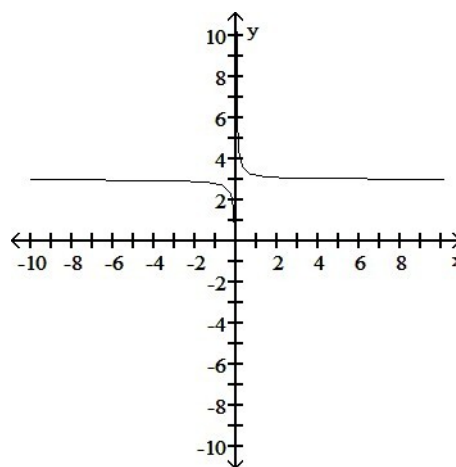


A)

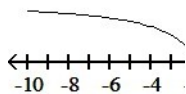


C)

B)



D)



Answer: D

Diff: 0 Type: BI

Find the formula for the function.

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

A) $A = \pi r$

B) $A = \pi r^3$

C) $A = \pi r^2$

D) $A = 2\pi r$

117) _____

Answer: C

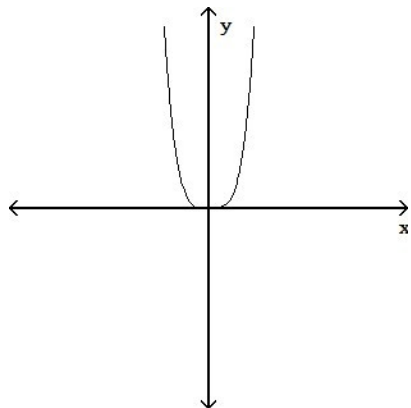
Diff: 0 Type: BI

Match the equation with its graph.

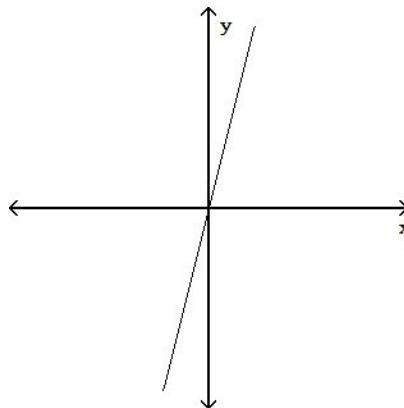
118) $y = 4^x$

118) _____

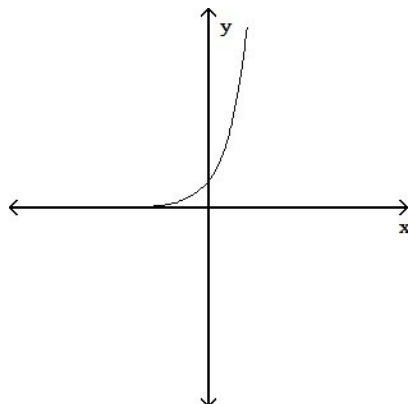
A)



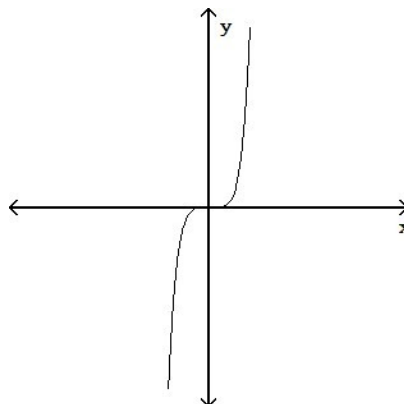
B)



C)



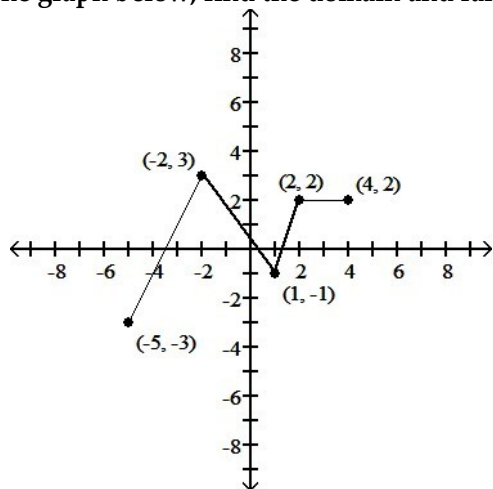
D)



Answer: C

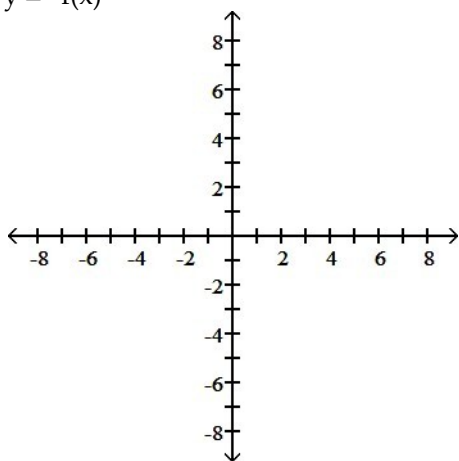
Diff: 0 Type: MC

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

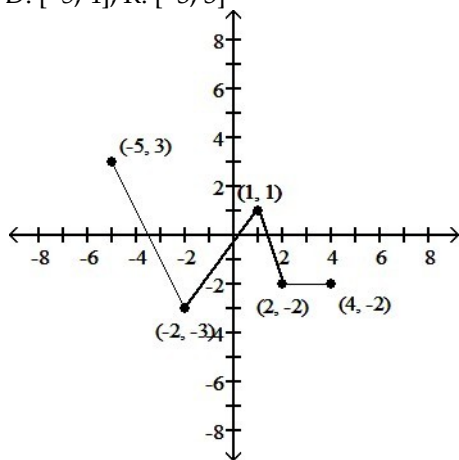


119) $y = -f(x)$

119) _____

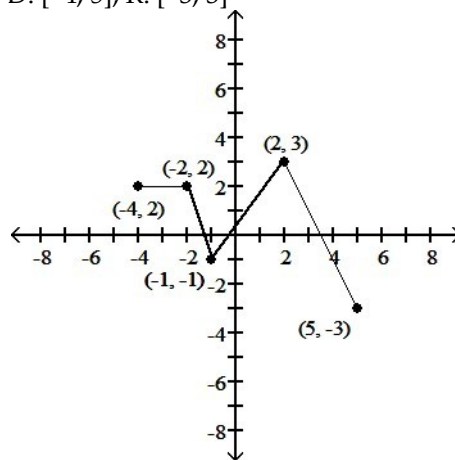


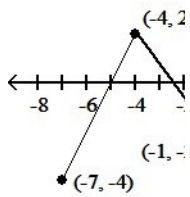
A) D: $[-5, 4]$; R: $[-3, 3]$



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

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





D) D:
 [-
 7.
 5,
 1];
 R:
 [-
 1,
 5]

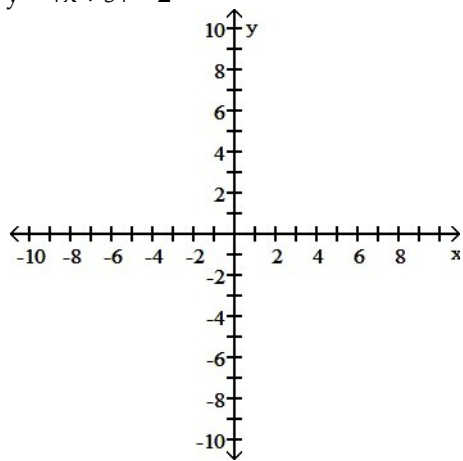
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Answer: A
 Diff: 0 Type: BI

Graph the function.

120) $y = |x + 5| - 2$

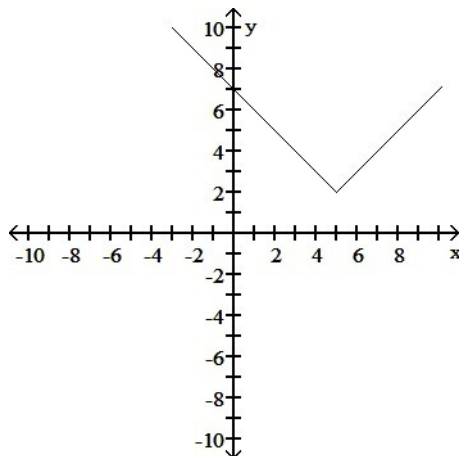
120) _____



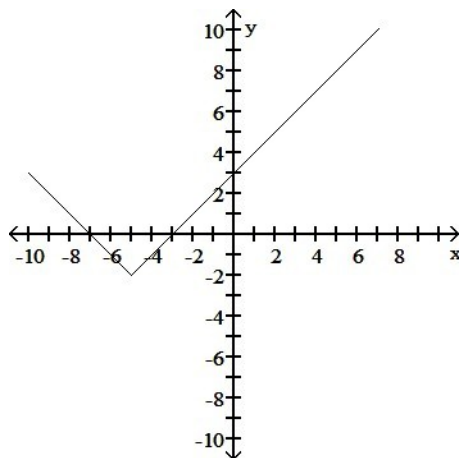
A)

←
 -10

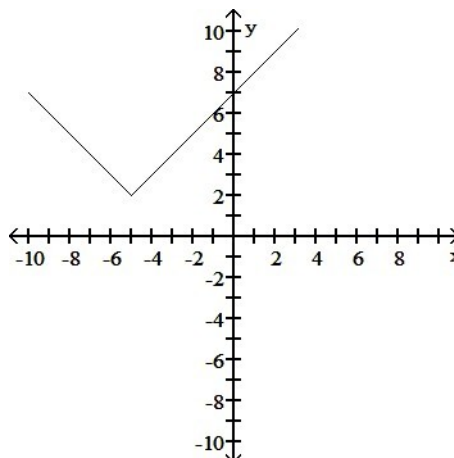
B)



C)



D)



Answer: C

Diff: 0 Type: BI

Solve the problem.

121) Let $f(x) = \sqrt{x-4}$. Find a function $y = g(x)$ so that $(f \circ g)(x) = \sqrt{x^2 - 4}$.

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

B) $g(x) = x^2 - 4$

C) $g(x) = x^2$

D) $g(x) = 2x$

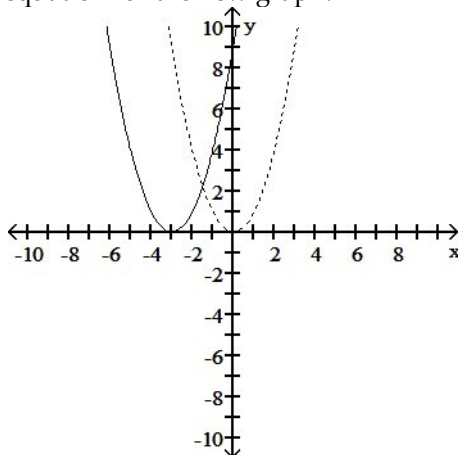
121) ____

Answer: C

Diff: 0 Type: BI

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

122) ____



A) $y = x^2 - 3$

B) $y = x^2 + 3$

C) $y = (x - 3)^2$

D) $y = (x + 3)^2$

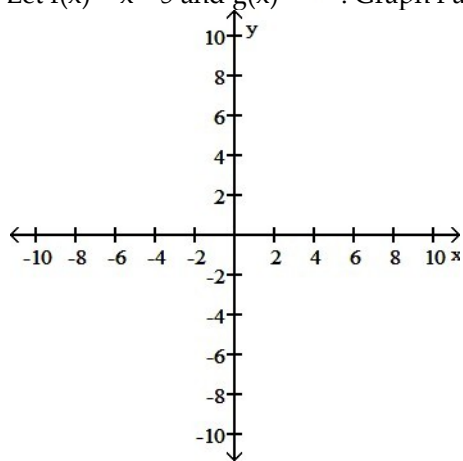
Answer: D

Diff: 0 Type: BI

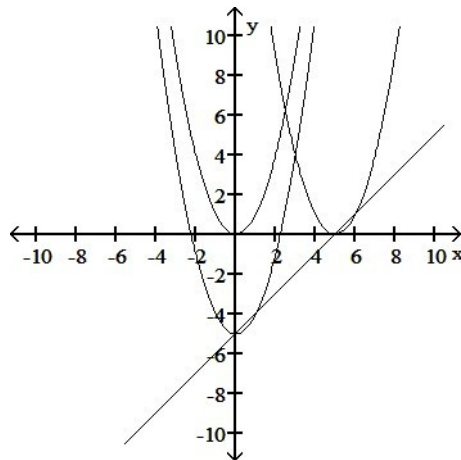
SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

123) Let $f(x) = x - 5$ and $g(x) = x^2$. Graph f and g together with $f \circ g$ and $g \circ f$.

123) _____



Answer:



Diff: 0 Type: SA

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

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

124) $f(x) = (x - 8)(x + 9)$

124) _____

A) Even

B) Odd

C) Neither

Answer: C

Diff: 0 Type: BI

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

125) $\csc\left(\frac{\pi}{3}\right)$

125) _____

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

B) $\sqrt{2}$

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

D) 2

Answer: A

Diff: 0 Type: BI

Find the domain and range for the indicated function.

126) $f(x) = \sqrt{x + 11}$, $g(x) = \sqrt{x - 11}$, $f + g$

126) _____

A) D: $x \geq 11$

B) D: $x \geq 11$

R: $\geq \sqrt{22}$
y

C) D: $x \geq -11$

R: $y \geq 0$

$$R: y \geq \sqrt{22}$$

$$\begin{array}{l} D) \quad D: \\ x \\ \geq \\ - \\ 11 \\ R: \\ y \\ \geq \\ 0 \end{array}$$

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.

$$127) \quad \tan x = 1, \quad x \text{ in } \left[\pi, \frac{3\pi}{2} \right]$$

127) _____

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

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

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

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

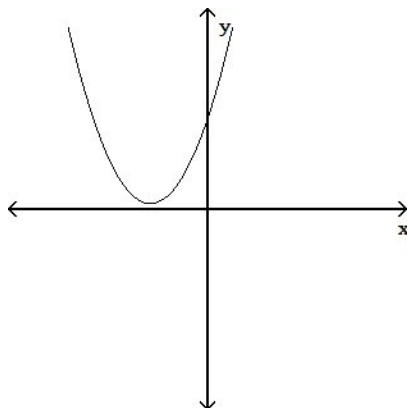
Answer: D

Diff: 0 Type: BI

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

128)

128) _____



A) Function

B) Not a function

Answer: A

Diff: 0 Type: BI

Find the domain and range for the indicated function.

$$129) \quad f(x) = 6, \quad g(x) = 6 + \sqrt{x}; \quad f/g$$

129) _____

$$A) \quad D: x \geq 0$$

$$B) \quad D: x \geq 0$$

$$C) \quad D: x \geq 0$$

$$D) \quad D: x \geq -6$$

$$R: y \geq 1$$

$$R: y \leq 1$$

$$R: y \leq 6$$

$$R: y \geq 0$$

Answer: B

Diff: 0 Type: BI

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

130)

130)

—

←

A) Not a function

B) Function

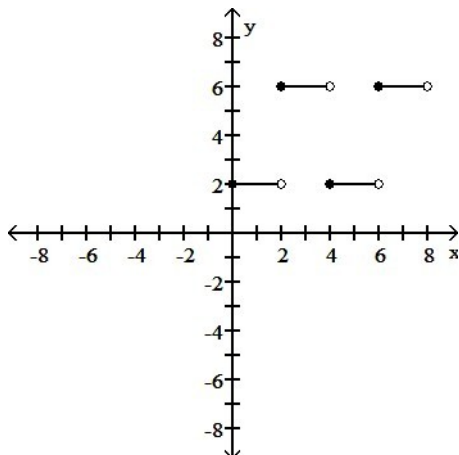
Answer: B

Diff: 0 Type: BI

Find a formula for the function graphed.

131)

131) _____



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

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

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

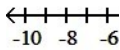
D) $f(x) = \begin{cases} 2, & 0 \leq x < 2 \\ 6, & 2 \leq x < 4 \\ 2, & 4 \leq x < 6 \\ 6, & 6 \leq x < 8 \end{cases}$

Answer: D

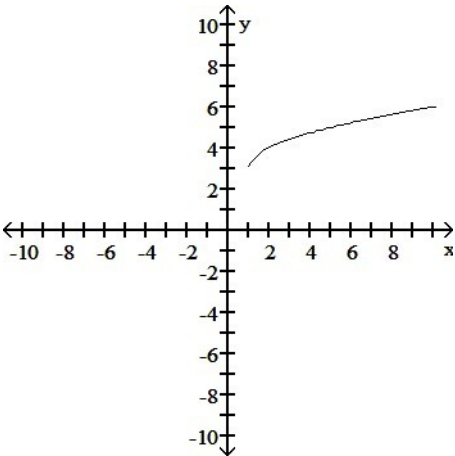
Diff: 0 Type: BI

Graph the function.

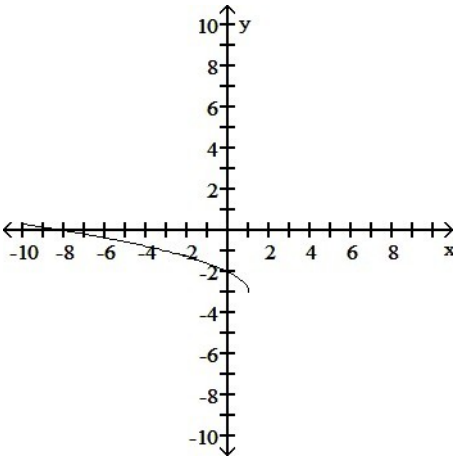
132) $y = \sqrt{x-1} + 3$



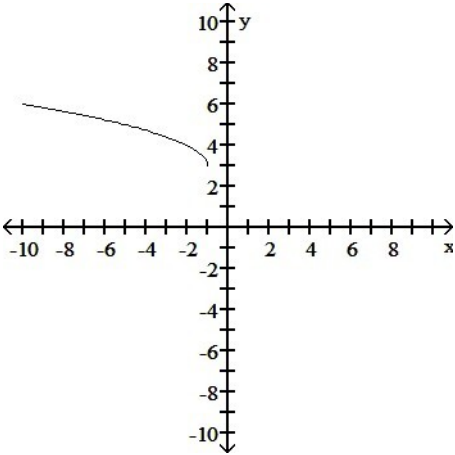
A)



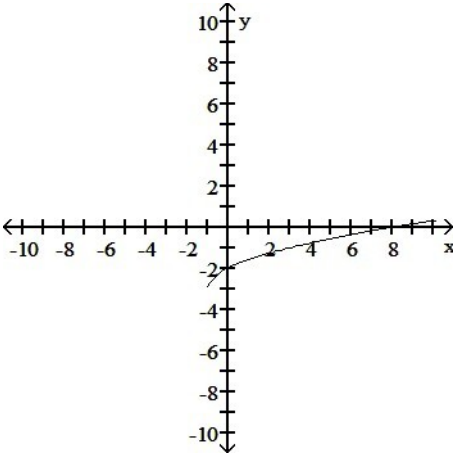
B)



C)



D)



Answer: A
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.

133) $f \cdot g$

133) _____

A) Even

B) Odd

Answer: B
Diff: 0 Type: BI

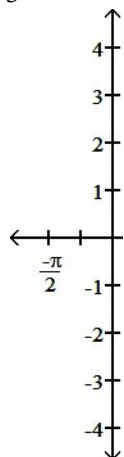
State the period of the function and graph.

134)

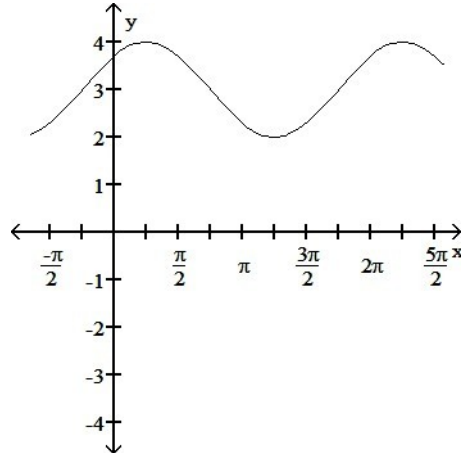
\sin

$$\left(x + \frac{\pi}{4}\right)_+ \quad 134)$$

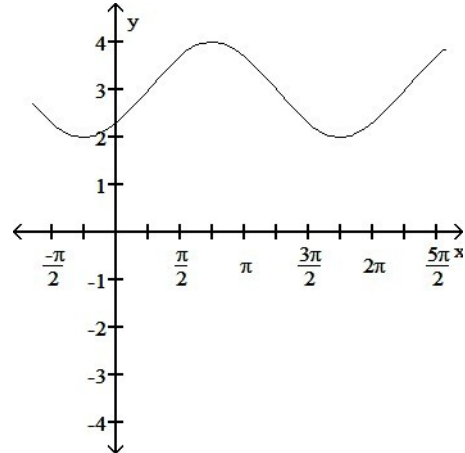
3



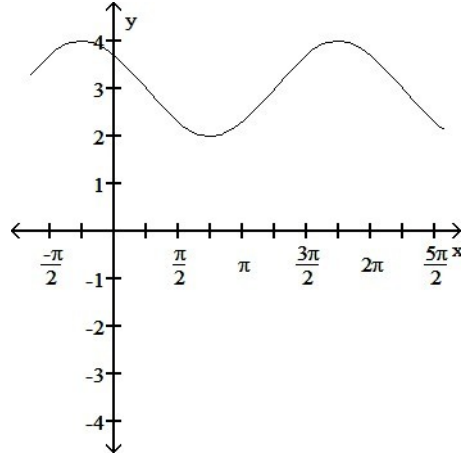
A) Period 2π



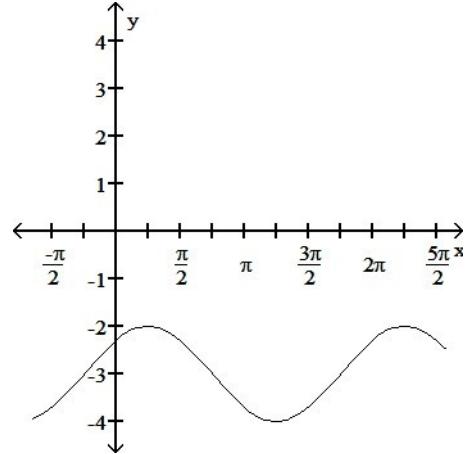
B) Period 2π



C) Period 2π



D) Period 2π



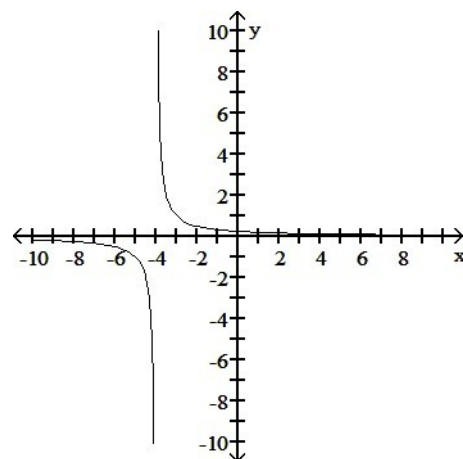
Answer: A

Diff: 0 Type: BI

Graph the function.

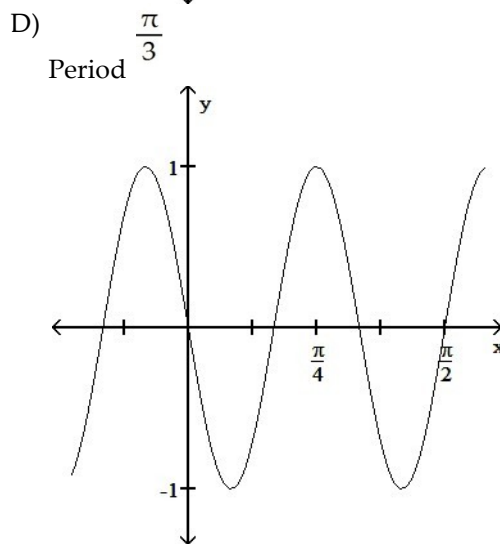
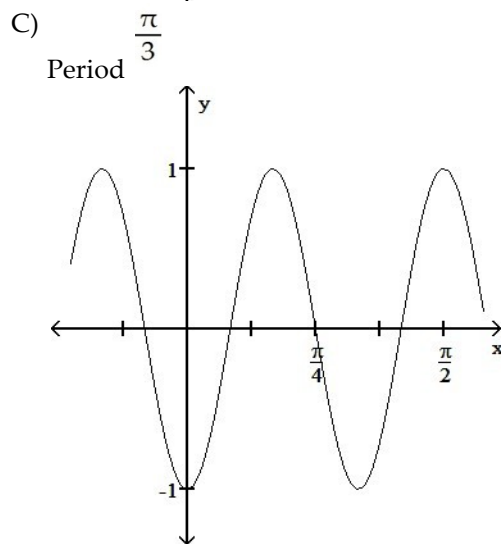
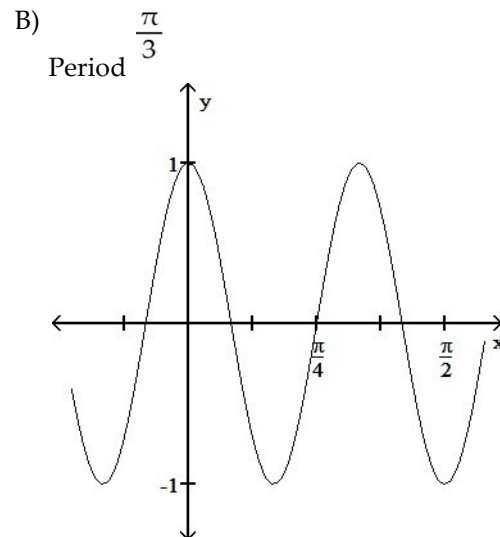
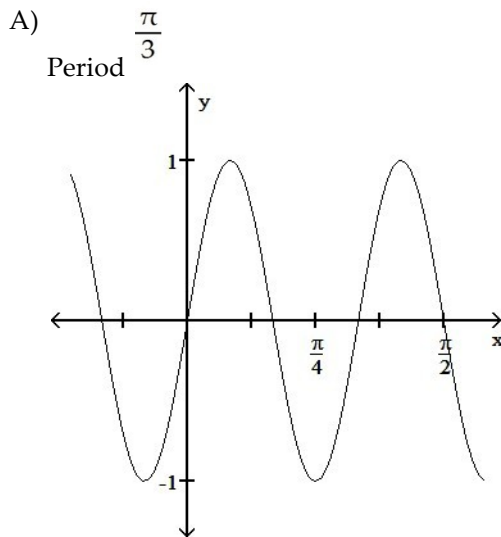
135)

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



Diff: 0 Type: BI

136) $\sin 6x$



Answer: A

Diff: 0 Type: BI

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

137) $y = \frac{1}{x^2 - 8}$

137) ____

A) $f(x) = \frac{1}{x^2}, g(x) = x^2 - 8$

B) $f(x) = \frac{1}{x}, g(x) = x^2 - 8$

C) $f(x) = \frac{1}{8}, g(x) = x^2 - 8$

D) $f(x) = \frac{1}{x^2}, g(x) = x - 8$

Answer: B

Diff: 0 Type: BI

Solve the problem.

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

138) _____

A) $f(x) = x^2$

B) $f(x) = \frac{1}{x}$

C) $f(x) = x$

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

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.

139) $y = 1 + \frac{1}{x^2}$

139) _____

compressed horizontally by a factor of 2

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

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

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

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

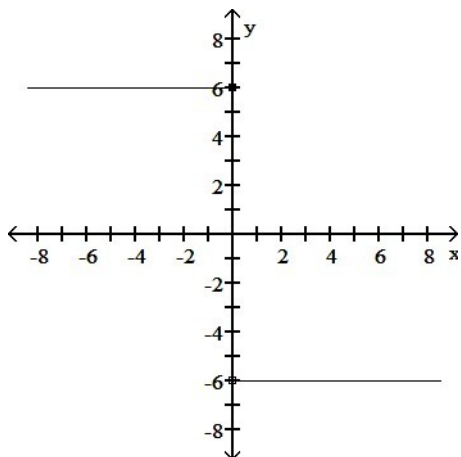
Answer: B

Diff: 0 Type: BI

Find a formula for the function graphed.

140)

140) _____



A) $f(x) = \begin{cases} 6x, & x \leq 0 \\ -6x, & x > 0 \end{cases}$

B) $f(x) = \begin{cases} -6, & x \leq 0 \\ 6, & x > 0 \end{cases}$

C) $f(x) = \begin{cases} 6, & x \leq 0 \\ -6, & x > 0 \end{cases}$

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

Answer: C

Diff: 0 Type: BI

Solve the problem.

141) If $f(x) = -6x + 2$ and $g(x) = 2x + 7$, find $g(f(x))$.

141) _____

A) $-12x + 44$

B) $-12x + 3$

C) $12x + 11$

D) $-12x + 11$

Answer: D

Diff: 0 Type: BI

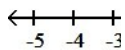
Graph the function. Determine the symmetry, if any, of the function.

142)

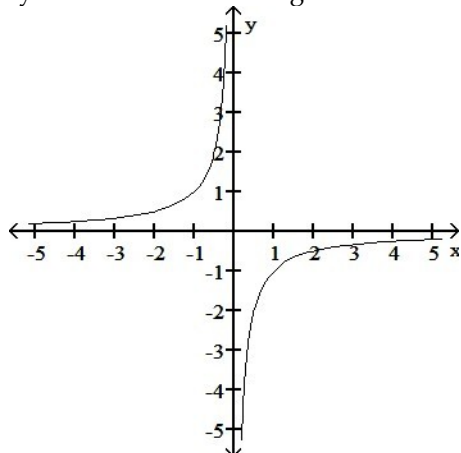
y =

$$\frac{1}{x}$$

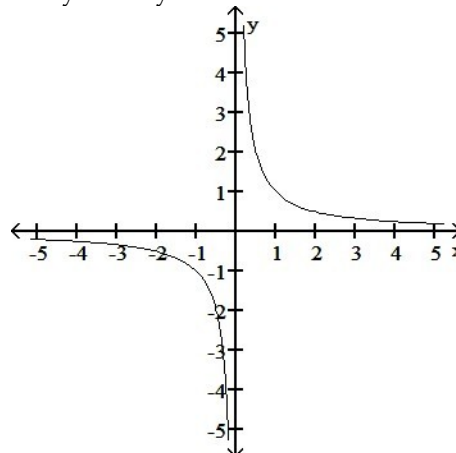
142)



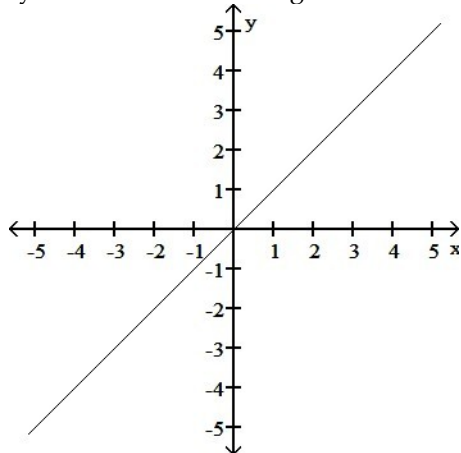
A) Symmetric about the origin



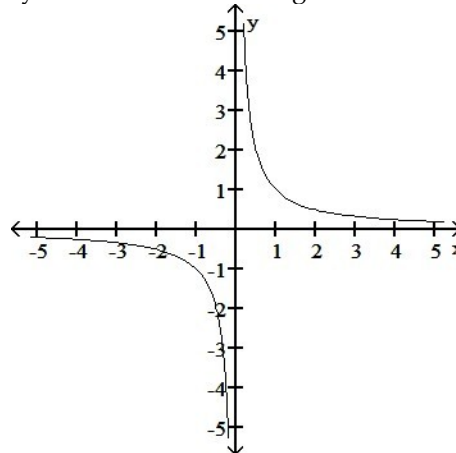
B) No symmetry



C) Symmetric about the origin



D) Symmetric about the origin



Answer: D

Diff: 0 Type: BI

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

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

A) $\sqrt{6} + \sqrt{2}$

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

C) $\sqrt{2} - \sqrt{6}$

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

Answer: B

Diff: 0 Type: BI

143) _____

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

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

144) _____

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

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

145) $\cos(6\pi + x)$

145) _____

A) $\cos x$

B) $-\cos x$

C) $\cos x - \sin x$

D) $-\sin x$

Answer: A

Diff: 0 Type: BI

Find the domain and range of the function.

146) $f(x) = \frac{7}{1 + \sqrt{x}}$

146) _____

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

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

C) D: $(-\infty, \infty)$, R: $(0, 7]$

D) D: $[0, \infty)$, R: $(0, 7]$

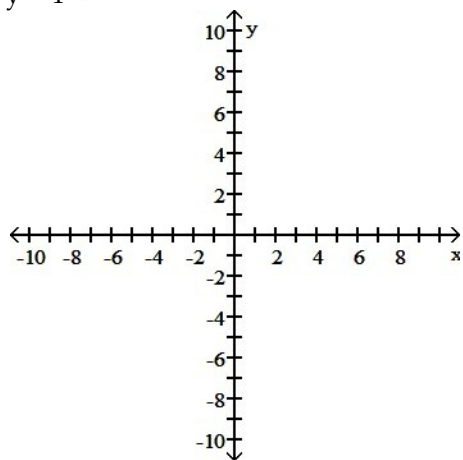
Answer: D

Diff: 0 Type: BI

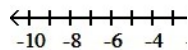
Graph the function. Determine the symmetry, if any, of the function.

147) $y = 4\sqrt{x}$

147) _____



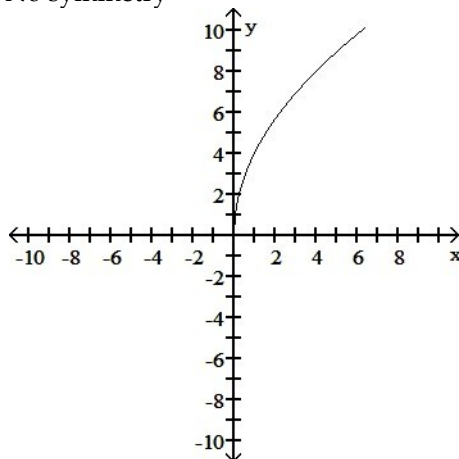
A) No symmetry



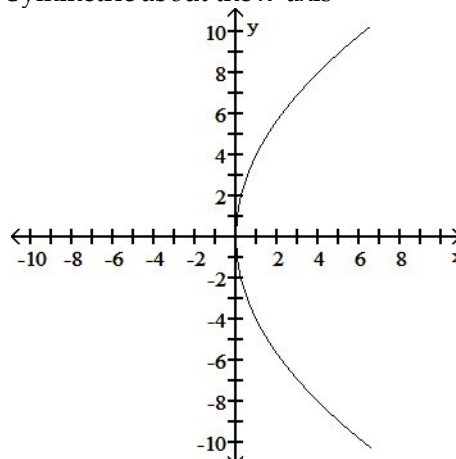
B) Symmetric about the x-axis



C) No symmetry



D) Symmetric about the x-axis



Answer: C

Diff: 0 Type: BI

Find the domain and range of the function.

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

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

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

Answer: D

Diff: 0 Type: BI

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

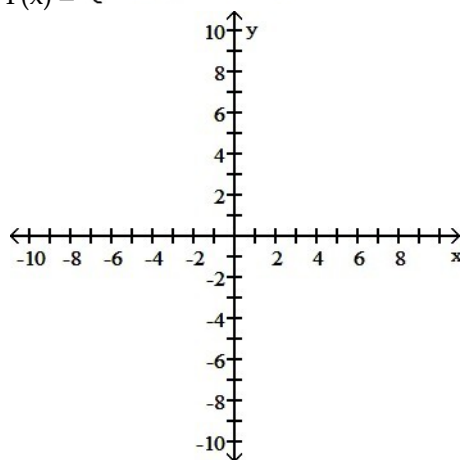
D) D: $(0, \infty)$, R: $(0, \infty)$

Graph the function.

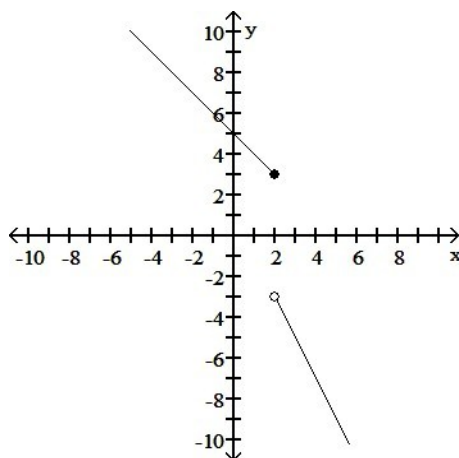
148) _____

149)
$$F(x) = \begin{cases} 5 - x, & x \leq 2 \\ 1 + 2x, & x > 2 \end{cases}$$

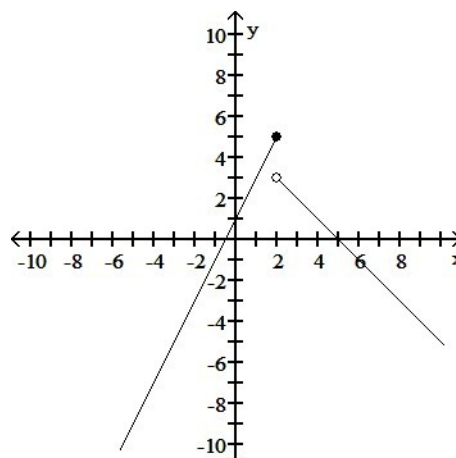
149) _____



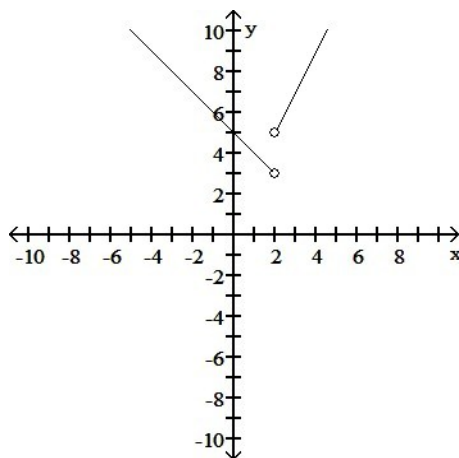
A)



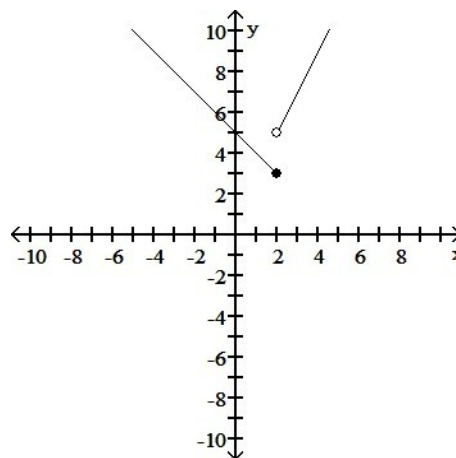
B)



C)



D)



Answer: D

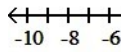
Diff: 0 Type: BI

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.

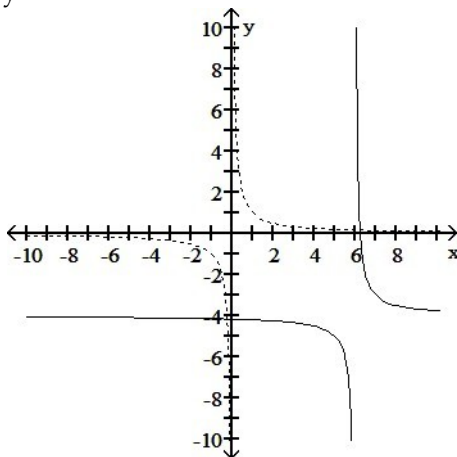
150)
$$y = \frac{1}{x}$$

Down 4, right 6

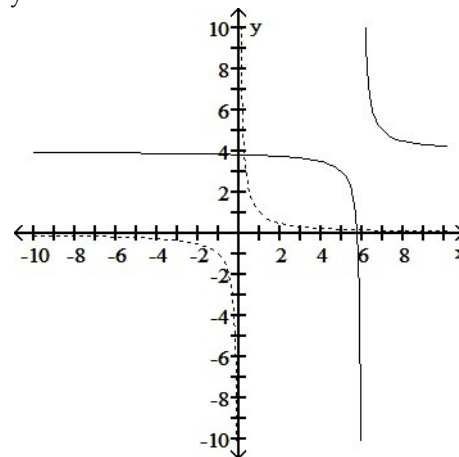
150)



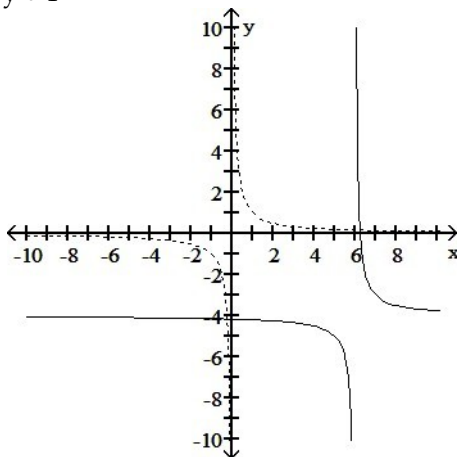
A) $y + 4 = \frac{1}{x - 6}$



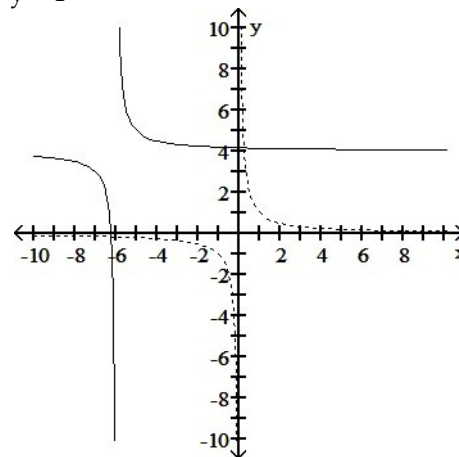
B) $y - 4 = \frac{1}{x - 6}$



C) $y + 4 = \frac{1}{x + 6}$



D) $y - 4 = \frac{1}{x + 6}$



Answer: A

Diff: 0 Type: BI

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

151) $\cos(2\pi - x)$

A) $-\cos x$

B) $\cos x + \sin x$

C) $\cos x$

D) $\cos x - \sin x$

Answer: C

Diff: 0 Type: BI

151) _____

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

152) $\sec\left(\frac{3\pi}{2}\right)$

152) _____

A) -1

B) 1

C) 0

D) Undefined

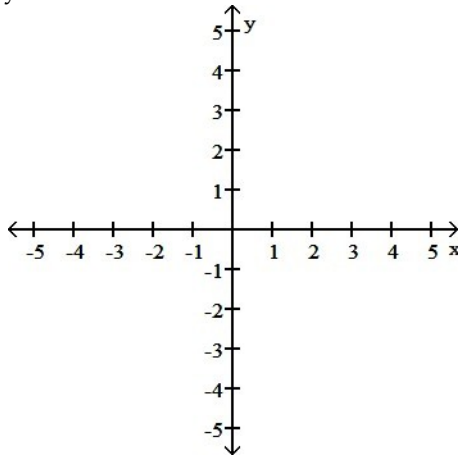
Answer: D

Diff: 0 Type: BI

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

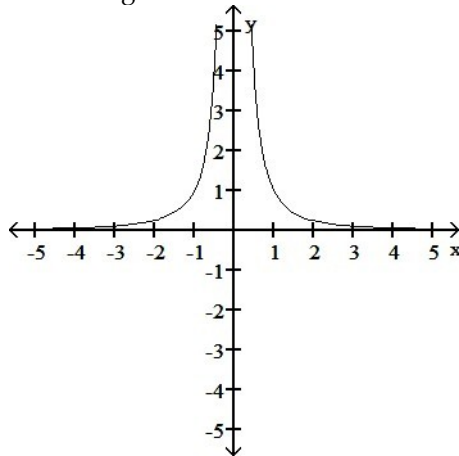
153) $y = -\frac{1}{x^2}$

153) _____



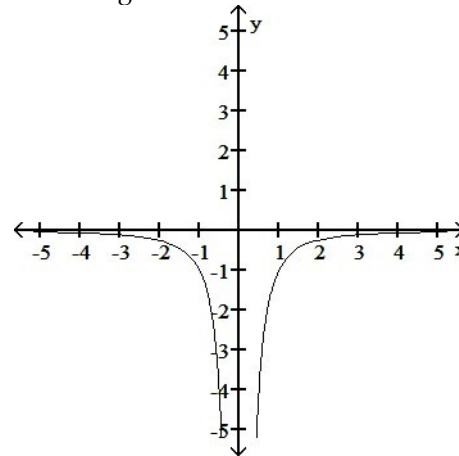
A) Increasing $-\infty < x < 0$

Decreasing $0 < x < \infty$

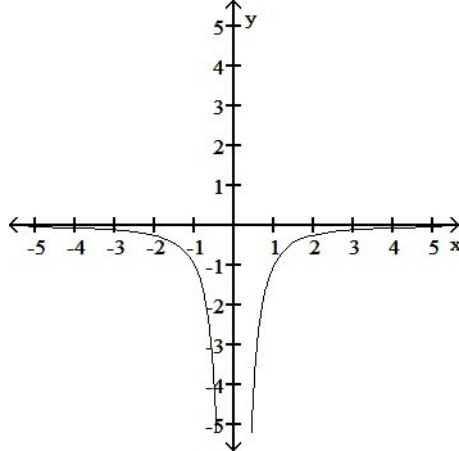


B) Decreasing $-\infty < x < 0$

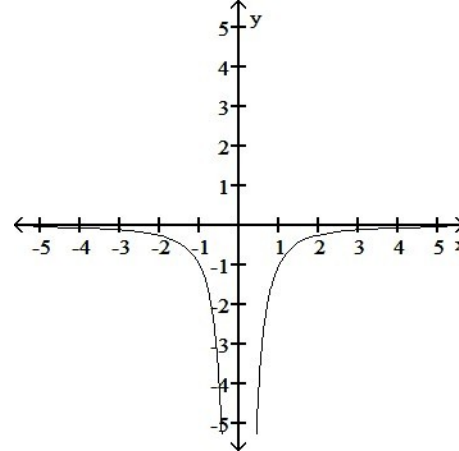
Increasing $0 < x < \infty$



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



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

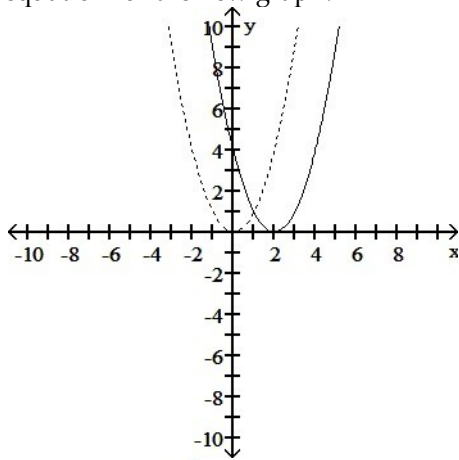


Answer: B
Diff: 0 Type: BI

Solve the problem.

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

154) _____



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

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

C) $y = x^2 - 2$

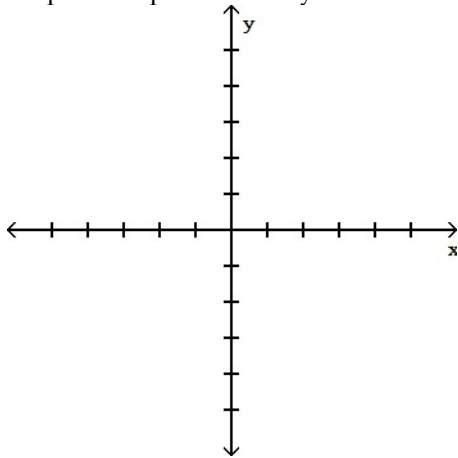
D) $y = x^2 + 2$

Answer: B
Diff: 0 Type: BI

Provide an appropriate response.

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

155) _____



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.

- 156) f^2

156) _____

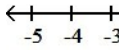
A) Even

B) Odd

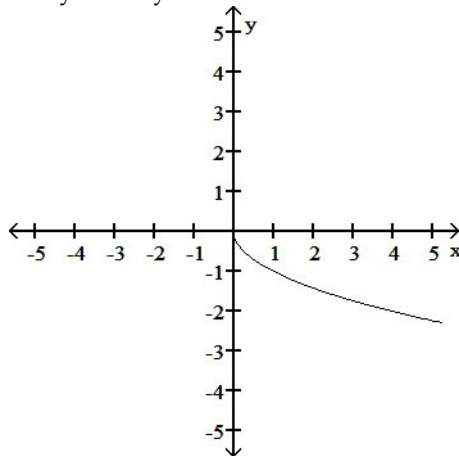
Answer: A
Diff: 0 Type: BI

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

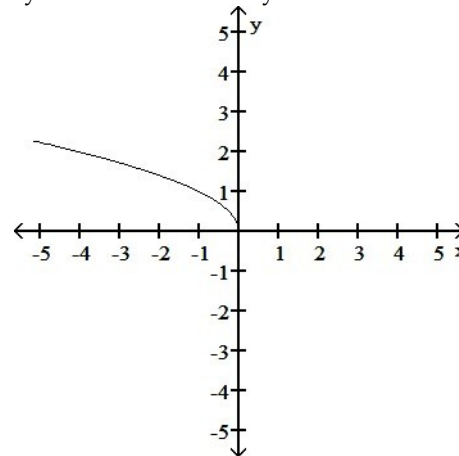
- 157) $y = \sqrt{-x}$



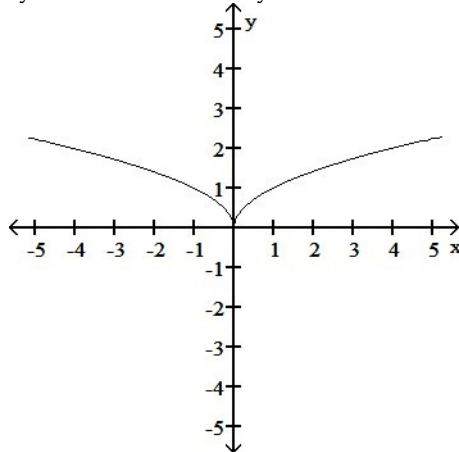
A) No symmetry



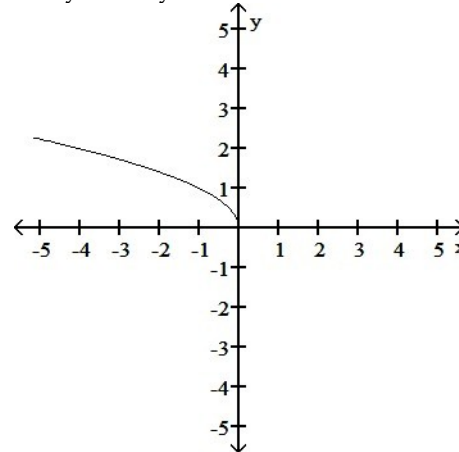
B) Symmetric about the y-axis



C) Symmetric about the y-axis



D) No symmetry



Answer: D

Diff: 0 Type: BI

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

158) $\cot(-2\pi)$

A) 0

B) 1

C) -1

D) Undefined

158) _____

Answer: D

Diff: 0 Type: BI

Find the formula for the function.

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

A) $A = x^2$

B) $A = 2x$

C) $A = x^4$

D) $A = 4x$

159) _____

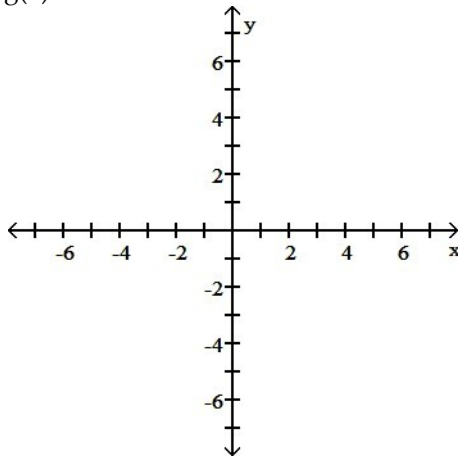
Answer: A

Diff: 0 Type: BI

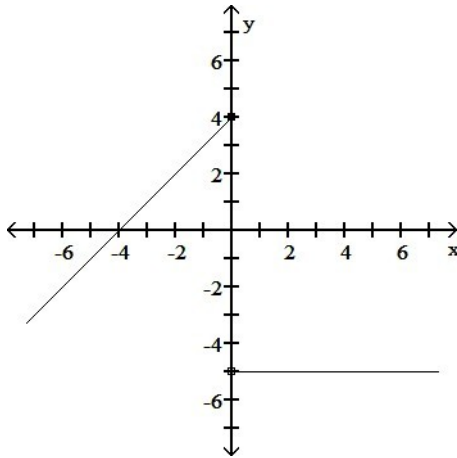
Graph the function.

$$160) \quad g(x) = \begin{cases} -5 & x \leq 0 \\ x + 4, & x > 0 \end{cases}$$

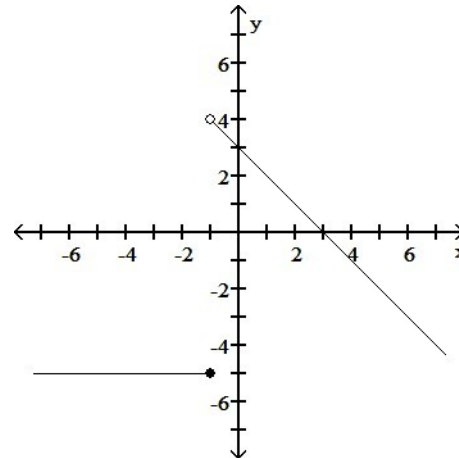
160) _____



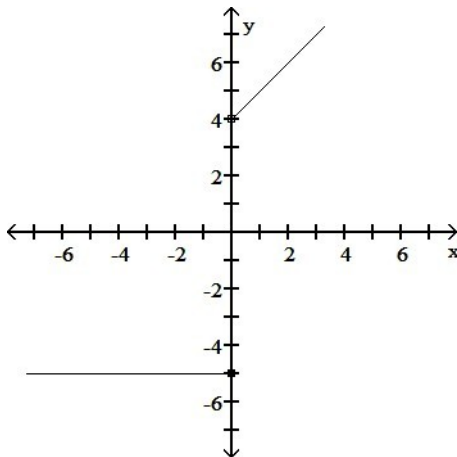
A)



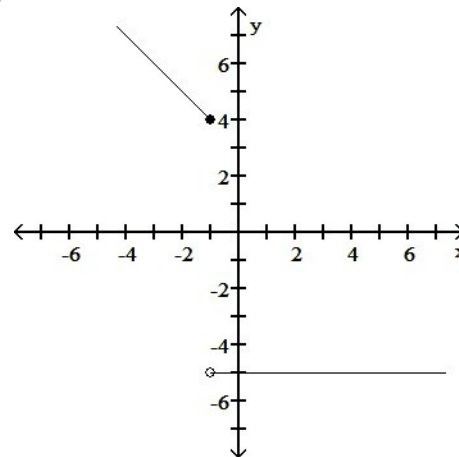
B)



C)



D)



Answer: C

Diff: 0 Type: BI

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

$$161) \quad \sin\left(\frac{19\pi}{12}\right)$$

161) _____

A)

-

$$\frac{\sqrt{6} + \sqrt{2}}{4}$$

B) $\underline{\sqrt{t}}$

C) $\underline{\sqrt{t}}$

D) $\underline{\sqrt{t}}$

Answer: A

Diff: 0 Type: BI

Solve the problem.

162) If $f(x) = 4x^2 + 6x + 4$ and $g(x) = 6x - 6$, find $g(f(x))$.

A) $4x^2 + 36x + 18$

B) $24x^2 + 36x + 30$

C) $4x^2 + 6x - 2$

D) $24x^2 + 36x + 18$

162) _____

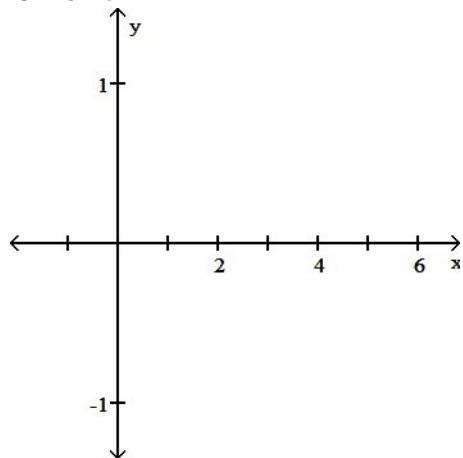
Answer: D

Diff: 0 Type: BI

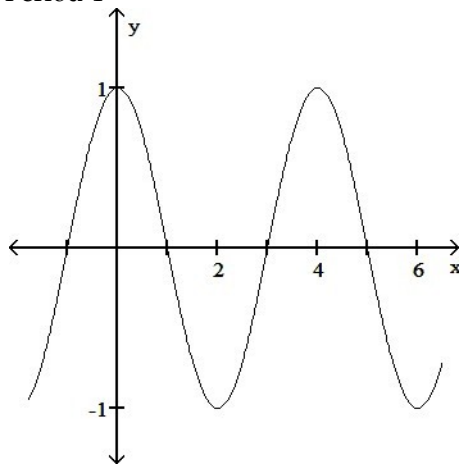
State the period of the function and graph.

163) $\sin\left(\frac{\pi x}{2}\right)$

163) _____

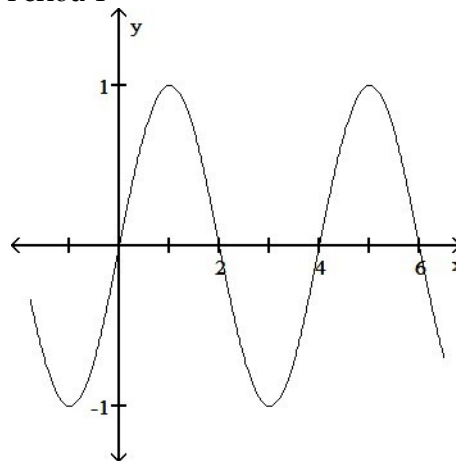


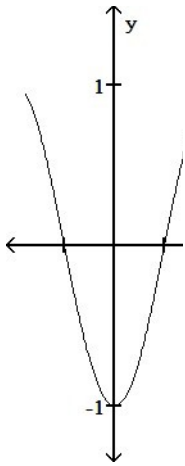
A) Period 4



C) Period 4

B) Period 4





D) Period 4

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.

- 164) $\cos x = \frac{5}{13}$, x in $\left[-\frac{\pi}{2}, 0\right]$ 164) _____
- A) $\sin x = -\frac{12}{13}$, $\tan x = -\frac{5}{12}$ B) $\sin x = \frac{12}{13}$, $\tan x = -\frac{5}{12}$
- C) $\sin x = -\frac{12}{13}$, $\tan x = -\frac{12}{5}$ D) $\sin x = \frac{12}{13}$, $\tan x = \frac{12}{5}$

Answer: C
Diff: 0 Type: BI

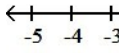
Solve the problem.

- 165) Let $f(x) = \frac{x}{x-8}$. Find a function $y = g(x)$ so that $(f \circ g)(x) = x$. 165) _____
- A) $g(x) = \frac{1}{x-8}$ B) $g(x) = \frac{x-8}{8}$ C) $g(x) = \frac{8x}{x-1}$ D) $g(x) = x(x-8)$

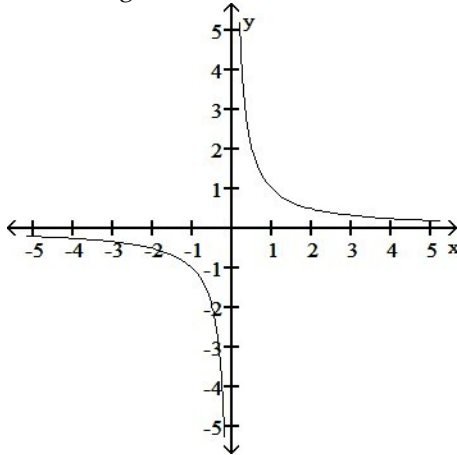
Answer: C
Diff: 0 Type: BI

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

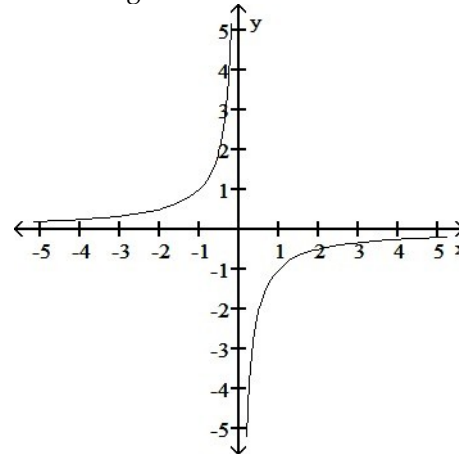
166) $y = \frac{1}{x}$



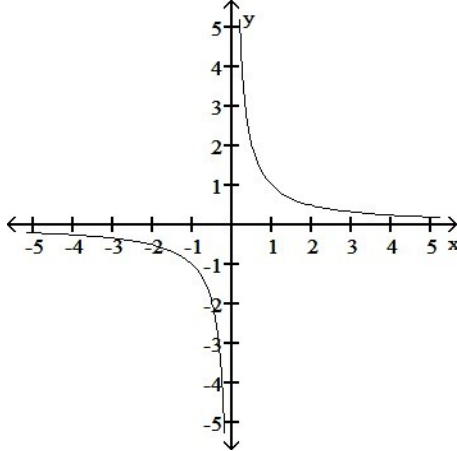
A) Decreasing $-\infty < x < 0$ and $0 < x < \infty$



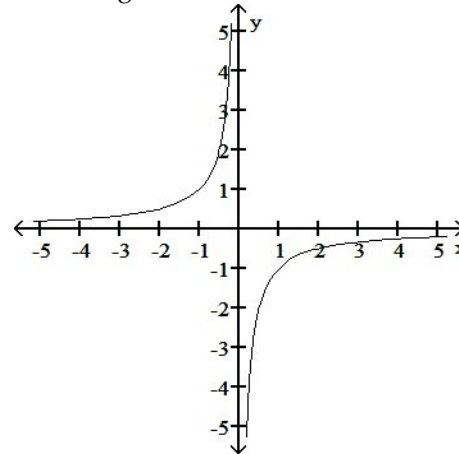
B) Increasing $-\infty < x < 0$
Decreasing $0 < x < \infty$



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



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

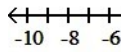


Answer: A

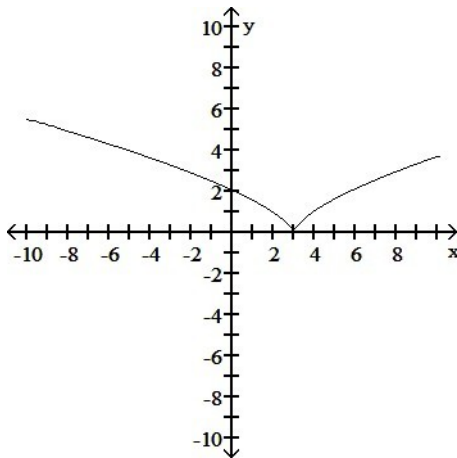
Diff: 0 Type: BI

Graph the function.

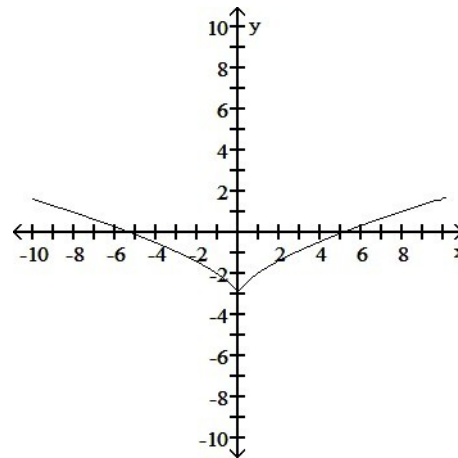
167) $y = (x - 3)^{2/3}$



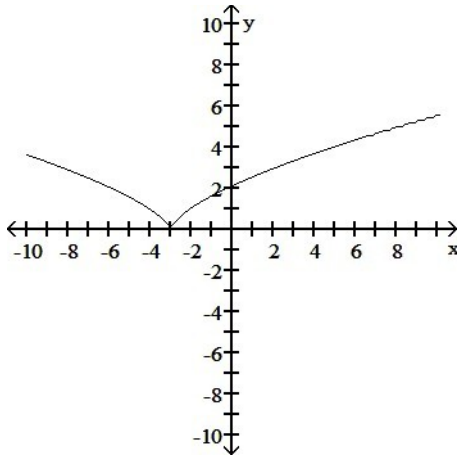
A)



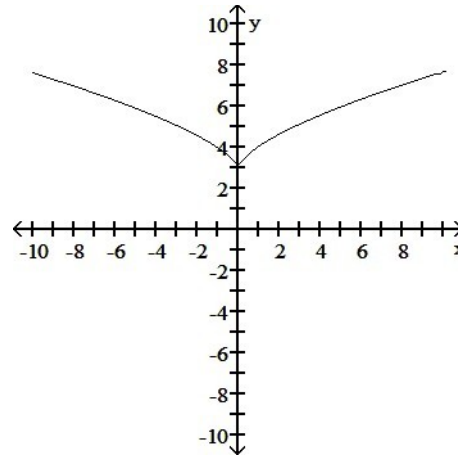
B)



C)



D)



Answer: A

Diff: 0 Type: BI

Find the domain and range of the function.

$$168) \quad F(t) = \frac{4}{7\sqrt{t}}$$

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

Answer: A

Diff: 0 Type: BI

B) D: $[0, \infty)$, R: $[0, \infty)$ D) D: $(-\infty, 0)$, R: $(-\infty, 0)$ Express the given quantity in terms of $\sin x$ or $\cos x$.

168) _____

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

169) _____

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

Answer: C

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.

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

170) _____

Answer:
$$\begin{aligned}\cos\left(x + \frac{\pi}{2}\right) &= \cos x \cos \frac{\pi}{2} - \sin x \sin \frac{\pi}{2} \\ &= \cos x (0) - \sin x (1) \\ &= 0 - \sin x \\ &= -\sin x\end{aligned}$$

Diff: 0 Type: SA

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

Find the function value.

171) $\sin^2 \frac{\pi}{6}$

171) _____

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

Answer: B

Diff: 0 Type: BI

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

172) $f(x) = \frac{-1}{x-1}$

172) _____

- A) Even B) Odd C) Neither

Answer: C

Diff: 0 Type: BI

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

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

173) _____

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

Answer: B

Diff: 0 Type: BI

Provide an appropriate response.

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

174) _____

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

Answer: A

Diff: 0 Type: BI

Solve the problem.

175) If $f(x) =$

$\frac{1}{x}$ and
 $g(x) =$
 $4x^4$, find
 $g(f(x))$.

A) $\frac{4}{x^4}$

B) $\frac{1}{4x^4}$

C) $\frac{4}{x}$

D) $\frac{1}{x^4}$

Answer: A

Diff: 0 Type: BI

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

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

A) $\frac{\sqrt{6} + \sqrt{2}}{4}$

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

C) $\frac{\sqrt{6} + \sqrt{2}}{4}$

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

Answer: C

Diff: 0 Type: BI

Find the domain and range for the indicated function.

177) $f(x) = \sqrt{x+5}$, $g(x) = \sqrt{x-5}$, $g - f$

A) D: $x \geq -5$

B) D: $x \geq 5$

C) D: $x \geq 5$

D) D: $x \geq 5$

R: $y \geq -\sqrt{10}$

R: $y \geq -\sqrt{10}$

R: $y \geq \sqrt{10}$

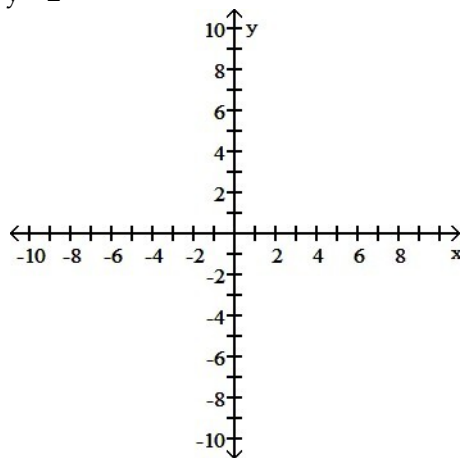
R: $y \geq 0$

Answer: B

Diff: 0 Type: BI

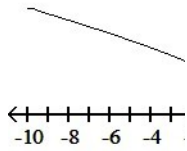
Graph the function.

178) $y - 2 = x^{2/3}$

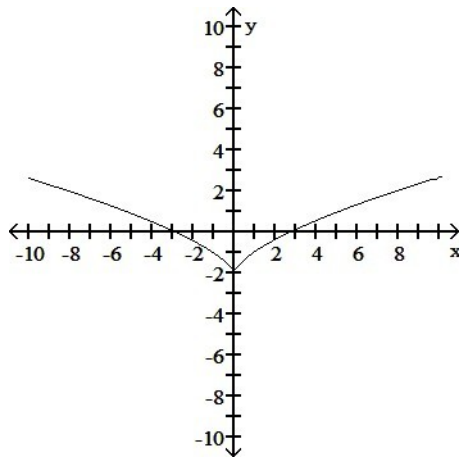


A)

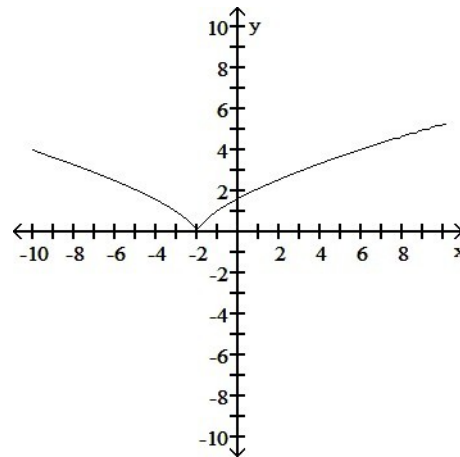
B)



C)



D)



Answer: B

Diff: 0 Type: BI

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

179) $f(x) = \frac{-7}{x^2 - 5}$

A) Even

B) Odd

C) Neither

Answer: A

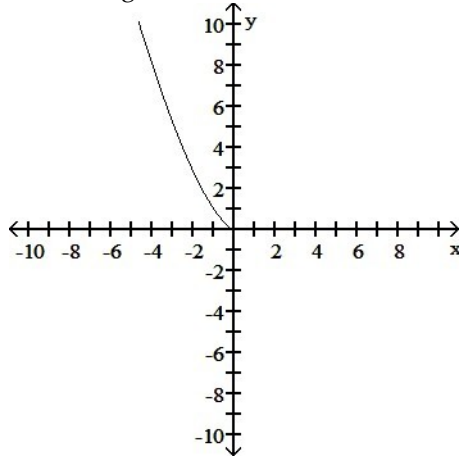
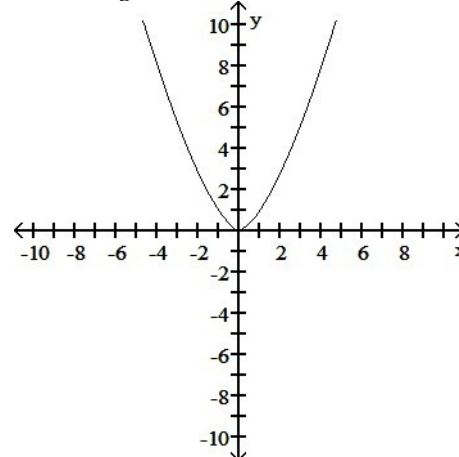
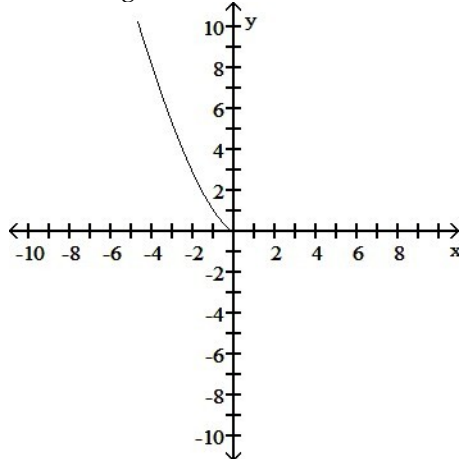
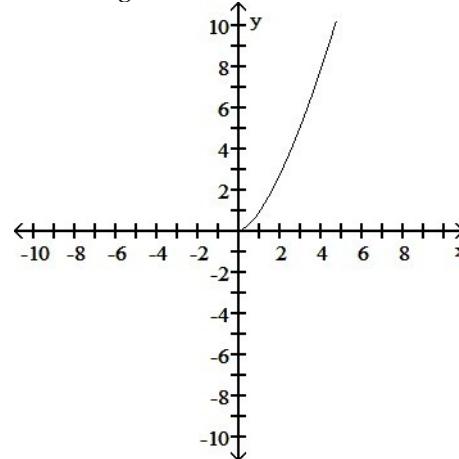
Diff: 0 Type: BI

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

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



180)

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

Answer: A

Diff: 0 Type: BI

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

181) $g(x) = |3x^7|$

A) Even

B) Odd

C) Neither

181) _____

Answer: A

Diff: 0 Type: BI

Solve the problem.

182) $g(x) = \frac{x}{4}$

If $f(x) = \sqrt{x}$, $g(x) = \frac{x}{4}$, and $h(x) = 4x + 8$, find $h(g(f(x)))$.

A) $\sqrt{x+2}$

B) $\sqrt{x} + 8$

C) $\sqrt{x} + 2$

D) $4\sqrt{x} + 8$

182) _____

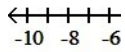
Answer: B

Diff: 0 Type: BI

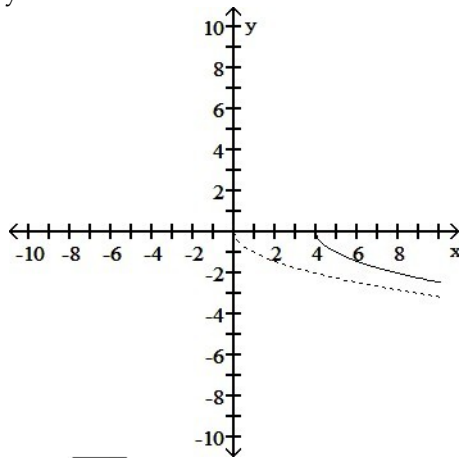
The problem tells how many units and in what direction the graph of the given equation is to be shifted. Give an equation for the shifted graph. Then sketch the original graph with a dashed line and the shifted graph with a solid line.

183) $y = -\sqrt{x}$ Left 4

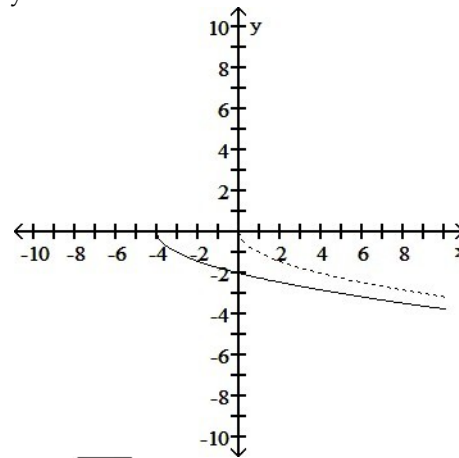
183)



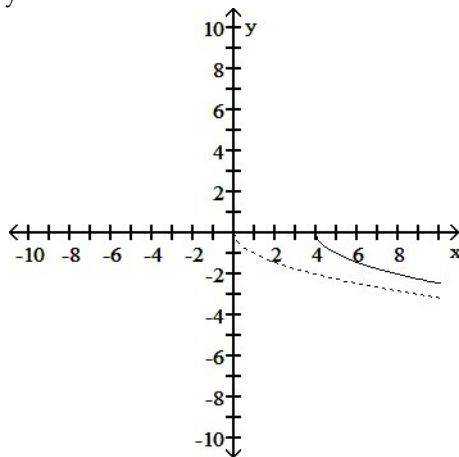
A) $y = \sqrt{x} - 4$



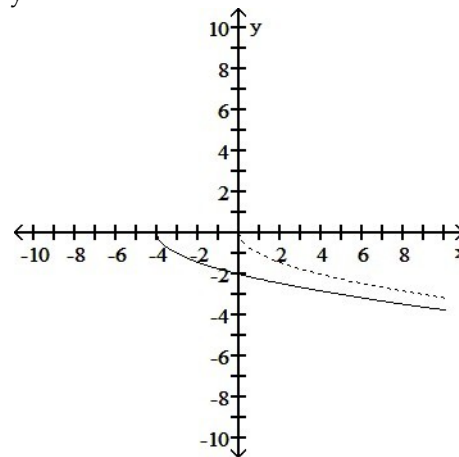
B) $y = \sqrt{x} + 4$



C) $y = \sqrt{x - 4}$



D) $y = \sqrt{x + 4}$



Answer: D

Diff: 0 Type: BI

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

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

A) $\cos x$

B) $\sin x - \cos x$

C) $-\cos x - \sin x$

D) $-\cos x$

Answer: D

Diff: 0 Type: BI

Find the formula for the function.

184) _____

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

A) $d = x\sqrt{2}$

B) $d = 2x$

C) $d = x$

D) $d = x\sqrt{3}$

185) _____

Answer: A

Diff: 0 Type: BI

Find the domain and range of the function.

186) $g(z) = 4 - \sqrt{z}$

A) D: $(-\infty, \infty)$, R: $(-\infty, 4]$

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

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

D) D: $(-\infty, 4]$, R: $(-\infty, \infty)$

186) _____

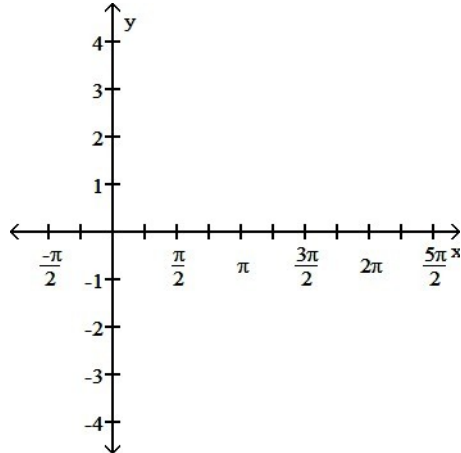
Answer: B

Diff: 0 Type: BI

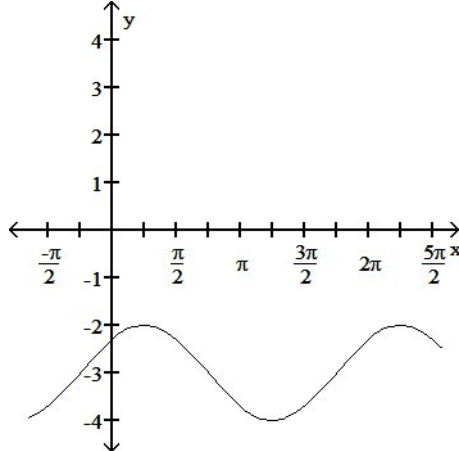
State the period of the function and graph.

187) $\cos\left(x - \frac{\pi}{4}\right) - 3$

187) _____

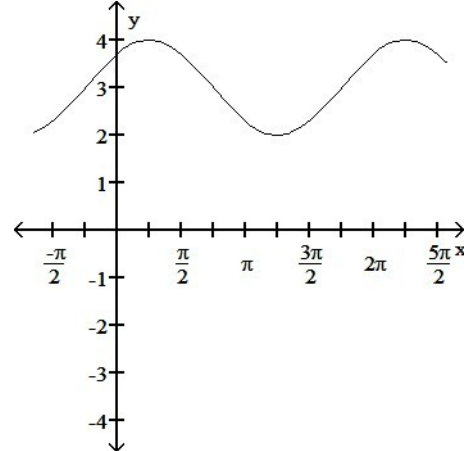


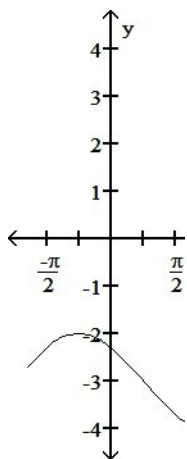
A) Period 2π



C) Period 2π

B) Period 2π





D) Period 2π

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

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

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

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

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

Answer: A

Diff: 0 Type: BI

Solve the problem.

189)

On a circle of radius 25 meters, how long is an arc that subtends a central angle of $\frac{2\pi}{5}$ radians?

A) 10 m

B) 10π m

C) 50 m

D) 5π m

Answer: B

Diff: 0 Type: BI

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

190) $g(x) = \frac{-7x}{x^2 + 9}$

A) Even

B) Odd

C) Neither

Answer: B

Diff: 0 Type: BI

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

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

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

B) $\frac{2 + \sqrt{3}}{4}$

C) $\frac{2 - \sqrt{3}}{4}$

D) $2 + \sqrt{3}$

Answer: A

Diff: 0 Type: BI

Find the domain and range of the function.

192) $g(z) = \frac{-6}{\sqrt{z+1}}$

192) _____

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

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

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

193) _____

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: B

Diff: 0 Type: BI

Find the formula for the function.

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

194) _____

A) $\frac{3x}{2}$

B) $p = 6x$

C) $p = x^3$

D) $p = 4x$

$p =$

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.

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

195) _____

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

Answer: C

Diff: 0 Type: BI

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

196) $\sin(3\pi + x)$

196) _____

A) $\cos x + \sin x$

B) $\cos x - \sin x$

C) $-\sin x$

D) $\sin x$

Answer: C

Diff: 0 Type: BI

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

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

197) _____

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

B) $\frac{\sqrt{6} + \sqrt{2}}{4}$

C) $\frac{\sqrt{6} + \sqrt{2}}{4}$

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

Answer: C

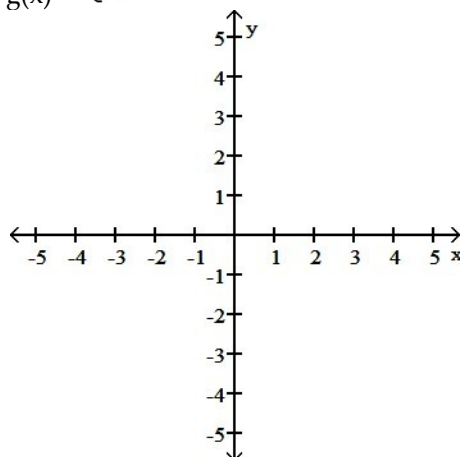
Diff: 0 Type: BI

Graph the function.

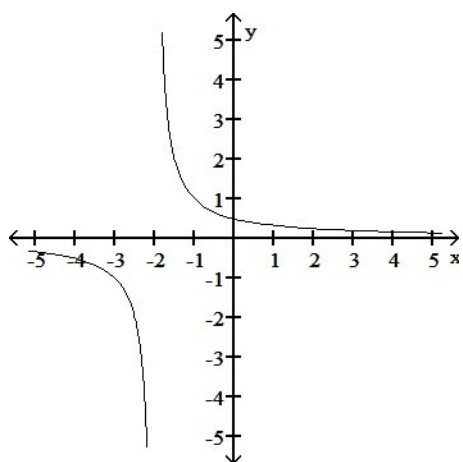
198)

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

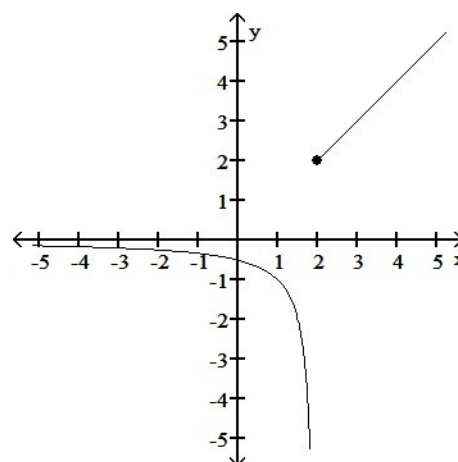
198) _____



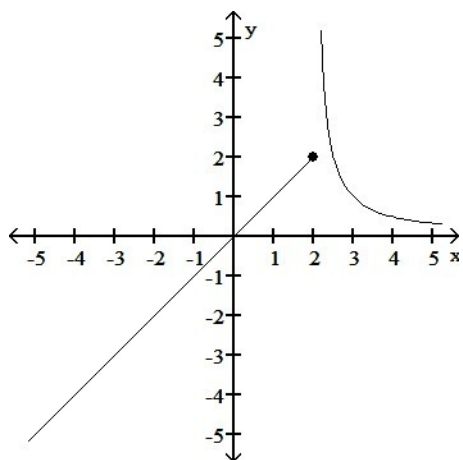
A)



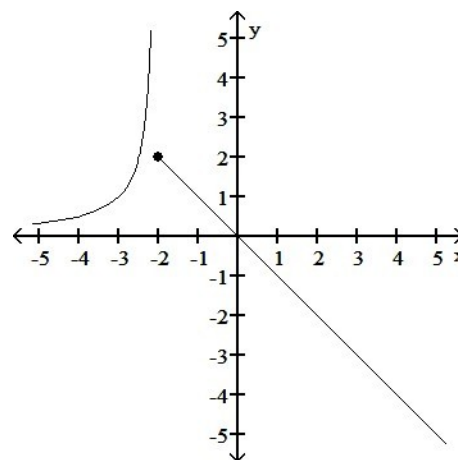
B)



C)



D)



Answer: B

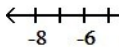
Diff: 0 Type: BI

Find a formula for the function graphed.

199)

199)

_



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

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

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

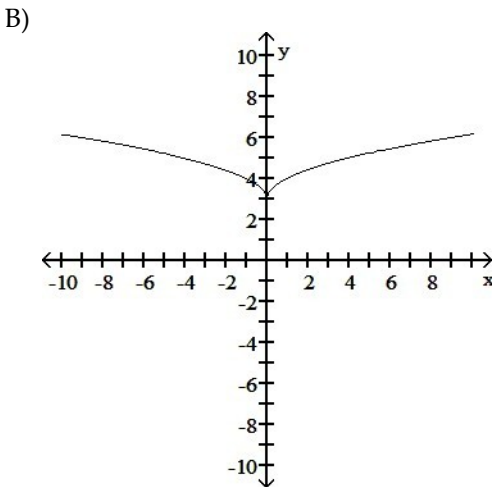
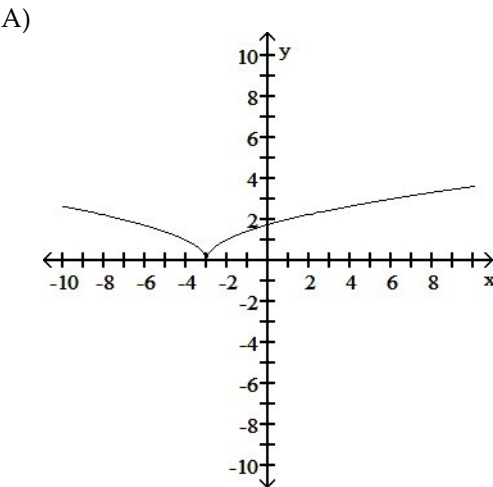
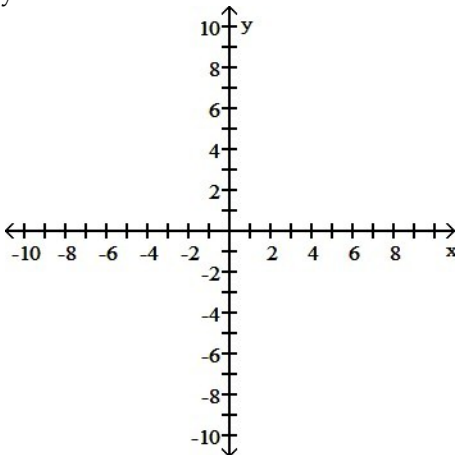
D)
$$f(x) = \begin{cases} x + 6, & 0 \leq x \leq 3 \\ -x, & 3 < x \leq 6 \end{cases}$$

Answer: C
Diff: 0 Type: BI

Graph the function.

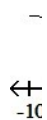
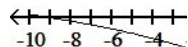
200) $y = \sqrt{|x|} - 3$

200) ____



C)

D)

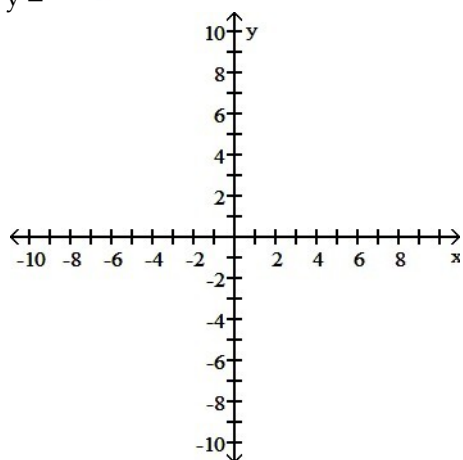


Answer: C

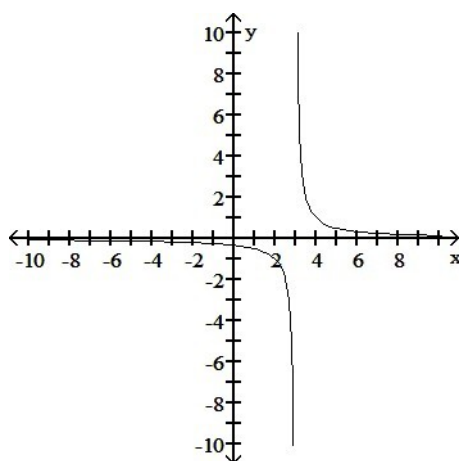
Diff: 0 Type: BI

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

201) _____

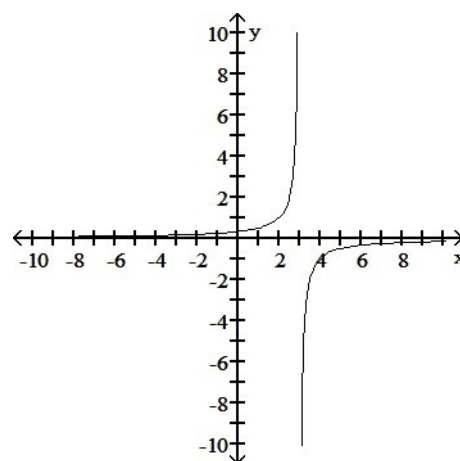


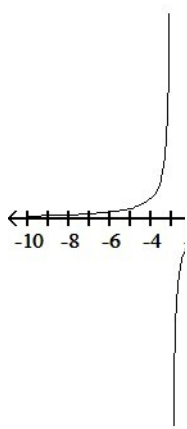
A)



C)

B)





D)

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-10

Answer: A

Diff: 0 Type: BI

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

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

202) _____

A) $\cos x$

B) $-\cos(-x)$

C) $-\cos x$

D) $-\cos x - \sin x$

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.

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

203) _____

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

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

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

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

Answer: D

Diff: 0 Type: BI

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

204) $y = \frac{2}{\sqrt{6x+9}}$

204) _____

A) $f(x) = \frac{2}{x}$, $g(x) = 6x+9$

B) $f(x) = \frac{2}{\sqrt{x}}$, $g(x) = 6x+9$

C) $f(x) = 2$, $g(x) = \sqrt{6x+9}$

D) $f(x) = \sqrt{6x+9}$, $g(x) = 2$

Answer: B

Diff: 0 Type: BI

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

205) $f(x) = -3x^4 - 4x - 6$

205) _____

A) Even

B) Odd

C) Neither

Answer: C

Diff: 0 Type: BI

Solve the problem.

206) On a circle of radius 12 meters, how long is an arc that subtends a central angle of 25° ?

A) 300π m

B) $\frac{5\pi}{3}$ m

C) 300 m

D) $\frac{5}{3}$ m

206) _____

Answer: B

Diff: 0 Type: BI

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

207) $\tan\left(\frac{5\pi}{6}\right)$

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

B) $-\sqrt{3}$

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

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

207) _____

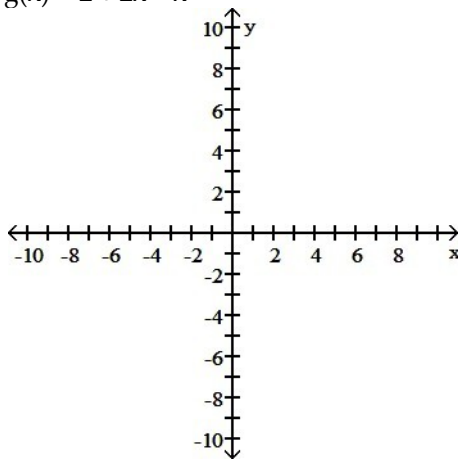
Answer: D

Diff: 0 Type: BI

Find the domain and graph the function.

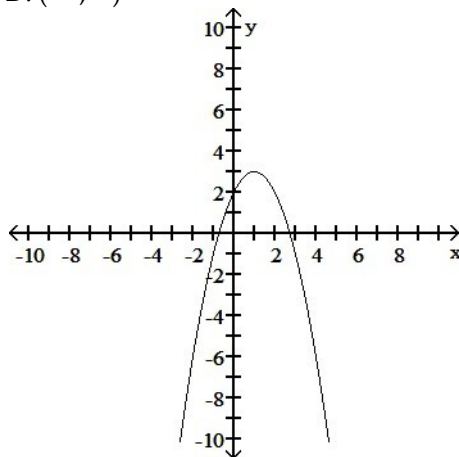
208) $g(x) = 2 + 2x - x^2$

208) _____

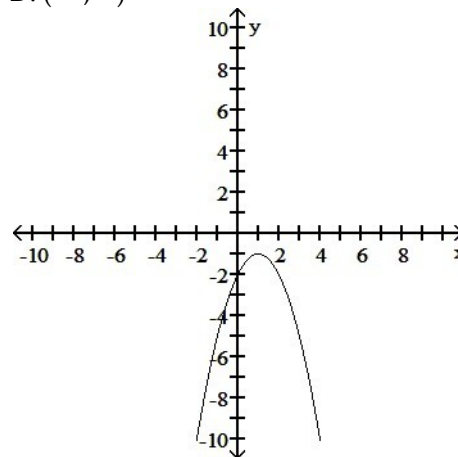


A) D: $(-\infty, \infty)$

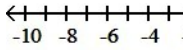
B) D: $(-\infty, \infty)$



C) D: $(-\infty, 3]$



D) D:
(-
 ∞ ,
 ∞)



\leftarrow
-10

Answer: A
Diff: 0 Type: BI

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

- 209) $\sin(6\pi - x)$ 209) _____
A) $\sin(-x)$ B) $\cos x - \sin x$ C) $\sin x$ D) $-\sin x$

Answer: D
Diff: 0 Type: BI

Solve the problem.

- 210) Let $g(x) = x + 7$. Find a function $y = f(x)$ so that $(f \circ g)(x) = 2x + 14$ 210) _____
A) $f(x) = 2x$ B) $f(x) = 2(x + 1)$ C) $f(x) = 2x - 7$ D) $f(x) = 2x + 7$

Answer: A
Diff: 0 Type: BI

- 211) If $f(x) = -5x - 2$ and $g(x) = -5x^2 - 2x - 3$, find $g(f(-9))$. 211) _____
A) -304 B) -302 C) -9334 D) 1948

Answer: C
Diff: 0 Type: BI

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

- 212) $\cos^2 \theta = \frac{3}{4}$ 212) _____

- A) $\theta = 0, \pi, 2\pi$ B) $\frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}, \frac{5\pi}{3}$
C) $\frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$ D) $\frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$
 $\theta = , , ,$ $\theta = , , ,$

Answer: C
Diff: 0 Type: BI

Provide an appropriate response.

- 213) Consider the function $y = \sqrt{1 - \frac{1}{x}}$. Can x be negative? 213) _____
A) Yes B) No

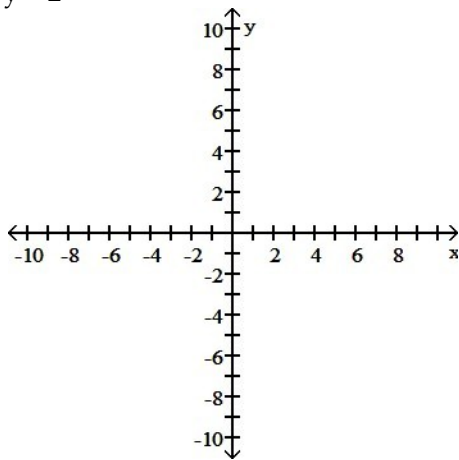
Answer: A

Diff: 0 Type: BI

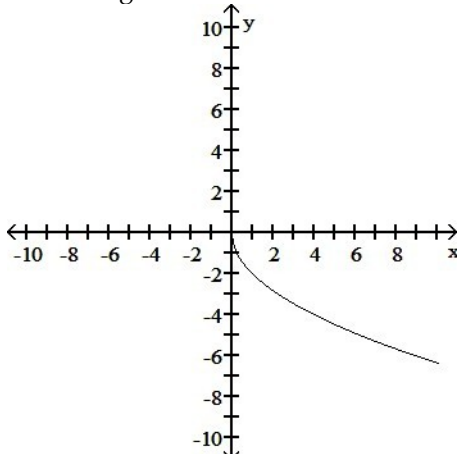
Graph the function. Specify the intervals over which the function is increasing and the intervals where it is decreasing.

214) $y = 2\sqrt{x}$

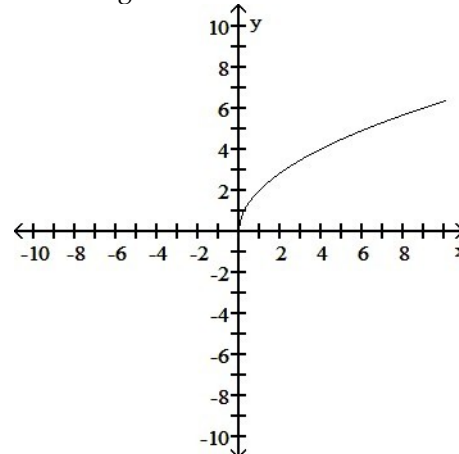
214) _____



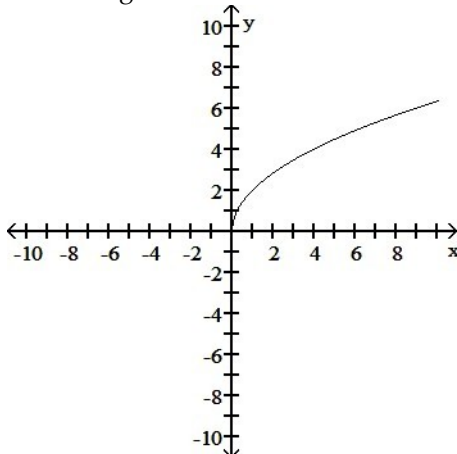
A) Decreasing $0 \leq x < \infty$



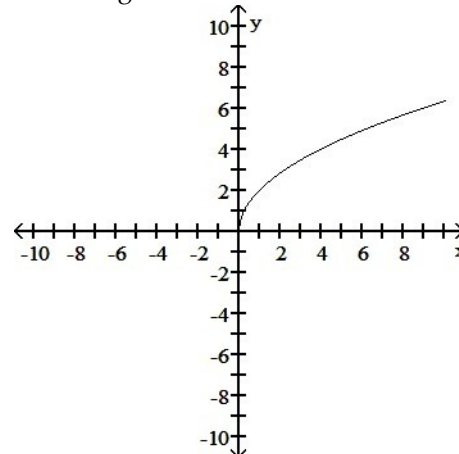
B) Increasing $0 \leq x < \infty$



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



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



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.

215)

COS

$$\cos\left(x - \frac{\pi}{2}\right) = \quad 215)$$

$\sin x$

Answer:

$$\begin{aligned}\cos\left(x - \frac{\pi}{2}\right) &= \cos x \cos\left(-\frac{\pi}{2}\right) - \sin x \sin\left(-\frac{\pi}{2}\right) \\ &= \cos x (0) - \sin x (-1) \\ &= 0 + \sin x \\ &= \sin x\end{aligned}$$

Diff: 0 Type: SA

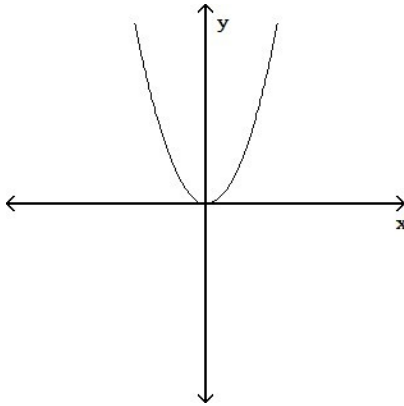
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Match the equation with its graph.

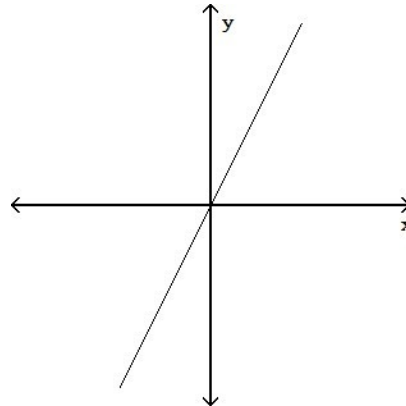
216) $y = x^2$

216) _____

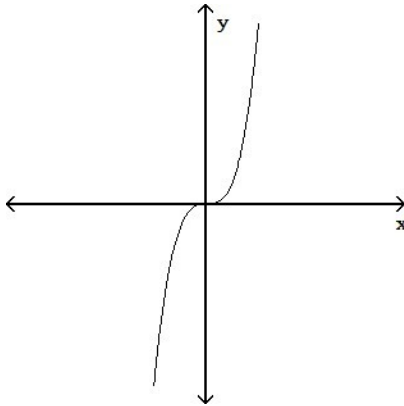
A)



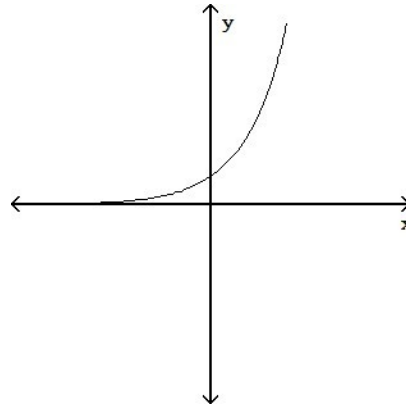
B)



C)



D)



Answer: A

Diff: 0 Type: MC

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

217)

217)



A) Not a function

B) 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.

218) $\sin x = \frac{12}{13}$, x in $\left[\frac{\pi}{2}, \pi\right]$

218) _____

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

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

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

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

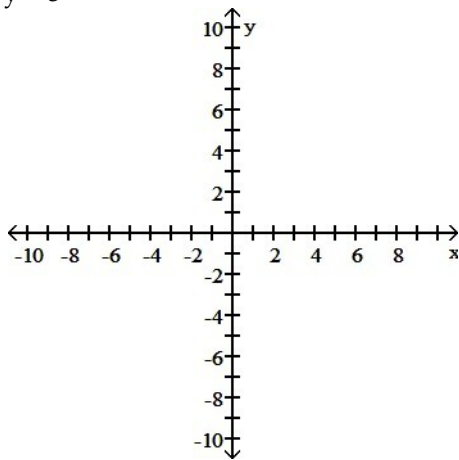
Answer: C

Diff: 0 Type: BI

Graph the function.

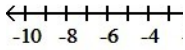
219) $y = 3 - \sqrt{x}$

219) _____

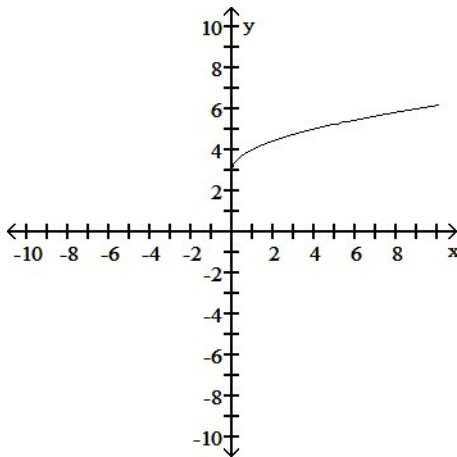


A)

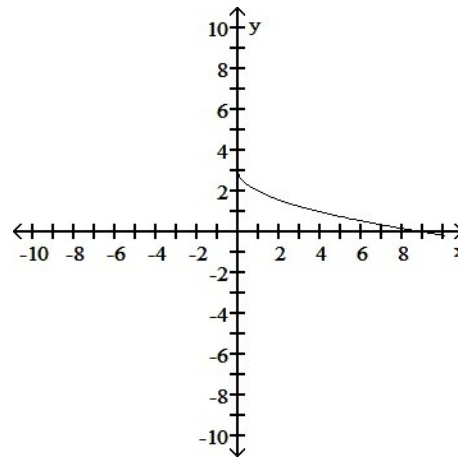
B)



C)



D)



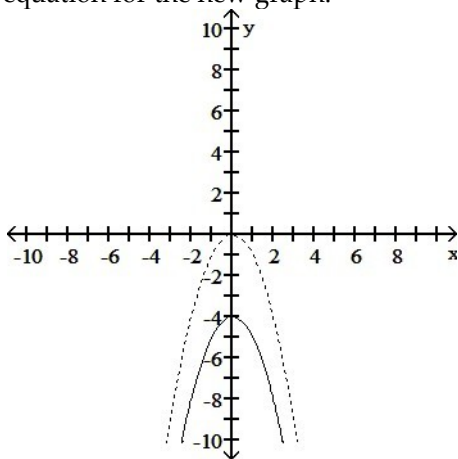
Answer: D

Diff: 0 Type: BI

Solve the problem.

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

220) _____



A) $y = -x^2 - 4$

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

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

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

Answer: A

Diff: 0 Type: BI

- 221) The kinetic energy K of a mass is proportional to the square of its velocity v . If $K = 17,340$ joules

when $v = 17$ m/sec,
what

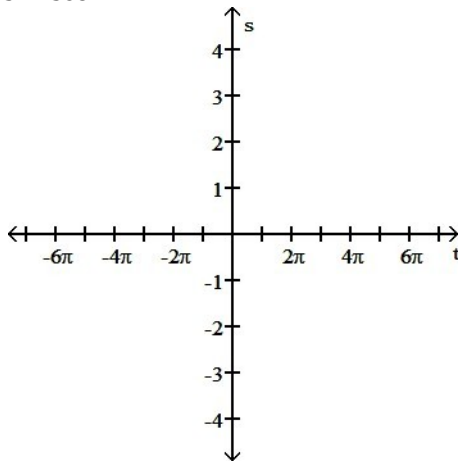
is K 221)
 when $v =$
 13
 m/sec?

- A) 8450 joules B) 10,985 joules C) 11,830 joules D) 10,140 joules
 Answer: D
 Diff: 0 Type: BI

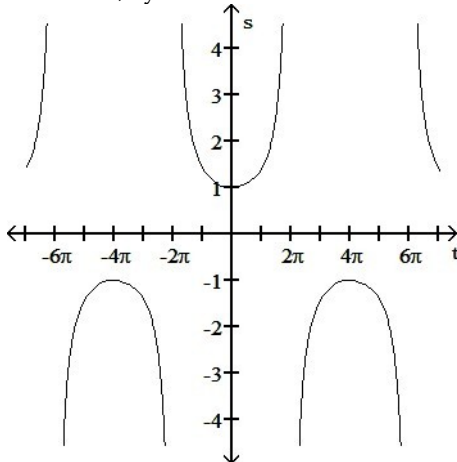
Graph the function in the ts -plane (t -axis horizontal, s -axis vertical). State the period and symmetry of the function.

222) $s = \sec\left(\frac{t}{4}\right)$

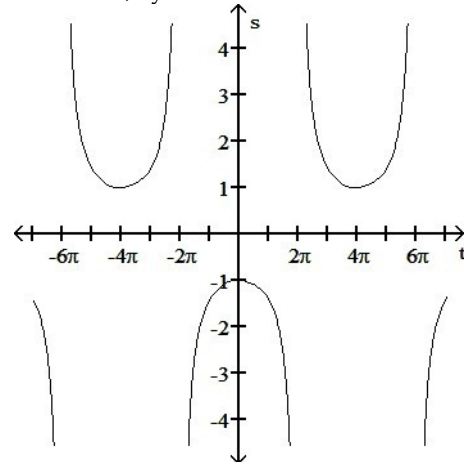
222) _____



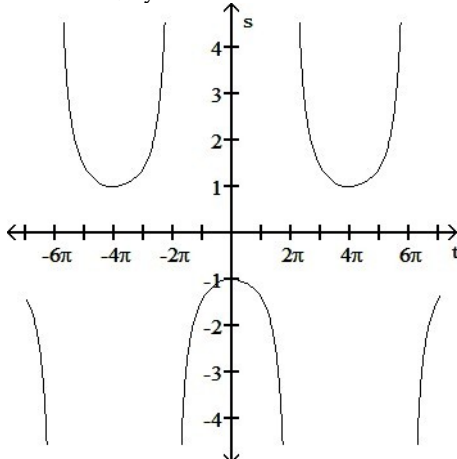
A) Period 8π , symmetric about the t -axis



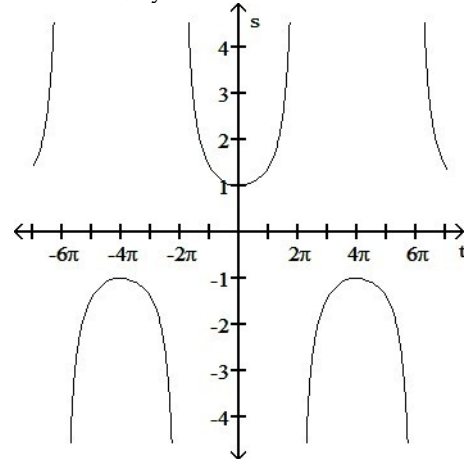
B) Period 8π , symmetric about the s -axis



C) Period 8π , symmetric about the t -axis



D) Period 8π , symmetric about the s -axis



Answer: D

Diff: 0 Type: BI

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

223) $h(t) = \sqrt{t^2 - 6}$

223) _____

A) Even

B) Odd

C) Neither

Answer: A

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.

224) f/g

224) _____

A) Even

B) Odd

Answer: B

Diff: 0 Type: BI

225) $g \circ g$

225) _____

A) Even

B) Odd

Answer: B

Diff: 0 Type: BI

- 1) A
- 2) A
- 3) C
- 4) A
- 5) D
- 6) C
- 7) B
- 8) D
- 9) C
- 10) B
- 11) D
- 12) D
- 13) A
- 14) C
- 15) B
- 16) B
- 17) A
- 18) D
- 19) D
- 20) A
- 21) B
- 22) C
- 23) A
- 24) B
- 25) C
- 26) D
- 27) A
- 28) A
- 29) A
- 30) A
- 31) B

$$\begin{aligned}
 32) \quad \sin \left(x + \frac{\pi}{2} \right) &= \sin x \cos \frac{\pi}{2} + \cos x \sin \frac{\pi}{2} \\
 &= \sin x (0) + \cos x (1) \\
 &= 0 + \cos x \\
 &= \cos x
 \end{aligned}$$

- 33) A
- 34) C
- 35) C
- 36) C
- 37) C
- 38) C
- 39) B
- 40) C
- 41) D
- 42) C
- 43) D
- 44) A
- 45) C
- 46) B
- 47) C

- 48) D
- 49) D
- 50) C
- 51) C
- 52) B
- 53) B
- 54) C
- 55) A
- 56) A
- 57) C
- 58) D
- 59) B
- 60) A
- 61) B
- 62) D
- 63) B
- 64) B
- 65) B
- 66) C
- 67) C
- 68) A
- 69) C
- 70) D
- 71) A
- 72) B
- 73) A
- 74) D
- 75) B
- 76) A
- 77) B
- 78) C
- 79) B
- 80) B
- 81) B
- 82) D
- 83) D
- 84) C
- 85) C
- 86) A
- 87) B
- 88) A
- 89) B
- 90) D
- 91) A
- 92) C
- 93) A
- 94) A
- 95) B
- 96) B
- 97) D
- 98) C
- 99) D

100) A

101) B

102) D

103) A

104) D

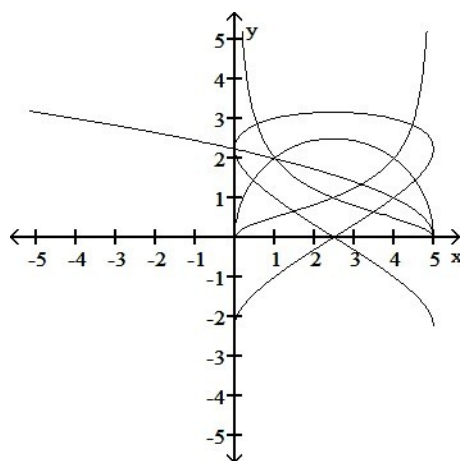
105) B

$$\begin{aligned}106) \quad \sin \left(x - \frac{\pi}{2} \right) &= \sin x \cos \left(-\frac{\pi}{2} \right) + \cos x \sin \left(-\frac{\pi}{2} \right) \\&= \sin x (0) + \cos x (-1) \\&= 0 - \cos x \\&= -\cos x\end{aligned}$$

107) B

108) C

109)



110) A

111) D

112) C

113) D

114) B

115) A

116) D

117) C

118) C

119) A

120) C

121) C

122) D

123)

- 124) C
- 125) A
- 126) B
- 127) D
- 128) A
- 129) B
- 130) B
- 131) D
- 132) A
- 133) B
- 134) A
- 135) B
- 136) A
- 137) B
- 138) A
- 139) B
- 140) C
- 141) D
- 142) D
- 143) B
- 144) A
- 145) A
- 146) D
- 147) C
- 148) D
- 149) D
- 150) A
- 151) C
- 152) D
- 153) B
- 154) B
- 155) B
- 156) A
- 157) D
- 158) D
- 159) A
- 160) C
- 161) A
- 162) D
- 163) B

164) C

165) C

166) A

167) A

168) A

169) C

$$\begin{aligned} 170) \quad \cos \left(x + \frac{\pi}{2} \right) &= \cos x \cos \frac{\pi}{2} - \sin x \sin \frac{\pi}{2} \\ &= \cos x (0) - \sin x (1) \\ &= 0 - \sin x \\ &= -\sin x \end{aligned}$$

171) B

172) C

173) B

174) A

175) A

176) C

177) B

178) B

179) A

180) A

181) A

182) B

183) D

184) D

185) A

186) B

187) A

188) A

189) B

190) B

191) A

192) D

193) B

194) D

195) C

196) C

197) C

198) B

199) C

200) C

201) A

202) C

203) D

204) B

205) C

206) B

207) D

208) A

209) D

210) A

211) C

212) C

213) A

214) B

215)
$$\begin{aligned}\cos\left(x - \frac{\pi}{2}\right) &= \cos x \cos\left(-\frac{\pi}{2}\right) - \sin x \sin\left(-\frac{\pi}{2}\right) \\ &= \cos x (0) - \sin x (-1) \\ &= 0 + \sin x \\ &= \sin x\end{aligned}$$

216) A

217) B

218) C

219) D

220) A

221) D

222) D

223) A

224) B

225)

Exam

Name _____

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

- 1) A certain radioactive isotope decays at a rate of 2% per 100 years. If t represents time in years and y represents the amount of the isotope left then the equation for the situation is 1) _____

$$y = y_0 e^{-0.0002t}$$

In how many years will there be 85% of the isotope left?

- A) 750 yr B) 813 yr C) 1500 yr D) 234 yr

Answer: B

Diff: 0 Type: BI

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

- 2) A triangle has sides $a = 5$ and $b = 3$ and angle $C = 50^\circ$. Find the sine of B. 2) _____

- A) 0.067 B) 0.599 C) 0.2 D) 0.998

Answer: B

Diff: 0 Type: BI

Find the domain and range of the inverse of the given function.

3) $f(x) = \frac{6}{x^2 + 1}, x \geq 0$

3) _____

- A) Domain and range: $[0, \infty)$
C) Domain: $(0, 6]$; range: $[0, \infty)$

- B) Domain: $[0, \infty)$; range: $(0, 6]$
D) Domain: $(-\infty, 0]$; range: $[-6, 0)$

Answer: C

Diff: 0 Type: BI

4) $f(x) = 4.9 - 0.25x$

4) _____

- A) Domain and range: all real numbers
C) Domain: all real numbers; range: $(-\infty, 4.9]$

- B) Domain: $[4.9, \infty)$; range: all real numbers
D) Domain: all real numbers; range: $[4.9, \infty)$

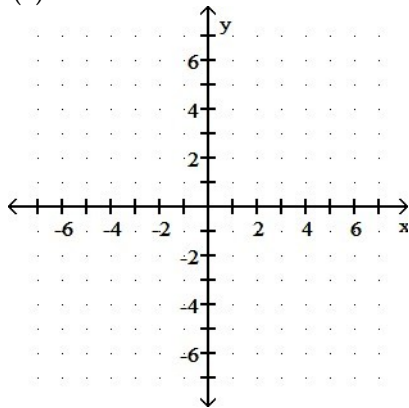
Answer: A

Diff: 0 Type: BI

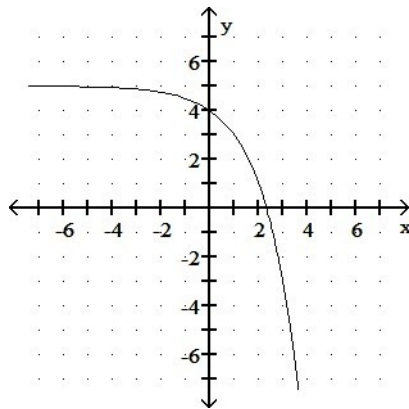
Graph the function.

5) $f(x) = -2^{-x} + 5$

5) _____

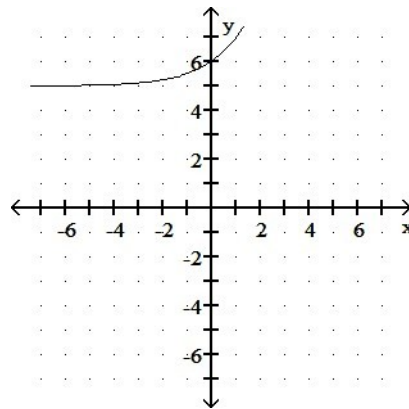


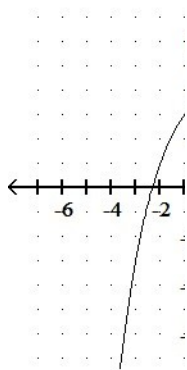
A)



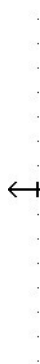
C)

B)





D)



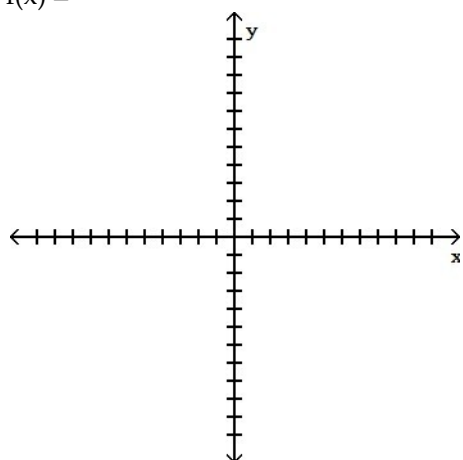
Answer: C

Diff: 0 Type: BI

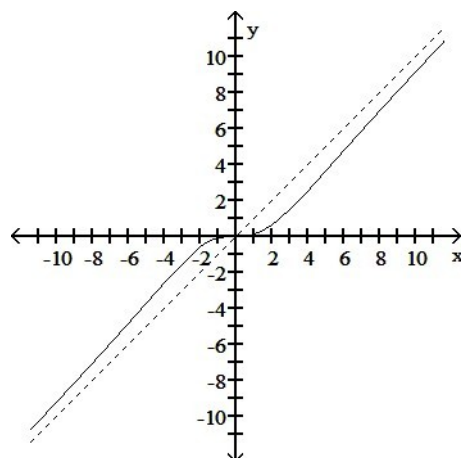
Determine an appropriate viewing window for the given function and use it to display its graph.

6) $f(x) = \frac{x^3}{x^2 + 9}$

6) _____

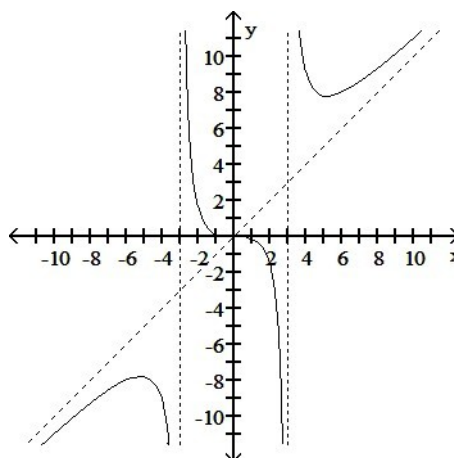


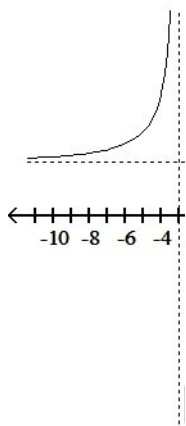
A)



C)

B)





D)

↔

Answer: A

Diff: 0 Type: BI

State the domain and range of the function.

7) $f(x) = 2^x - 5$

A) domain: $(-\infty, \infty)$; range: $(-5, \infty)$

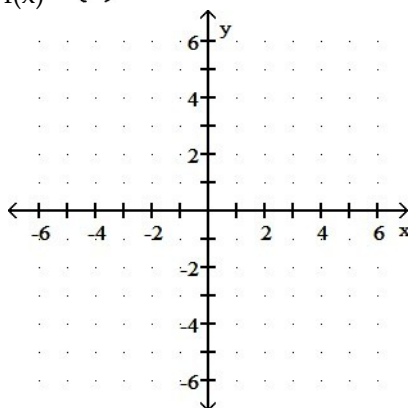
C) domain: $(-\infty, 0) \cup (0, \infty)$; range: $(-5, \infty)$

Answer: A

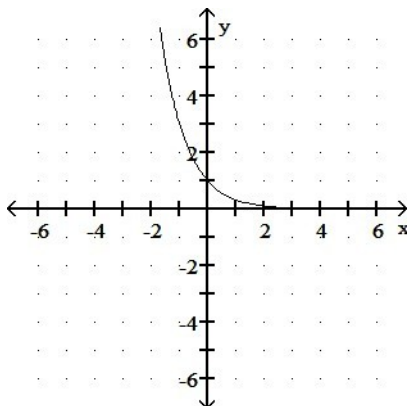
Diff: 0 Type: BI

Graph the function.

8) $f(x) = \left(\frac{1}{3}\right)^x$

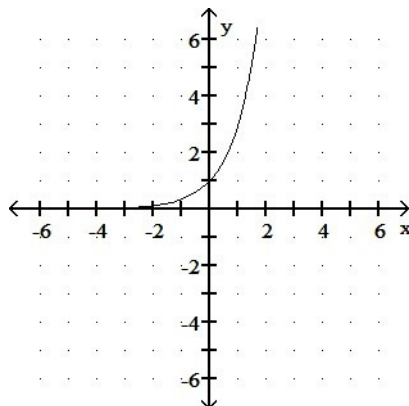


A)



C)

B)

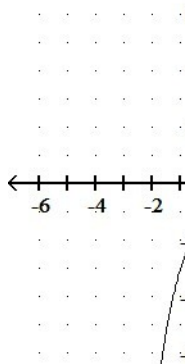


7) _____

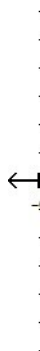
B) domain: $(-\infty, \infty)$; range: $(-\infty, \infty)$

D) domain: $(-\infty, \infty)$; range: $[-5, \infty)$

8) _____



D)



Answer: A

Diff: 0 Type: BI

Simplify the expression.

9) $\ln e^{7/5}$

A) $\frac{7}{5}$

B) $\frac{5}{7}$

C) $\frac{5}{7}e$

D) $\frac{7}{5}e$

9) _____

Answer: A

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.

10) $y = -4 \cos \left(2x + \frac{\pi}{3} \right)$

Find A.

A) -8

B) $\frac{\pi}{2}$

C) 2

D) -4

10) _____

Answer: D

Diff: 0 Type: BI

Find the inverse of the function.

11) $f(x) = \sqrt{x+3}, x \geq -3$

A) $f^{-1}(x) = x^2 - 3, x \geq 0$

C) $f^{-1}(x) = -x^2 + 3, x \geq 0$

B) Not a one-to-one function

D) $f^{-1}(x) = x^2 - 9, x \geq 0$

Answer: A

Diff: 0 Type: BI

11) _____

Graph the function.

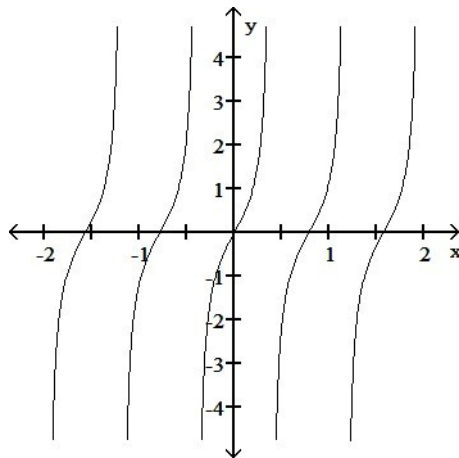
12) Graph five periods of the function $f(x) = \tan 4x$.

12)

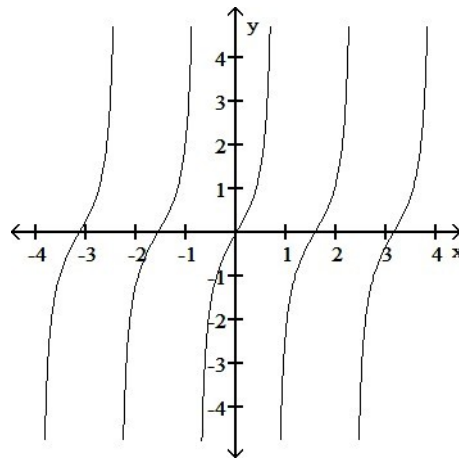
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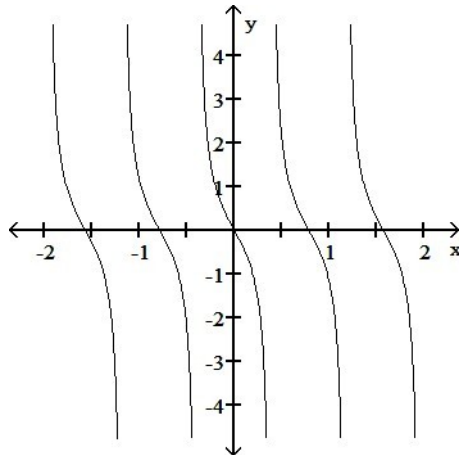
A)



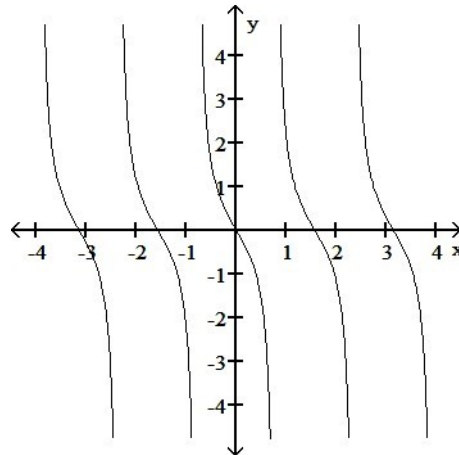
B)



C)



D)



Answer: A

Diff: 0 Type: BI

State the domain and range of the function.

13) $f(x) = e^{-x} + 3$

A) domain: $(-\infty, \infty)$; range: $(-\infty, -3]$

C) domain: $(-\infty, \infty)$; range: $(-\infty, 3)$

Answer: B

Diff: 0 Type: BI

B) domain: $(-\infty, \infty)$; range: $(3, \infty)$

D) domain: $(-\infty, \infty)$; range: $(-\infty, \infty)$

13) _____

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

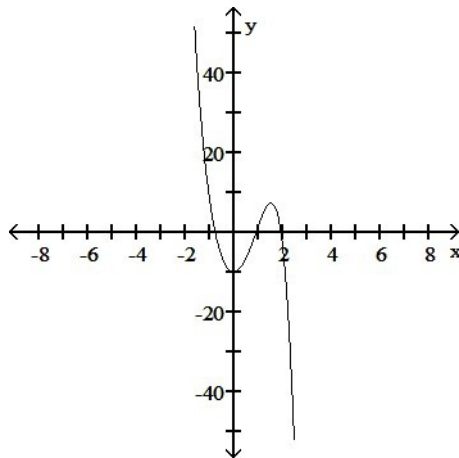
14) $f(x) = x^4 - 3x^3 + 15x^2 + x - 10$

14)

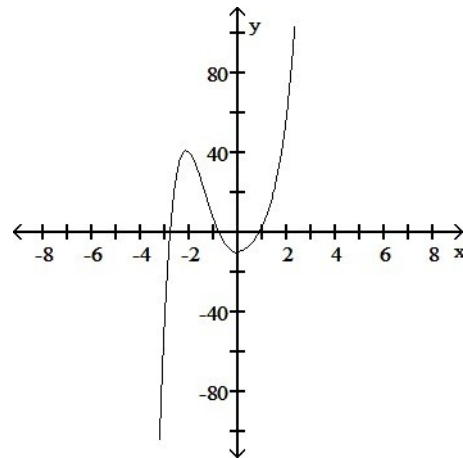
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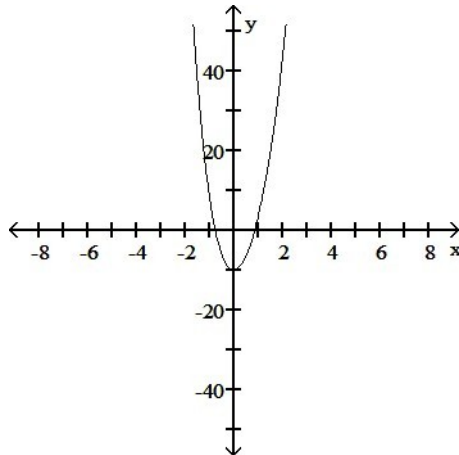
A)



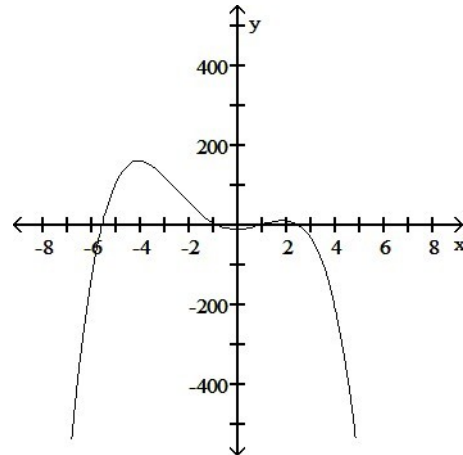
B)



C)



D)



Answer: C

Diff: 0 Type: BI

Simplify the expression.

15) $\log_e e^{|x-16|}$

A) $16 \log_e e$

B) $\log |x-16|$

C) $\log_e 16$

D) $|x-16|$

15) _____

Answer: D

Diff: 0 Type: BI

Find the inverse of the function.

16) $f(x) = \sqrt{x-9}, x \geq 9$

A) Not a one-to-one function

B)

16) _____

$$f^{-1}(x) = x + 9, \quad x \geq 0$$

$$\text{C) } f^{-1}(x) = x^2 - 9, \quad x \geq 0$$

$$\text{D) } f^{-1}(x) = x^2 + 9, \quad x \geq 0$$

Answer: D

Diff: 0 Type: BI

Find the domain and range of the inverse of the given function.

$$17) f(x) = \sqrt{x-5}$$

17) _____

A) Domain: $[0, \infty)$; range: $[5, \infty)$

B) Domain and range: all real numbers

C) Domain: $[5, \infty)$; range: $[5, \infty)$

D) Domain: $[5, \infty)$; range: $[0, \infty)$

Answer: A

Diff: 0 Type: BI

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

Solve the problem.

18)

$$\frac{3\pi}{4} \leq x \leq \frac{3\pi}{4}$$

18) _____

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

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 at a maximum point.

Diff: 0 Type: SA

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

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.

19)

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

Find B.

19) _____

$$\text{A) } \frac{\pi}{2}$$

$$\text{B) } \frac{2\pi}{5}$$

$$\text{C) } 4$$

$$\text{D) } \pi$$

Answer: B

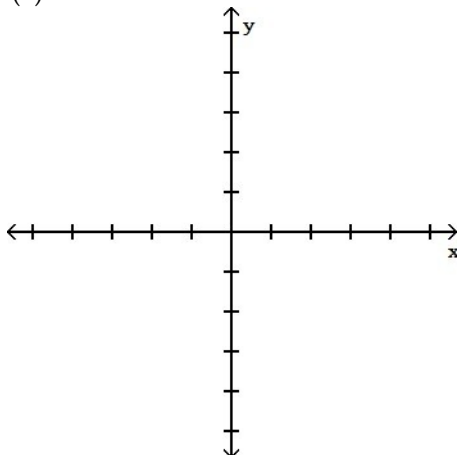
Diff: 0 Type: BI

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

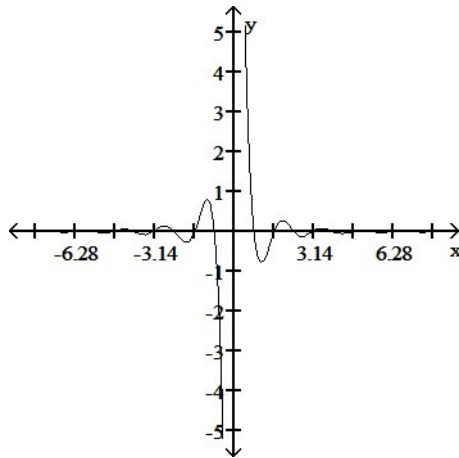
20)

$$f(x) = \frac{\sin 4x}{x}$$

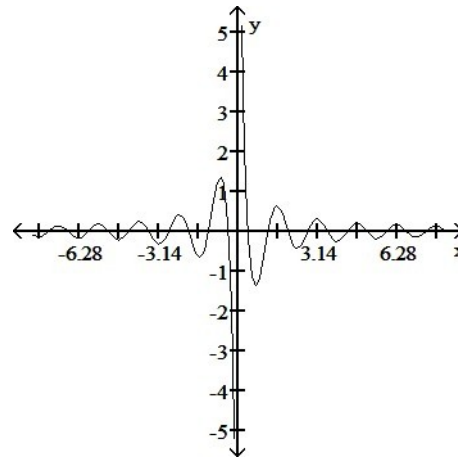
20) _____



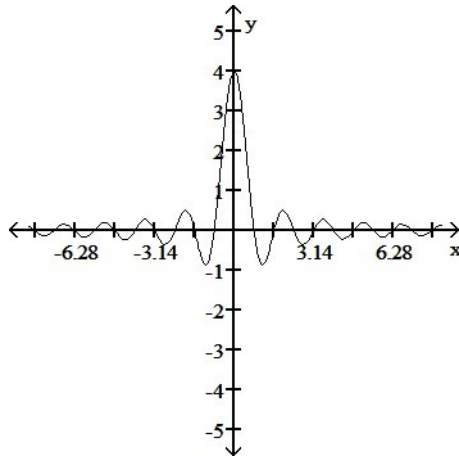
A)



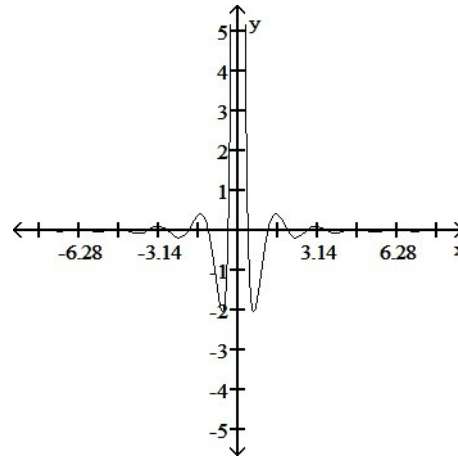
B)



C)



D)



Answer: C

Diff: 0 Type: BI

Solve the problem.

- 21) The amount of particulate matter left in solution during a filtering process decreases by the equation $P = 1000(2)^{-0.8n}$, where n is the number of filtering steps. Find the amounts left for $n = 0$ and $n = 5$. (Round to the nearest whole number.)

21) _____

A) 1000, 63

B) 1000, 31

C) 1000, 16,000

D) 2000, 63

Answer: A

Diff: 0 Type: BI

- 22) In the formula $A = Ie^{kt}$, A is the amount of radioactive material remaining from an initial amount I at a given time t and k is a negative constant determined by the nature of the material. A certain radioactive isotope has a half-life of approximately 1000 years. How many years would be required for a given amount of this isotope to decay to 35% of that amount?

22) _____

A) 650 yr

B) 1480 yr

C) 1515 yr

D) 621 yr

Answer: C

Diff: 0 Type: BI

Use a graph to find an approximate solution to the equation. Round to the nearest thousandth.

- 23) $2e^{9x+3} = 7$

23) _____

A) -0.194

B) -1.404

C) 1.016

D) -1.683

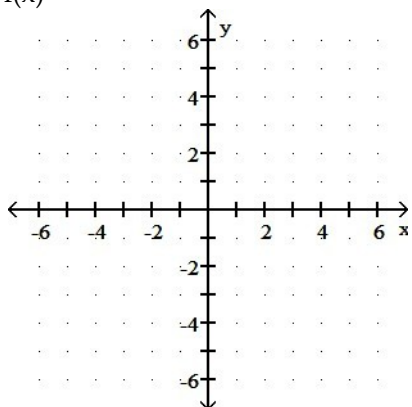
Answer: A

Diff: 0 Type: BI

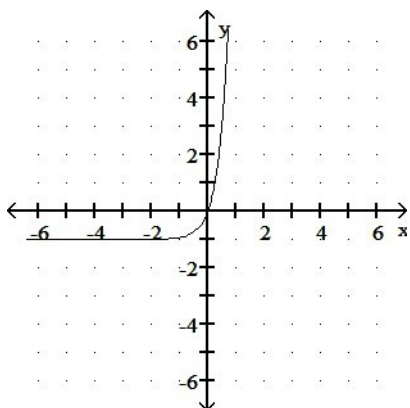
Graph the function.

24) $f(x) = 2^{(4x - 1)}$

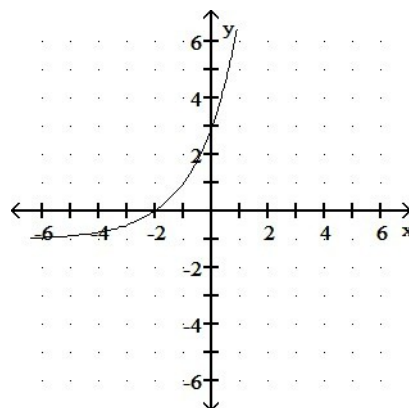
24) _____



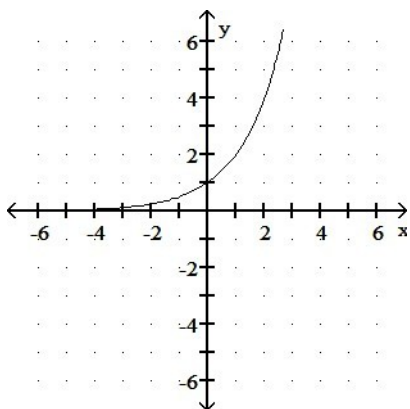
A)



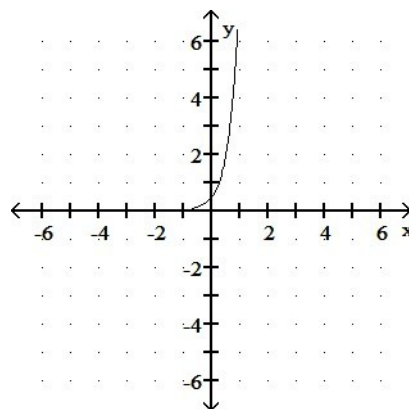
B)



C)



D)



Answer: D

Diff: 0 Type: BI

Find the exact function value.

25) $\arccos(0)$

25) _____

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

B) $\frac{\pi}{3}$

C) 0

D) $\frac{\pi}{2}$

Answer: D

Diff: 0 Type: BI

26) $\cot^{-1}(-1)$

26) _____

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

B) $\frac{3\pi}{4}$

C) $\frac{3\pi}{4}$

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

Answer: A

Diff: 0 Type: BI

Determine from its graph if the function is one-to-one.

27) $f(x) = \begin{cases} 5x + 8, & x < 0 \\ 5x^2 - 2, & x \geq 0 \end{cases}$

27) _____

A) Yes

B) No

Answer: B

Diff: 0 Type: BI

Use the laws of exponents to simplify. Do not use negative exponents in your answer.

28) $9^{-2} \cdot 9^5$

28) _____

A) 81^{10}

B) 9^{-10}

C) 81^3

D) 9^3

Answer: D

Diff: 0 Type: BI

Determine from its graph if the function is one-to-one.

29) $f(x) = \begin{cases} x + 3, & x > 0 \\ -1, & x \leq 0 \end{cases}$

29) _____

A) Yes

B) No

Answer: B

Diff: 0 Type: BI

Express as a single logarithm and, if possible, simplify.

30) $\ln(8 \sec \theta) + \ln(9 \cos \theta)$

30) _____

A) $\ln(72 \cot \theta)$

B) $\ln(8 \sec \theta + 9 \cos \theta)$

C) $\ln(72)$

D) $\ln\left(\frac{8}{9}\right)$

Answer: C

Diff: 0 Type: BI

31) $\ln \cos \theta - \ln\left(\frac{\cos \theta}{9}\right)$

31) _____

A) $\ln\left(\frac{\cos^2 \theta}{9}\right)$

B) $\ln \cos \theta$

C) $\ln 9$

D) $\ln\left(\frac{1}{9}\right)$

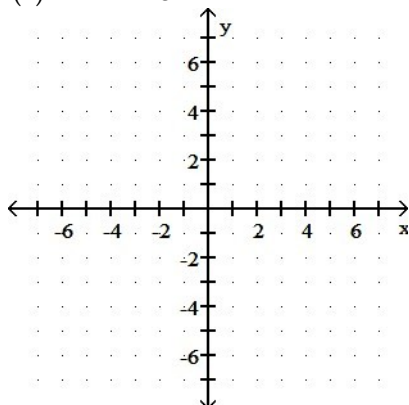
Answer: C

Diff: 0 Type: BI

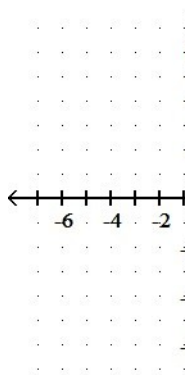
Graph the function.

32) $f(x) = 2e^{-x} + 3$

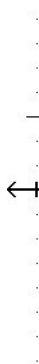
32) _____



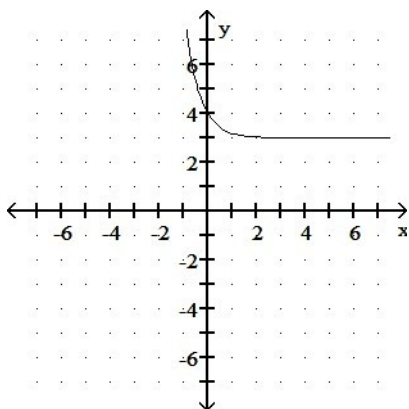
A)



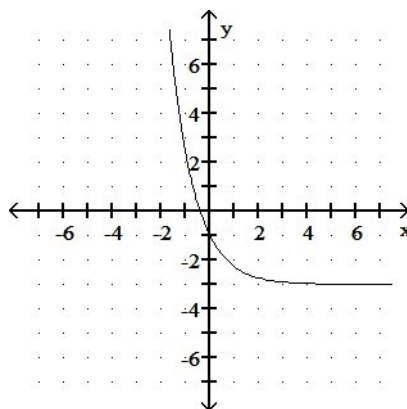
B)



C)



D)



Answer: A

Diff: 0 Type: BI

Find the inverse of the function.

33) $f(x) = \sqrt{x} - 8, x \geq 0$

A) $f^{-1}(x) = (x + 8)^2, x \geq 8$

C) $f^{-1}(x) = x + 8, x \geq 8$

Answer: A

Diff: 0 Type: BI

Simplify the expression.

34) $\log_{10} 10$

A) 1

B) 10

C) -1

D) 0

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.

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

A) $[-2, 2]$ by $[-15, 15]$

C) $[-4, 0]$ by $[-5, 5]$

B) $[-4, 10]$ by $[-10, 10]$

D) $[0, 10]$ by $[-10, 10]$

Answer: B

Diff: 0 Type: MC

Use the laws of exponents to simplify. Do not use negative exponents in your answer.

36) $11^{2/3} \cdot 11^{3/4}$

33) _____

34) _____

35) _____

36) _____

A) $11^{17/12}$

B) $12^{1/2}$

C) $11^{1/2}$

D) $12^{17/12}$

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.

37) _____

$$f(x) = x^2 + \frac{1}{20} \cos 70x$$

A) $[-0.6, 0.6]$ by $[-0.1, 0.6]$

B) $[-10, 10]$ by $[-10, 10]$

C) $[-2, 2]$ by $[-1, 1]$

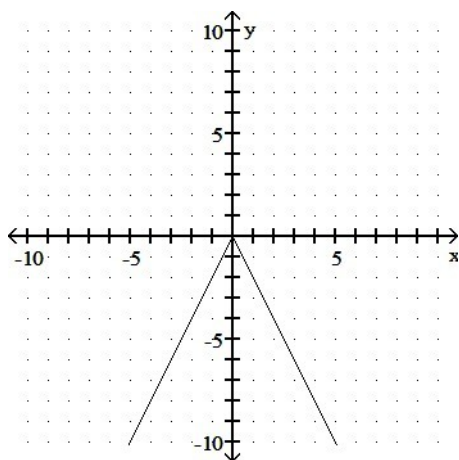
D) $[-0.1, 0.1]$ by $[-0.1, 0.1]$

Answer: A

Diff: 0 Type: MC

Is the function graphed below one-to-one?

38) _____



A) Yes

B) No

Answer: B

Diff: 0 Type: BI

Find the inverse of the function.

39) $f(x) = 7x^3 + 1$ _____

A)

$$f^{-1}(x) = \sqrt[3]{\frac{x+1}{7}}$$

B)

$$f^{-1}(x) = \sqrt[3]{\frac{x-1}{7}}$$

C) Not a one-to-one function

D)

$$f^{-1}(x) = \sqrt[3]{\frac{x}{7}} - 1$$

Answer: B

Diff: 0 Type: BI

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

Solve the problem.

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

$$\tan(A - B) = \frac{\tan A - \tan B}{1 + \tan A \tan B}$$

Derive the formula.

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

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

Diff: 0 Type: SA

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

Find the inverse of the function.

41) $f(x) = \sqrt{x+1}$

41) _____

A) $f^{-1}(x) = (x+1)^2$

B) Not a one-to-one function

C) $f^{-1}(x) = x^2 - 1, x \geq 0$

D) $f^{-1}(x) = \sqrt{x-1}$

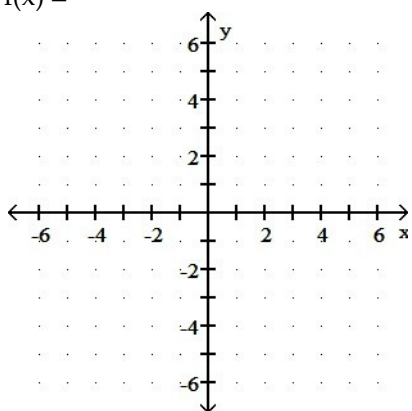
Answer: C

Diff: 0 Type: BI

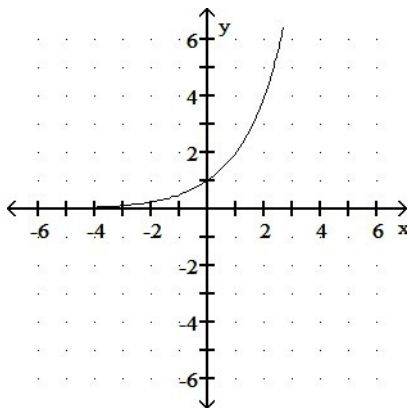
Graph the function.

42) $f(x) = 2(x-1)$

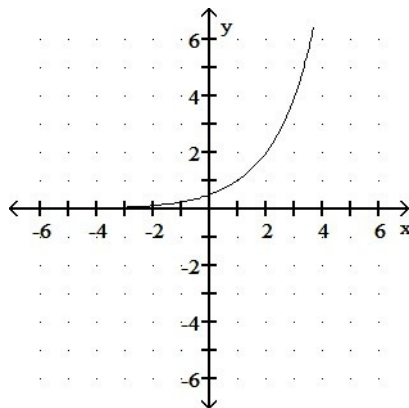
42) _____



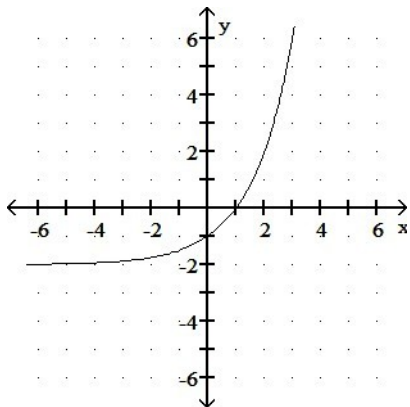
A)



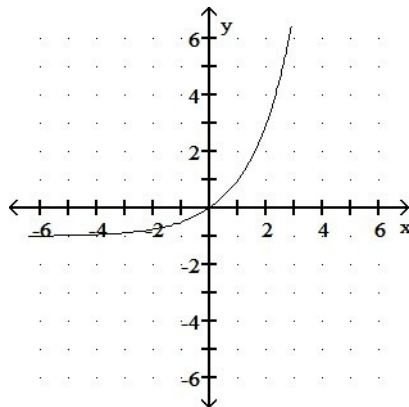
B)



C)



D)



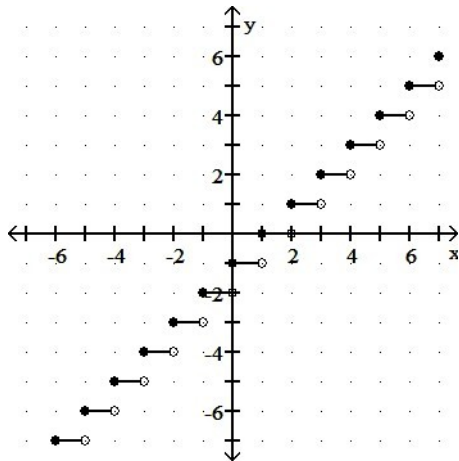
Answer: B

Diff: 0 Type: BI

Is the function graphed below one-to-one?

43)

43) _____



A) No

B) Yes

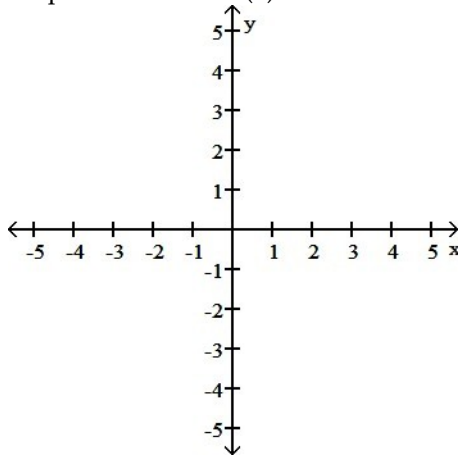
Answer: A

Diff: 0 Type: BI

Graph the function.

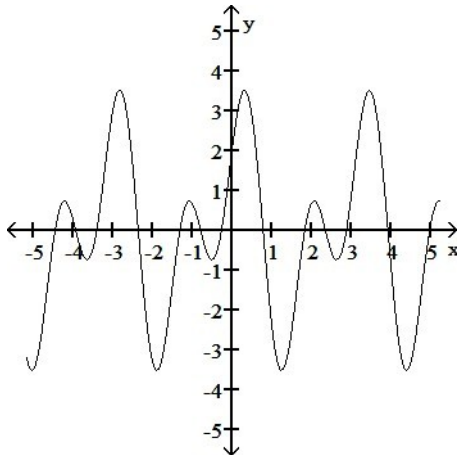
44) Graph the function $f(x) = \sin 4x + \cos 2x$.

44) _____

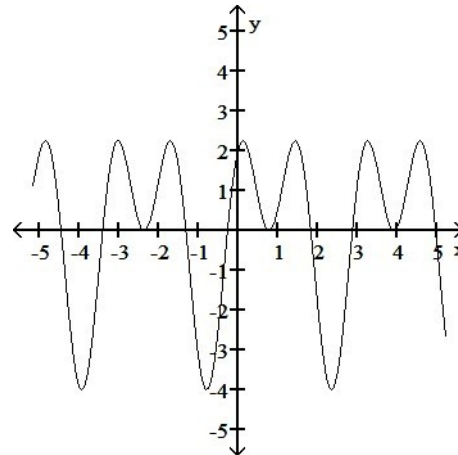


A)

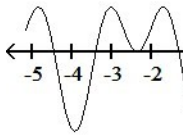
B)



C)



D)



Answer: D

Diff: 0 Type: BI

Express the following logarithm as specified.

45) $\ln 5\sqrt{5}$ in terms of $\ln 5$ and $\ln 7$

A) $\frac{\ln 5}{\ln 7 + 2}$

B) $\frac{\ln 5}{\ln 5 + 2}$

C) $\frac{3}{2} \ln 5$

D) $\frac{\ln 5}{2}$

45) _____

Answer: C

Diff: 0 Type: BI

Solve the problem.

46) An economist predicts that the buying power $B(x)$ of a dollar x years from now will decrease according to the formula $B(x) = 0.69^x$. How much will today's dollar be worth in 6 years? Round the answer to the nearest cent.

A) \$0.11

B) \$0.80

C) \$4.14

D) \$3.44

46) _____

Answer: A

Diff: 0 Type: BI

State the domain and range of the function.

47) $f(x) = 7e^{-x} - 2$

A) domain: $(-\infty, \infty)$; range: $(-\infty, 5]$

C) domain: $(-\infty, \infty)$; range: $(-2, \infty)$

B) domain: $(-\infty, 0)$; range: $(-\infty, -2)$

D) domain: $(-\infty, \infty)$; range: $(-\infty, \infty)$

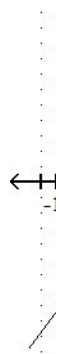
47) _____

Answer: C

Diff: 0 Type: BI

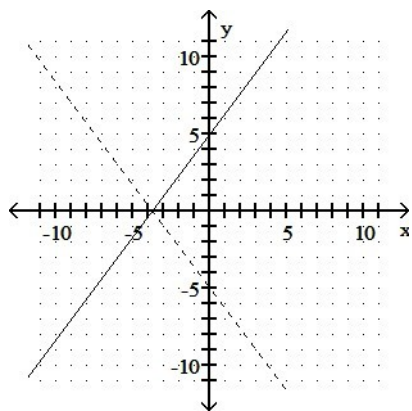
Graph the inverse of the function plotted, on the same set of axes. Use a dashed curve for the inverse.

48)

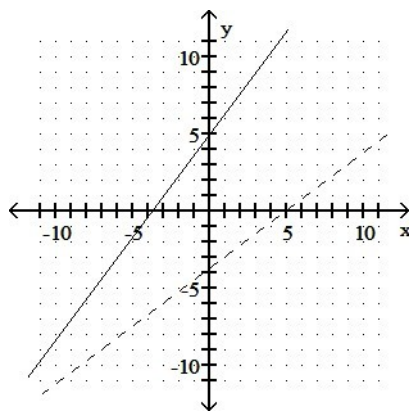


48)

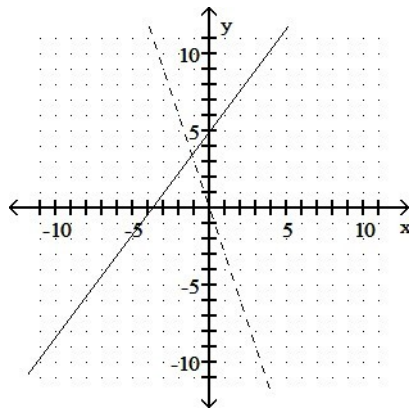
A)



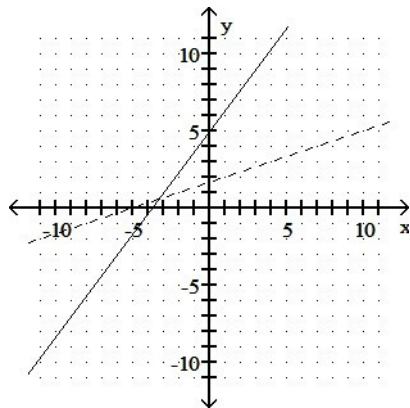
B)



C)



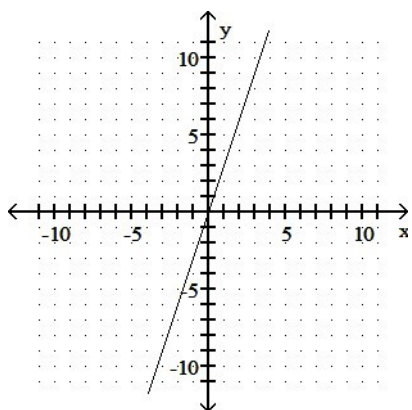
D)



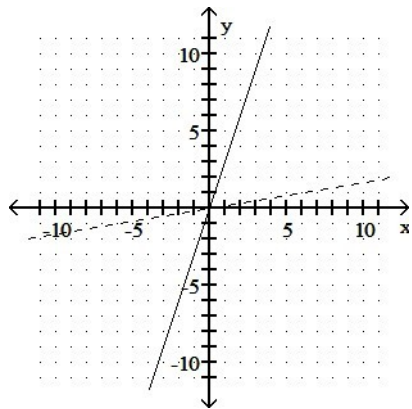
Answer: B

Diff: 0 Type: BI

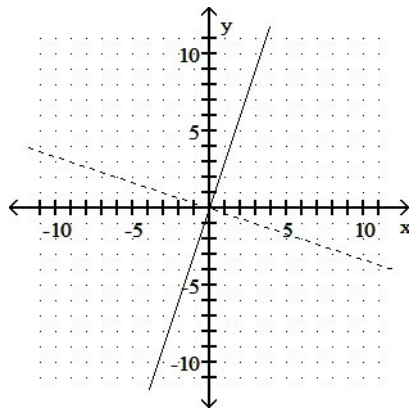
49)



A)

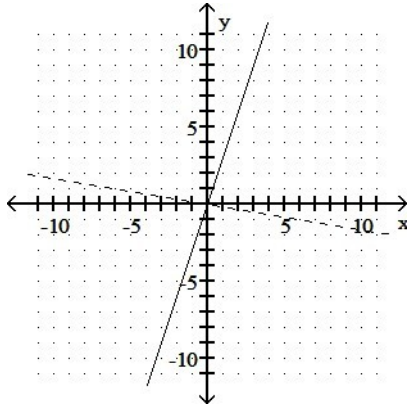


B)

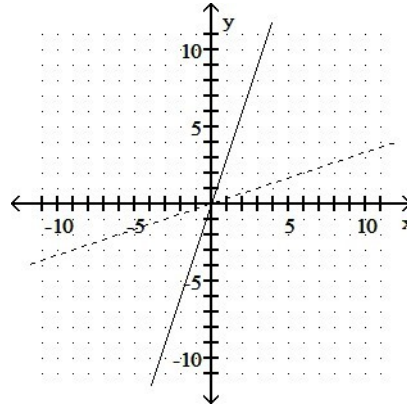


49) _____

C)



D)



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.

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

50) _____

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

Answer: B

Diff: 0 Type: MC

Use the laws of exponents to simplify. Do not use negative exponents in your answer.

51) $4^8 \cdot 4^3$

51) _____

A) 4^{11} B) 4^{24} C) 8^{11} D) 16^{24}

Answer: A

Diff: 0 Type: BI

52) $3^4 \cdot 3 \cdot 3^{-8}$

52) _____

A) 3^4 B) $\frac{1}{3^4}$ C) $\frac{1}{3^3}$ D) 3^3

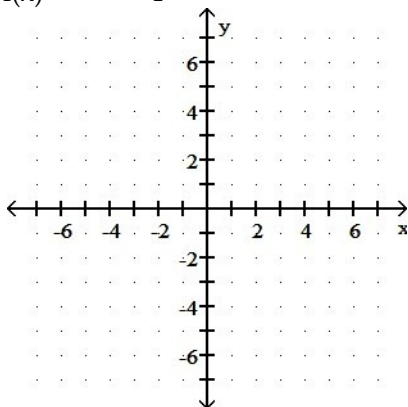
Answer: C

Diff: 0 Type: BI

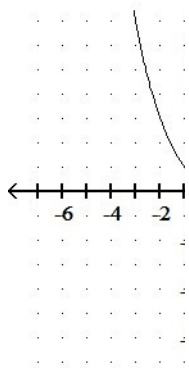
Graph the function.

53) $f(x) = 0.5^x - 1$

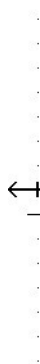
53) _____



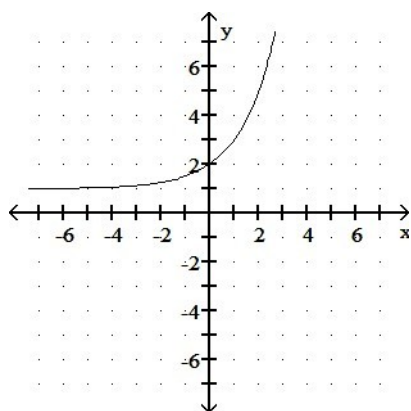
A)



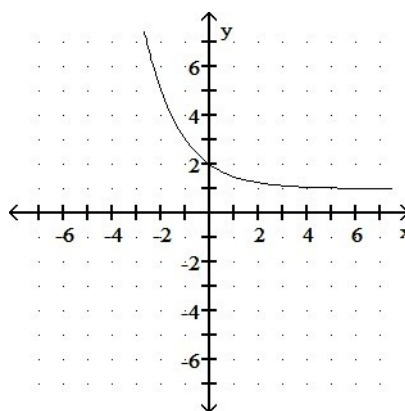
B)



C)



D)

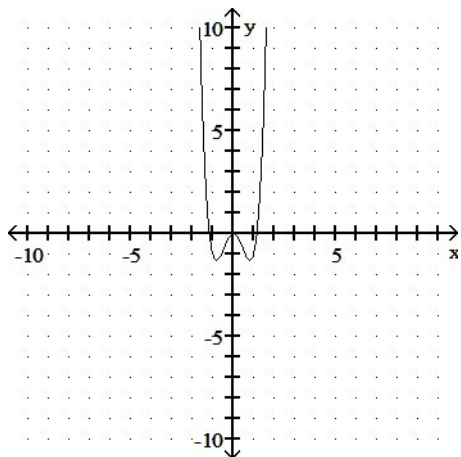


Answer: A

Diff: 0 Type: BI

Is the function graphed below one-to-one?

54)



54) _____

A) Yes

B) No

Answer: B

Diff: 0 Type: BI

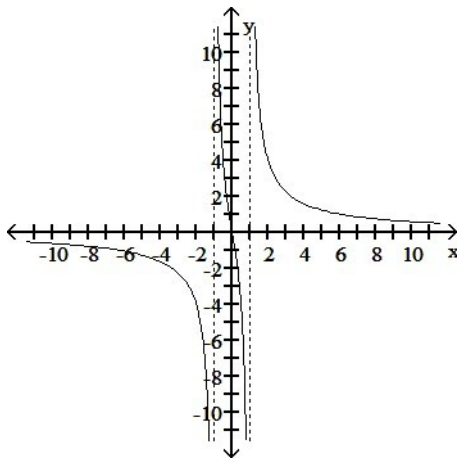
Determine an appropriate viewing window for the given function and use it to display its graph.

55)

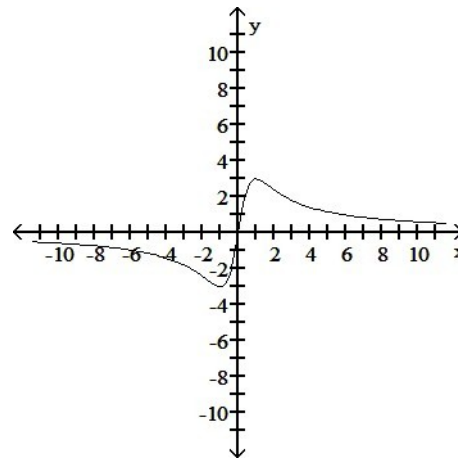
$$f(x) = \frac{6x}{x^2 - 1}$$

←+++++

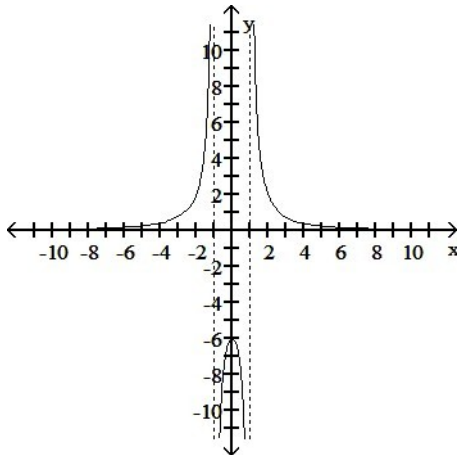
A)



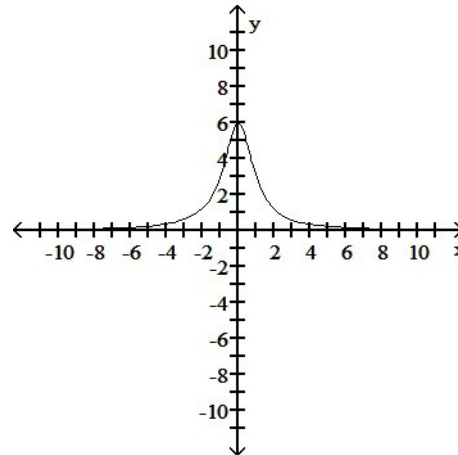
B)



C)



D)



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.

56) $f(x) = x^3 - 2x^2 - 3x + 11$

56) _____

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

Answer: A

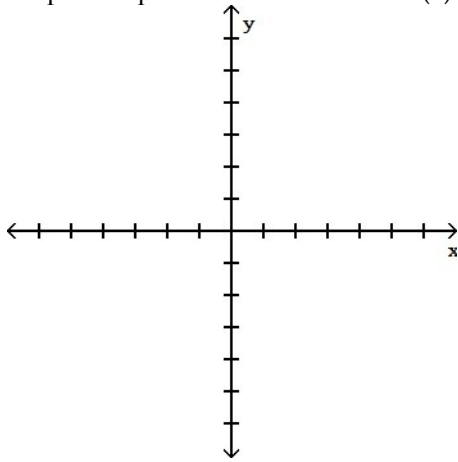
Diff: 0 Type: MC

Graph the function.

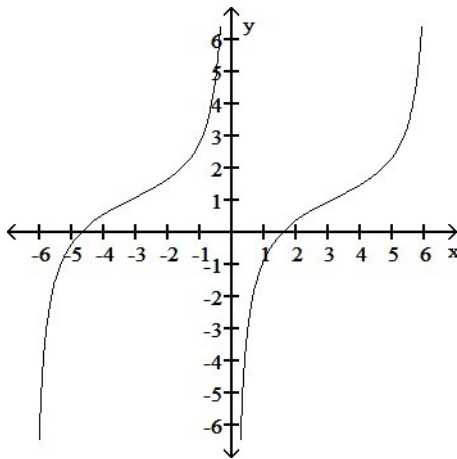
57)

57) _____

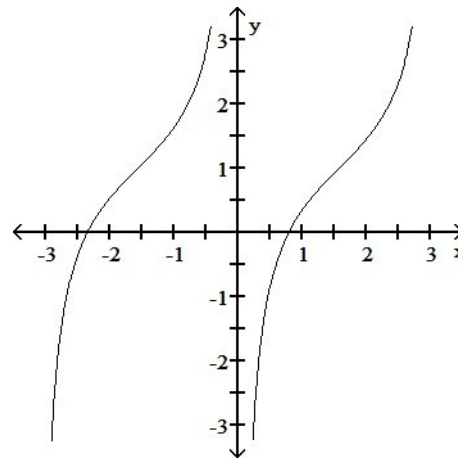
Graph two periods of the function $f(x) = -\cot \frac{x}{2} + 1$.



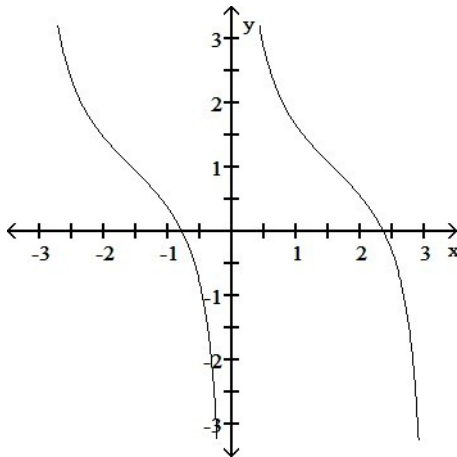
A)



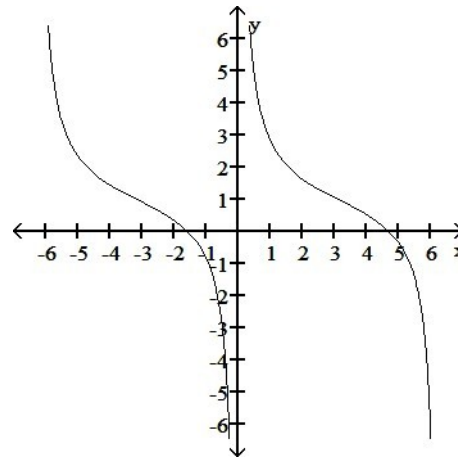
B)



C)



D)



Answer: A

Diff: 0 Type: BI

Solve the problem.

58) How long will it take for prices in the economy to double at a 4% annual inflation rate? Round the answer to the nearest hundredth.

58) _____

A) 28.01 yr

B) 14.21 yr

C) 17.67 yr

D) 23.45 yr

Answer: C

Diff: 0 Type: BI

Solve for t or y, as appropriate.

59) $e^{(\ln 0.4)t} = 0.3$

A) $\frac{3}{4 \ln}$

B) $\frac{3}{4}$

C) $\frac{e^{0.3}}{\ln 0.4}$

D) $\frac{\ln 0.3}{\ln 0.4}$

59) _____

Answer: D

Diff: 0 Type: BI

Simplify the expression.

60) $25^{\log 5^x}$

A) \sqrt{x}

B) 2

C) x^2

D) 5^2

60) _____

Answer: C

Diff: 0 Type: BI

Solve the problem.

61) A bacteria colony doubles in 8 hr. How long does it take the colony to triple? Use $N = N_0 2^{t/T}$, where N_0 is the initial number of bacteria and T is the time in hours it takes the colony to double. (Round to the nearest hundredth, as necessary.)

A) 3.24 hr

B) 12 hr

C) 24 hr

D) 12.68 hr

61) _____

Answer: D

Diff: 0 Type: BI

Use the laws of exponents to simplify. Do not use negative exponents in your answer.

62) $\frac{5^{11/13}}{5^{-4/13}}$

A) $5^{7/13}$

B) $5^{-44/169}$

C) $5^{11/13} \cdot 5^{4/13}$

D) $5^{15/13}$

62) _____

Answer: D

Diff: 0 Type: BI

Express the following logarithm as specified.

63) $\ln \sqrt{40.5}$ in terms of $\ln 3$ and $\ln 2$

A) $\frac{4 \ln 3 + \ln 2}{2}$

B) $\frac{4 \ln 3 - \ln 2}{2}$

C) $\frac{4 \ln 3}{2}$

D) $4 \ln 3$

63) _____

Answer: B

Diff: 0 Type: BI

Solve for t or y, as appropriate.

64) $\ln y = 4x + 3$

A) e^{4x+3}

B) $4x$

C) 7

D) $\ln(4x + 3)$

64) _____

Answer: A

Diff: 0 Type: BI

State the domain and range of the function.

65) $f(x) = \frac{2}{6 + e^x}$

A) domain: $(0, \infty)$; range: $(0, \infty)$

C) domain: $(-\infty, \infty)$; range: $(0, 6)$

B) domain: $(-\infty, \infty)$; range: $(-\infty, \infty)$

D) domain: $(-\infty, \infty)$; range: $\left(0, \frac{1}{3}\right)$

65) _____

Answer: D

Diff: 0 Type: BI

Determine from its graph if the function is one-to-one.

66) $f(x) = \begin{cases} -x - 2, & x < 1 \\ -5, & x \geq 1 \end{cases}$

66) _____

A) Yes

B) No

Answer: B

Diff: 0 Type: BI

State the domain and range of the function.

67) $f(x) = -2^x + 2$

67) _____

A) domain: $(-\infty, 0) \cup (0, \infty)$; range: $(-\infty, 2)$

B) domain: $[0, \infty)$; range: $(-\infty, \infty)$

C) domain: $(-\infty, \infty)$; range: $(-\infty, 2]$

D) domain: $(-\infty, \infty)$; range: $(-\infty, 2)$

Answer: D

Diff: 0 Type: BI

Solve the problem.

68) In the formula $N = Ie^{kt}$, N is the number of items in terms of an initial population I at a given time t and k is a growth constant equal to the percent of growth per unit time. There are currently 61 million cars in a certain country, increasing by 5.4% annually. How many years will it take for this country to have 68 million cars? Round to the nearest year.

68) _____

A) 3 yr

B) 1 yr

C) 36 yr

D) 2 yr

Answer: D

Diff: 0 Type: BI

69) The purchasing power of a dollar is decreasing at the rate of 4.3% annually, compounded continuously. How long will it take for the purchasing power of \$1.00 to be worth \$0.66? Round answers to the nearest hundredth.

69) _____

A) 0.10 yr

B) 0.97 yr

C) 9.66 yr

D) 15.35 yr

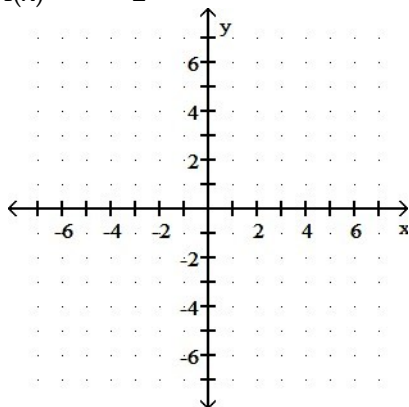
Answer: C

Diff: 0 Type: BI

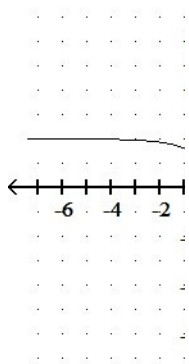
Graph the function.

70) $f(x) = e^x - 2$

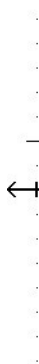
70) _____



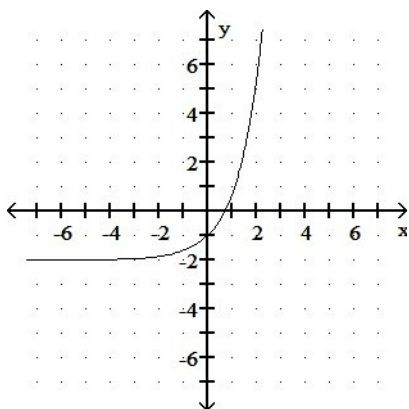
A)



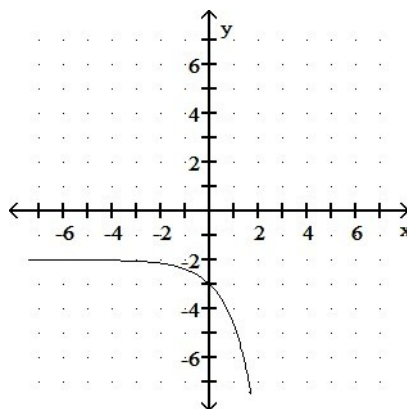
B)



C)



D)



Answer: C

Diff: 0 Type: BI

Use the laws of exponents to simplify. Do not use negative exponents in your answer.

71) $\sqrt[8]{625^2}$

A) 6

B) $\sqrt[4]{625}$

C) 3125

D) 5

71) _____

Answer: D

Diff: 0 Type: BI

Express as a single logarithm and, if possible, simplify.

72) $\ln(x^2 - 49) - \ln(x + 7)$

A) $\ln(x^2 - 7)$

B) $\ln(x - 7)$

C) $\ln(x + 7)$

D) $\ln(x - 49)$

72) _____

Answer: B

Diff: 0 Type: BI

Express the following logarithm as specified.

73) $\ln(1/16)$ in terms of $\ln 2$

A) $-4 \ln 2$

B) $\frac{1}{4} \ln 2$

C) $4 \ln 16$

D) $\frac{1}{4} \ln 2$

73) _____

Answer: A

Diff: 0 Type: BI

Express as a single logarithm and, if possible, simplify.

74) $\ln(32x + 16) - 2 \ln 4$

A) $\ln(2x + 1)$

B) $\ln(32x)$

C) $\ln(4x + 2)$

D) $\ln(256(2x + 1))$

74) _____

Answer: A

Diff: 0 Type: BI

Solve the problem.

- 75) Suppose the consumption of electricity grows at 7.5% per year, compounded continuously. Find the number of years before the use of electricity has tripled. Round the answer to the nearest hundredth. 75) _____

A) 40.00 yr B) 0.15 yr C) 1.46 yr D) 14.65 yr

Answer: D

Diff: 0 Type: BI

- 76) The population of a small country increases according to the function $B = 1,700,000e^{0.03t}$, where t is measured in years. How many people will the country have after 2 years? 76) _____

A) 1,951,861 people B) 2,077,143 people
C) 4,782,798 people D) 1,805,122 people

Answer: D

Diff: 0 Type: BI

Solve for t or y , as appropriate.

- 77) $e^{t/640} = k$ 77) _____

A) $\ln 640k$ B) $\frac{\ln k}{640}$ C) $640 \ln k$ D) $640e^k$

Answer: C

Diff: 0 Type: BI

Express the following logarithm as specified.

- 78) $\frac{\ln 6 + \ln (1/3)}{\ln 4}$ in terms of $\ln 2$ and $\ln 3$ 78) _____

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

Answer: C

Diff: 0 Type: BI

Find the exact function value.

- 79) $\sin^{-1}(0)$ 79) _____

A) $\frac{\pi}{2}$ B) $\frac{\pi}{2}$ C) 0 D) π

Answer: C

Diff: 0 Type: BI

Use the laws of exponents to simplify. Do not use negative exponents in your answer.

- 80) $\frac{32^7 \cdot 2^{-3}}{4^7}$ 80) _____

A) 2^7 B) 1 C) 2^{18} D) 8^{18}

Answer: C

Diff: 0 Type: BI

Solve the problem.

- 81) Find the amount of interest earned on the following deposit: \$1,000 at 4% compounded annually for 9 years 81) _____

A) \$1423.31 B) \$423.31 C) \$368.57 D) \$480.24

Answer: B

Diff: 0 Type: BI

Express the following logarithm as specified.

82) $\ln \sqrt{27}$ in terms of $\ln 3$

A) $\frac{1}{2} \ln 27$

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

C) $\frac{3}{2} \ln 3$

D) $6 \ln 3$

82) _____

Answer: C

Diff: 0 Type: BI

Find the inverse of the function.

83) $f(x) = x^3 + 4$

A) $f^{-1}(x) = \sqrt[3]{x} - 4$

C) Not a one-to-one function

B) $f^{-1}(x) = \sqrt[3]{x+4}$

D) $f^{-1}(x) = \sqrt[3]{x-4}$

83) _____

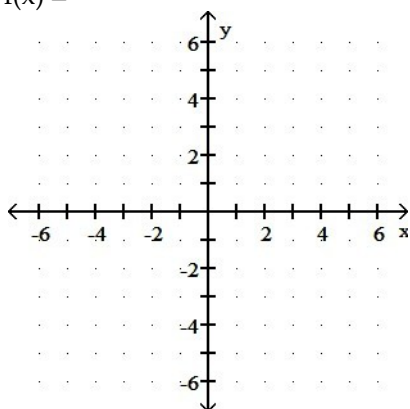
Answer: D

Diff: 0 Type: BI

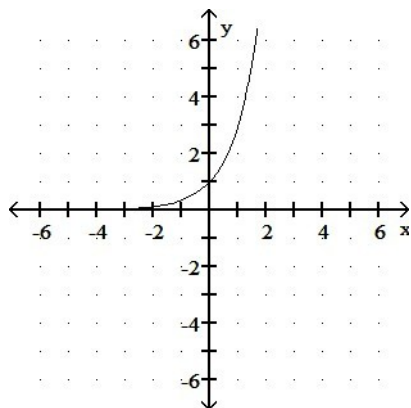
Graph the function.

84) $f(x) = 3^x$

84) _____

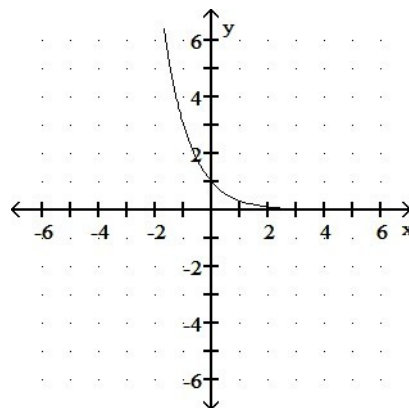


A)

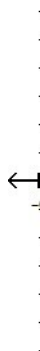
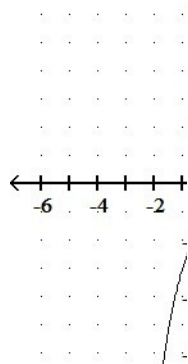


C)

B)



D)



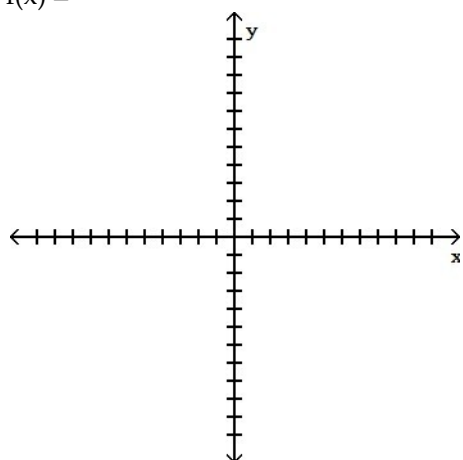
Answer: A

Diff: 0 Type: BI

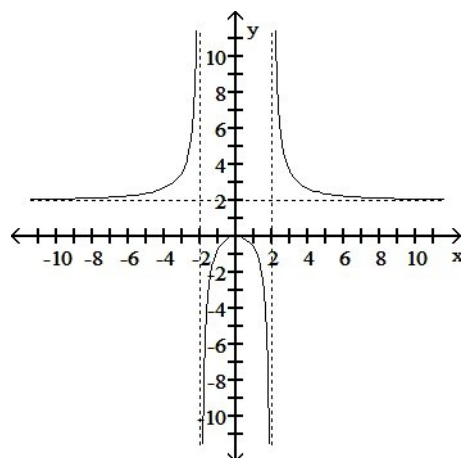
Determine an appropriate viewing window for the given function and use it to display its graph.

85) $f(x) = \frac{x^3}{x^2 - 4}$

85) _____

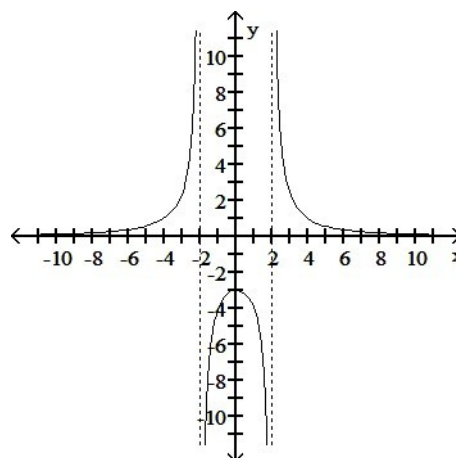


A)

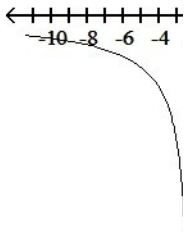


C)

B)



D)



←

↗

Answer: D

Diff: 0 Type: BI

Provide an appropriate response.

86) If $f(x)$ is one-to-one, can anything be said about $h(x) = 2f(x) + 8$? Is it also one-to-one? Give reasons for your answer. 86) _____

- A) Yes, $h(x)$ will be one-to-one. For every distinct value of $f(x)$ there is one distinct value of $h(x)$.
- B) No, $h(x)$ will not be one-to-one. The function $h(x)$ does not pass the horizontal line test.
- C) No, $h(x)$ will not be one-to-one. The function $h(x)$ assumes the same value for at least two different $f(x)$ -values.
- D) Yes, $h(x)$ will be one-to-one. The inverse of $f(x)$ is $h(x)$ and is therefore one-to-one.

Answer: A

Diff: 0 Type: BI

Rewrite the ratio as a ratio of natural logarithms and simplify.

87) $\frac{\log_{\sqrt{2}} x}{\log_{\sqrt{6}} x}$ 87) _____

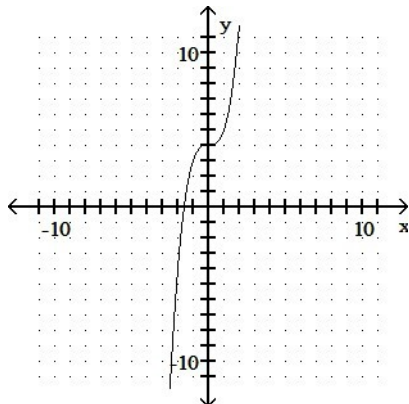
- A) $\sqrt{\frac{\ln 2}{\ln 6}}$
- B) $\sqrt{\frac{1}{3}}$
- C) $\frac{\ln 6}{\ln 2}$
- D) $\frac{1}{3}$

Answer: C

Diff: 0 Type: BI

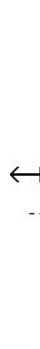
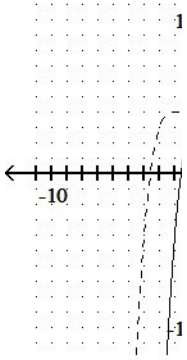
Graph the inverse of the function plotted, on the same set of axes. Use a dashed curve for the inverse.

88) 88) _____

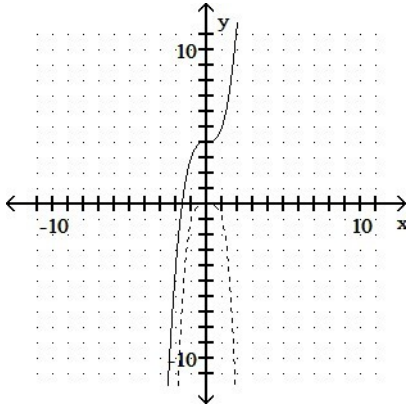


A)

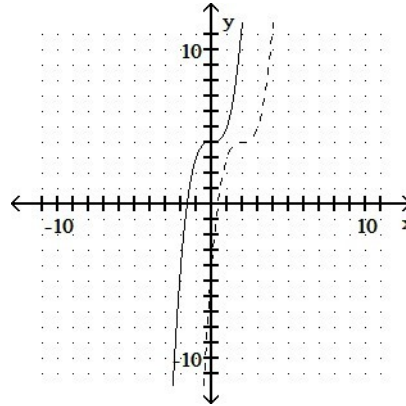
B)



C)



D)



Answer: B

Diff: 0 Type: BI

Find the domain and range of the inverse of the given function.

89) $f(x) = x^3 + 5$

A) Domain: $[0, \infty)$; range: $[0, \infty)$

C) Domain: $[5, \infty)$; range: all real numbers

B) Domain and range: all real numbers

D) Domain: all real numbers; range: $[5, \infty)$

Answer: B

Diff: 0 Type: BI

Simplify the expression.

90) $5^{\log_5 10}$

A) 5

B) 50

C) $\log_5 10$

D) 10

Answer: D

Diff: 0 Type: BI

Use a graph to find an approximate solution to the equation. Round to the nearest thousandth.

91) $114(1.30)^{x/3} = 228$

A) 1.136

B) 6.436

C) 7.926

D) 9.416

Answer: C

Diff: 0 Type: BI

Solve the problem.

92) In the formula $N = Ie^{kt}$, N is the number of items in terms of an initial population I at a given time t and k is a growth constant equal to the percent of growth per unit time. How long will it take for the population of a certain country to double if its annual growth rate is 1.3%? Round to

the year.
nea
rest

92)

A) 154 yr

B) 23 yr

C) 1 yr

D) 53 yr

Answer: D

Diff: 0 Type: BI

Solve for t or y, as appropriate.

93) $100e^{6t} = 200$

A) $\frac{e^2}{6}$

B) $\ln\left(\frac{1}{3}\right)$

C) $\frac{\ln 100}{6}$

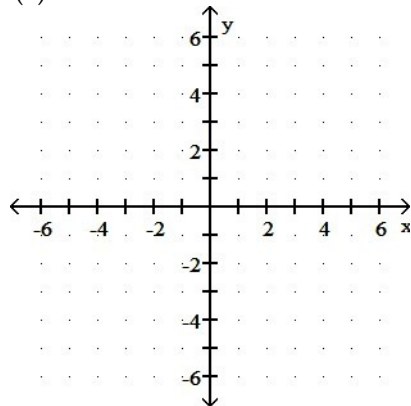
D) $\frac{\ln 2}{6}$

Answer: D

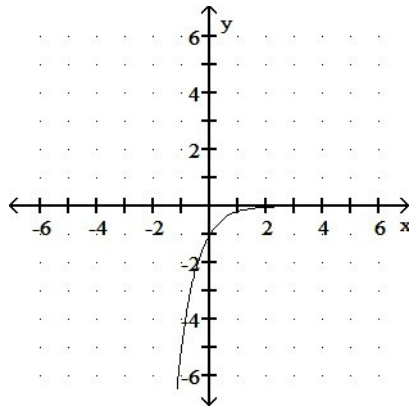
Diff: 0 Type: BI

Graph the function.

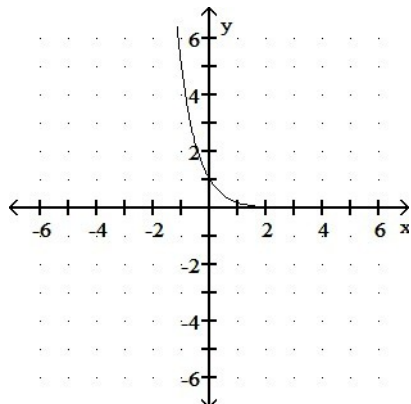
94) $f(x) = 5^{-x}$



A)



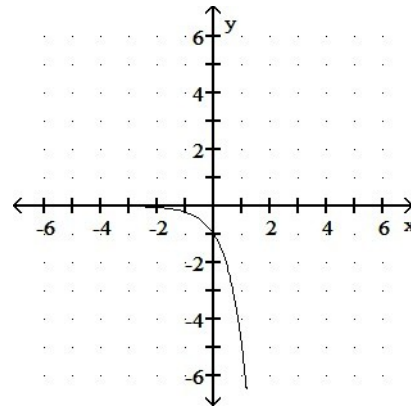
C)



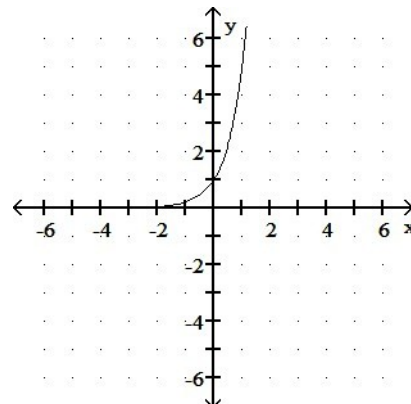
Answer: C

Diff: 0 Type: BI

B)



D)



93) _____

94) _____

Express the following logarithm as specified.

95) $\ln 6125$ in terms of $\ln 5$ and $\ln 7$

A) $3 \ln 5 - 2 \ln 7$

B) $3 \ln 5 + 2 \ln 7$

C) $6 \ln 5$

D) $-3 \ln 5 - 2 \ln 7$

95) _____

Answer: B

Diff: 0 Type: BI

Solve for t or y, as appropriate.

96) $e^{2t} = 9$

A) $\ln 3$

B) $\ln 9$

C) $\frac{9}{\ln 2}$

D) $\frac{e^9}{2}$

96) _____

Answer: A

Diff: 0 Type: BI

Find the exact function value.

97) $\cos^{-1}\left(\frac{\sqrt{2}}{2}\right)$

A) $\frac{11\pi}{6}$

B) $\frac{7\pi}{4}$

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

D) $\frac{\pi}{6}$

97) _____

Answer: C

Diff: 0 Type: BI

Rewrite the ratio as a ratio of natural logarithms and simplify.

98) $\frac{\log_2 x}{\log_{16} x}$

A) 2^3

B) $\frac{1}{2^3}$

C) 4

D) $\ln 4$

98) _____

Answer: C

Diff: 0 Type: BI

Express as a single logarithm and, if possible, simplify.

99) $\frac{1}{2} \ln(9t^{10}) - \ln 3$

A) $\ln(3t^5)$

B) $\ln 3(t^5 - 1)$

C) $\ln\left(\frac{3}{2}t^5\right)$

D) $\ln(t^5)$

99) _____

Answer: D

Diff: 0 Type: BI

State the domain and range of the function.

100) $f(x) = e^x - 5$

A) domain: $(-\infty, \infty)$; range: $(-\infty, \infty)$

B) domain: $(-\infty, \infty)$; range: $(-5, \infty)$

C) domain: $(-\infty, 0) \cup (0, \infty)$; range: $(-5, \infty)$

D) domain: $(-\infty, \infty)$; range: $[-5, \infty)$

100) _____

Answer: B

Diff: 0 Type: BI

101) $f(x) = -5^{-x} + 3$

A) domain: $(-\infty, \infty)$; range: $(-\infty, -5)$

B) domain: $(-\infty, \infty)$; range: $(-\infty, \infty)$

C) domain: $(-\infty, \infty)$; range: $(-\infty, 3)$

D) domain: $(-\infty, \infty) \cup (-\infty, \infty)$; range: $(-\infty, 3)$

101) _____

Answer: C

Diff: 0 Type: BI

Use a graph to find an approximate solution to the equation. Round to the nearest thousandth.

102) $5^{(x-1)} = 17$

102) _____

A) 2.760

B) 2.224

C) 4.400

D) 0.760

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.

103) $f(x) = 8 + 9x - x^3$

103) _____

A) $[-4, 5]$ by $[-5, 5]$

B) $[-10, 20]$ by $[-50, 50]$

C) $[-10, 10]$ by $[-10, 5]$

D) $[-4, 5]$ by $[-15, 25]$

Answer: D

Diff: 0 Type: MC

Use the laws of exponents to simplify. Do not use negative exponents in your answer.

104) $\frac{9^{-8}}{9^3}$

104) _____

A) $\frac{1}{9^5}$

B) 9^5

C) $\frac{1}{9^{11}}$

D) 9^{11}

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.

105) $f(x) = 2 \cos 50x$

105) _____

A) $[-1, 1]$ by $[-4, 4]$

B) $[-0.2, 0.2]$ by $[-4, 4]$

C) $[-0.2, 0.2]$ by $[-1, 1]$

D) $[-10, 10]$ by $[-10, 10]$

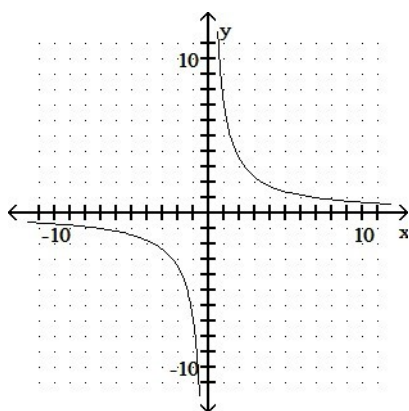
Answer: B

Diff: 0 Type: MC

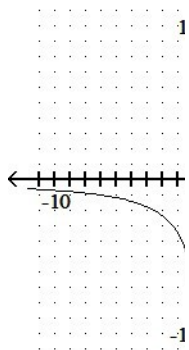
Graph the inverse of the function plotted, on the same set of axes. Use a dashed curve for the inverse.

106)

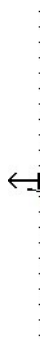
106) _____



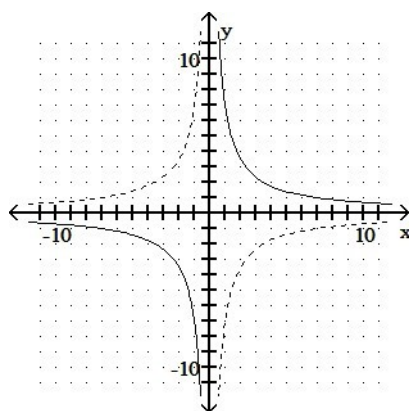
A) Function is its own inverse.



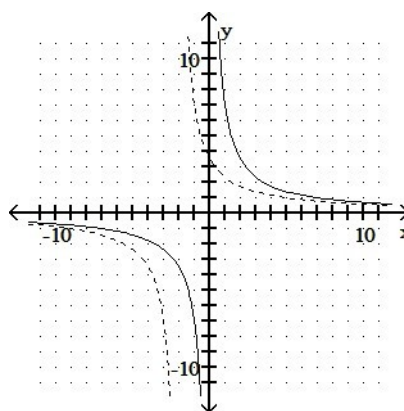
B)



C)



D)



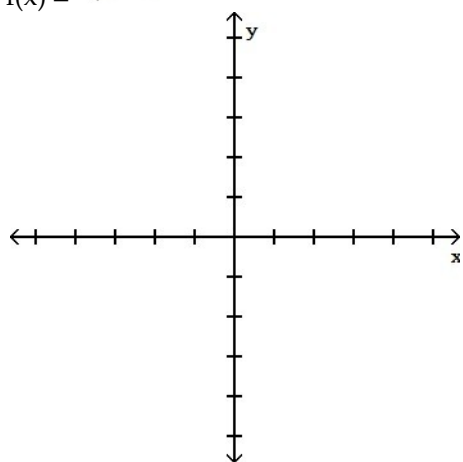
Answer: A

Diff: 0 Type: BI

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

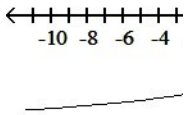
107) $f(x) = \sqrt[3]{x-3}$

107) _____



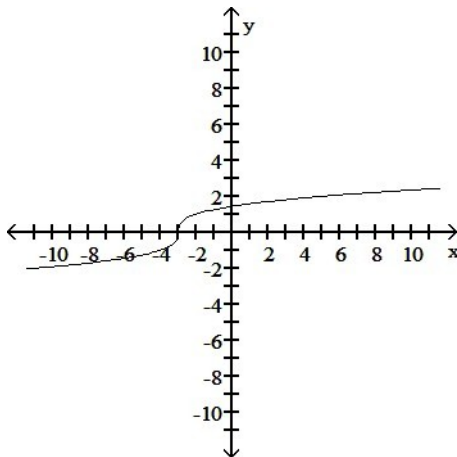
A)

B)

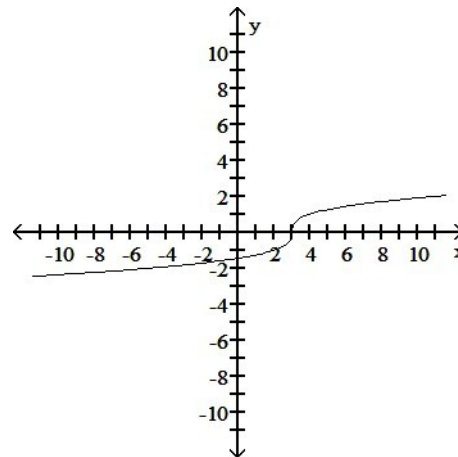


←→

C)



D)



Answer: D

Diff: 0 Type: BI

Simplify the expression.

108) $\ln(e^{7 \ln x})$

A) 7

B) x^7

C) $\ln 7$

D) $\ln x^7$

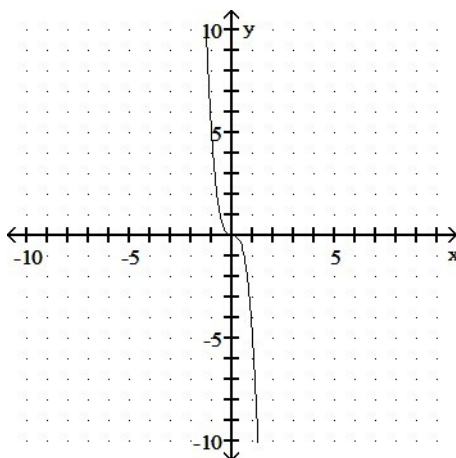
108) _____

Answer: D

Diff: 0 Type: BI

Is the function graphed below one-to-one?

109)



109) _____

A) No

B) Yes

Answer: B

Diff: 0 Type: BI

Find the domain and range of the inverse of the given function.

110) $f(x) = (7x - 6)^3$

110) _____

A) Domain: $[6, \infty)$; range: $[0, \infty)$

B) Domain and range: all real numbers

C) Domain: $[0, \infty)$; range: all real numbers

D) Domain: $[7, \infty)$; range: $[0, \infty)$

Answer: B

Diff: 0 Type: BI

Find the exact function value.

111) $\arcsin\left(-\frac{\sqrt{2}}{2}\right)$

111) _____

A) $\frac{\pi}{2}$

B) $\frac{\pi}{3}$

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

D) $\frac{\pi}{3}$

Answer: C

Diff: 0 Type: BI

Simplify the expression.

112) $2^{\log_2(5x)}$

112) _____

A) 2^{5x}

B) $5x$

C) 1

D) 2

Answer: B

Diff: 0 Type: BI

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

Solve the problem.

113) $\sin \frac{x}{2}$

113) _____

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

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.

Determine from its graph if the function is one-to-one.

114) $f(x) = \begin{cases} -1 - x, & x \leq 2 \\ 1 - 4x, & x > 2 \end{cases}$

114) _____

A) Yes

B) No

Answer: A

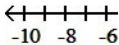
Diff: 0 Type: BI

Graph the function.

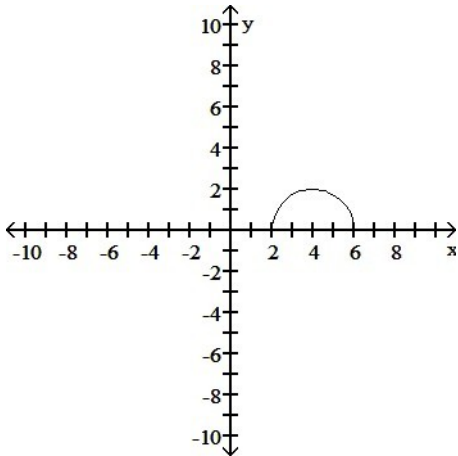
115) Graph the upper half of the circle defined by the equation $x^2 + y^2 - 8x - 6y + 21 = 0$.

115)

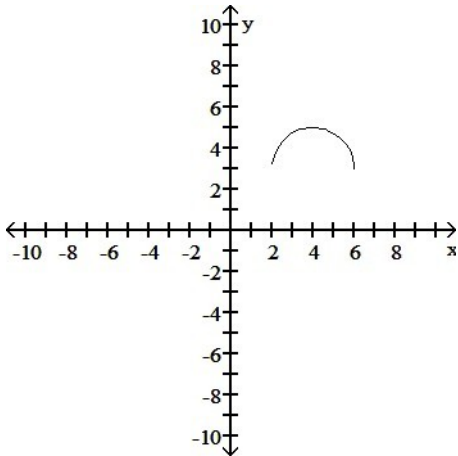
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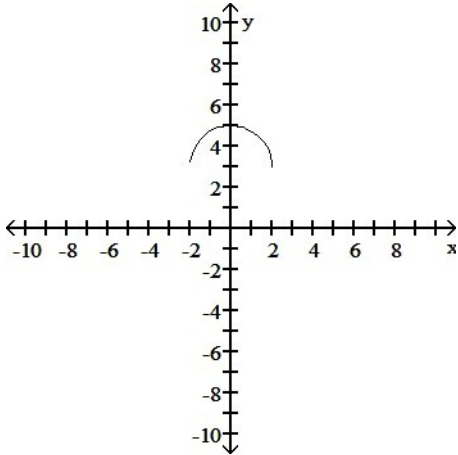
A)



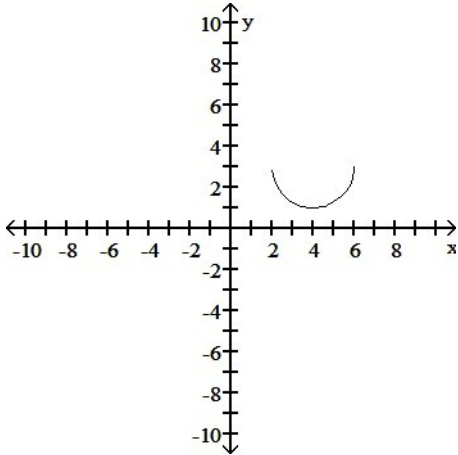
B)



C)



D)



Answer: B
Diff: 0 Type: BI

Find the inverse of the function.

116) $f(x) = (x - 6)^2, x \geq 6$

116) ____

A) $f^{-1}(x) = \sqrt{x} + 6, x \geq 0$

B) Not a one-to-one function

C) $f^{-1}(x) = -\sqrt{x} + 6, x \geq 0$

D) $f^{-1}(x) = \sqrt{x - 6}, x \geq 6$

Answer: A
Diff: 0 Type: BI

117)

$f(x) =$

$$\frac{4}{x-9}$$

117)

A) Not a one-to-one function

C) $f^{-1}(x) = \frac{-9+4x}{x}$

Answer: D

Diff: 0 Type: BI

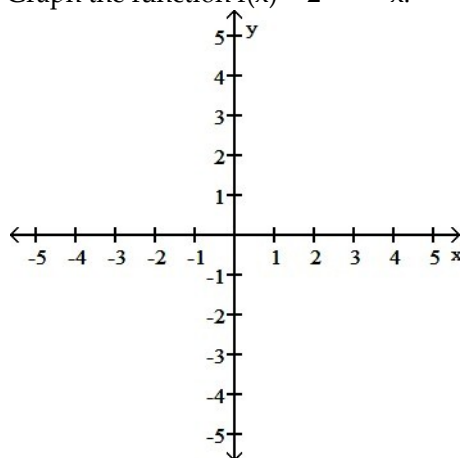
B) $f^{-1}(x) = \frac{x}{-9+4x}$

D) $f^{-1}(x) = \frac{9x+4}{x}$

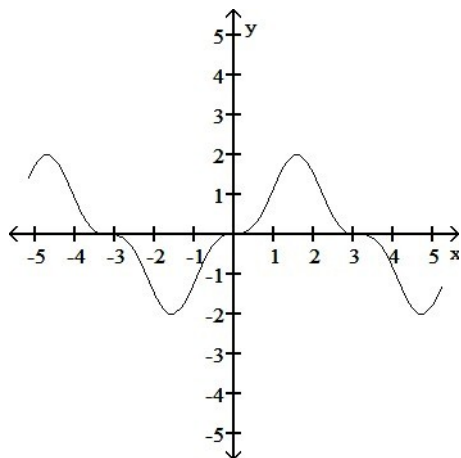
Graph the function.

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

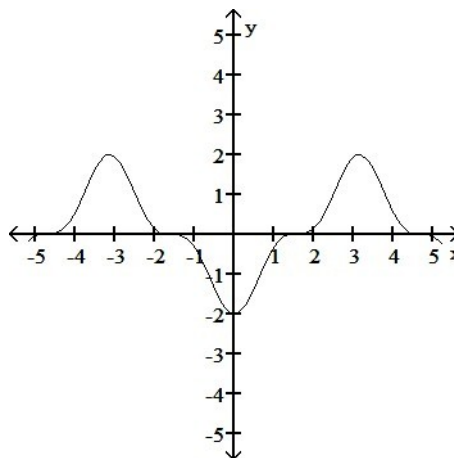
118) _____



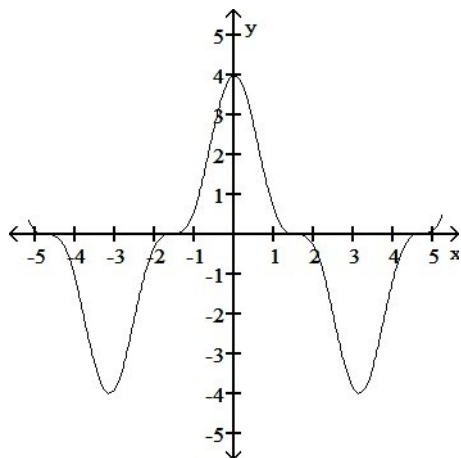
A)



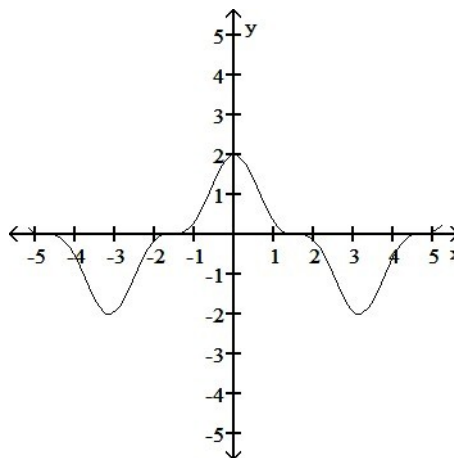
B)



C)



D)



Answer: D

Diff: 0 Type: BI

Find the inverse of the function.

119) $f(x) = 3x - 1$

A) $f^{-1}(x) = \frac{x-1}{3}$

C) Not a one-to-one function

B) $f^{-1}(x) = \frac{x}{3} + 1$

D) $f^{-1}(x) = \frac{x+1}{3}$

119) _____

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.

120) $f(x) = x^4 - 7x^2 + 3x$

A) $[-25, 15]$ by $[-5, 5]$

C) $[-5, 5]$ by $[-25, 15]$

B) $[-5, 5]$ by $[-10, 15]$

D) $[-10, 15]$ by $[-5, 5]$

Answer: C

Diff: 0 Type: MC

120) _____

Use a graph to find an approximate solution to the equation. Round to the nearest thousandth.

121) $4(2x - 1) = 24$

A) 0.646

B) 3.500

C) 1.646

D) 1.396

Answer: C

Diff: 0 Type: BI

121) _____

Solve the problem.

122) Find the amount of interest earned on the following deposit: \$1,000 at 7% compounded annually for 4 years

A) \$310.80

B) \$1310.8

C) \$402.55

D) \$225.04

Answer: A

Diff: 0 Type: BI

122) _____

State the domain and range of the function.

123) $f(x) = -4e^{-x} - 1$

A) domain: $(-\infty, \infty)$; range: $(-\infty, -1)$

C) domain: $(-\infty, \infty) \cup (-\infty, \infty)$; range: $(-\infty, -1)$

B) domain: $(-\infty, \infty)$; range: $(-\infty, \infty)$

D) domain: $(-\infty, \infty)$; range: $(-\infty, -1]$

Answer: A

Diff: 0 Type: BI

123) _____

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

124) $f(x) = \frac{x^2 - 6}{x^2 + 6}$

A) $[-5, 5]$ by $[-15, 15]$

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

B) $[-10, 10]$ by $[-2, 2]$

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

Answer: B

Diff: 0 Type: MC

124) _____

Solve for t or y, as appropriate.

125) $e^{x^2} e^{4x+7} = e^t$

125) _____

A) $4x^3 + 7x^2$

B) $x^2 + 4x + 7$

C) $x^2 - 4x - 7$

D) $\ln(x^2 + 4x + 7)$

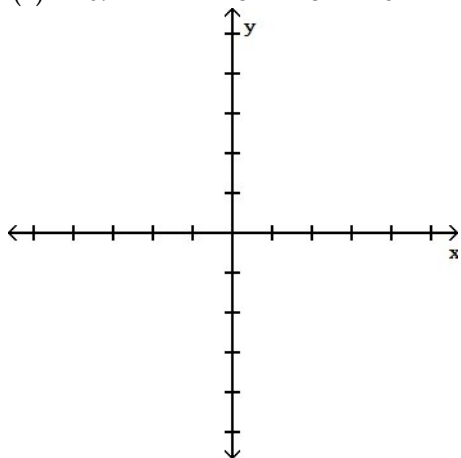
Answer: B

Diff: 0 Type: BI

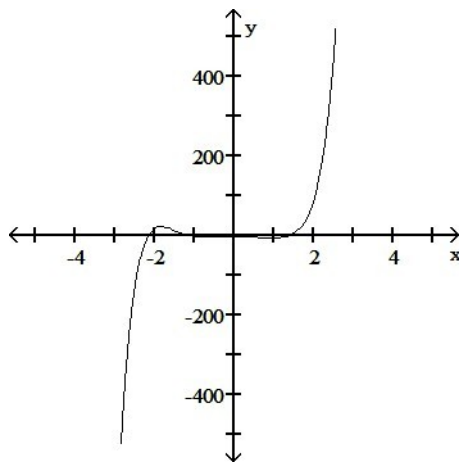
Determine an appropriate viewing window for the given function and use it to display its graph.

126) $f(x) = -0.7x^6 - x^5 + 5x^4 - 3x^3 - 6x^2 + x - 3$

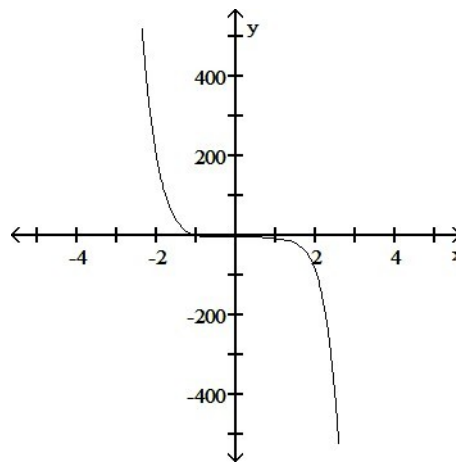
126) _____



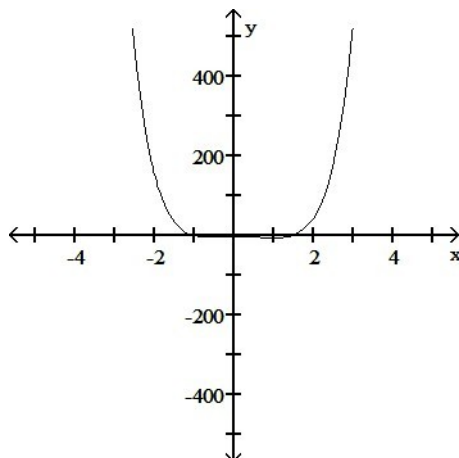
A)



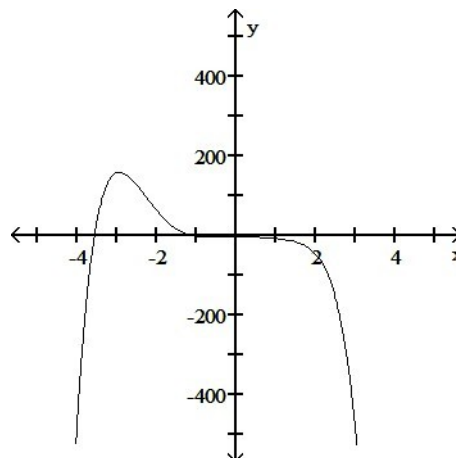
B)



C)



D)



Answer: D

Diff: 0 Type: BI

Provide an appropriate response.

127) Consider a linear function that is perpendicular to the line $y = x$. Will this function be its own inverse? Explain.

127) _____

- A) No it won't be its own inverse. The slope will be the same but the y-intercept will be different.
- B) Yes it will be its own inverse. If it is perpendicular to $y = x$ it is symmetric with respect to $y = x$. Therefore it is its own inverse.
- C) No it won't be its own inverse. Its inverse will be some other line that is perpendicular to it.
- D) Yes it will be its own inverse. All perpendicular lines are their own inverses.

Answer: B

Diff: 0 Type: BI

State the domain and range of the function.

128) $f(x) = 4^{-x} + 2$

128) _____

A) domain: $(-\infty, \infty) \cup (-\infty, \infty)$; range: $(-\infty, 2)$

B) domain: $(-\infty, \infty)$; range: $(-\infty, 2]$

C) domain: $(-\infty, \infty)$; range: $(2, \infty)$

D) domain: $(-\infty, \infty)$; range: $(-\infty, 2)$

Answer: C

Diff: 0 Type: BI

Use a graph to find an approximate solution to the equation. Round to the nearest thousandth.

129) $e^{8x} e^{3x} = e^5$

129) _____

A) 0.554

B) 0.455

C) 1.545

D) -0.635

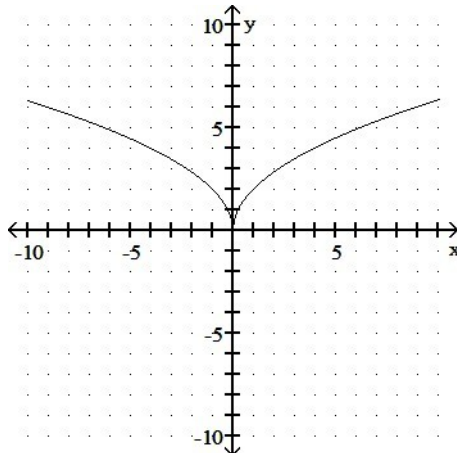
Answer: B

Diff: 0 Type: BI

Is the function graphed below one-to-one?

130)

130) _____



A) Yes

B) No

Answer: B

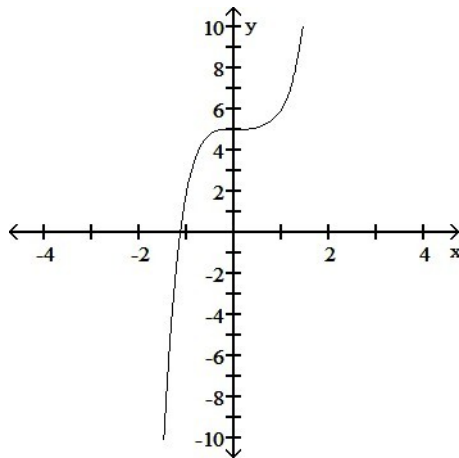
Diff: 0 Type: BI

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

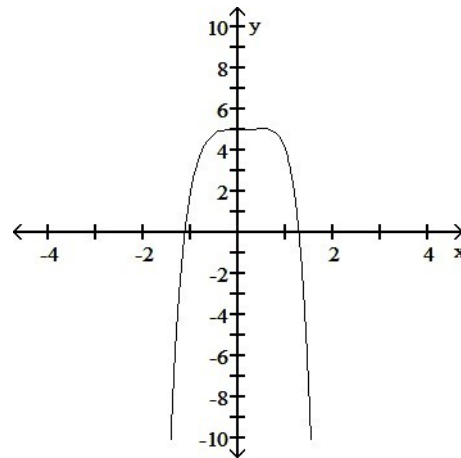
131) $f(x) = x^5 - x^4 + x^3 + 5$

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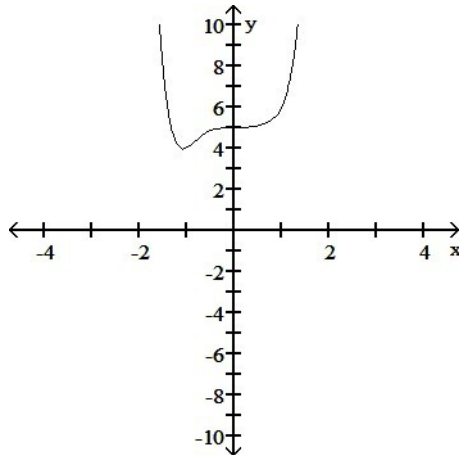
A)



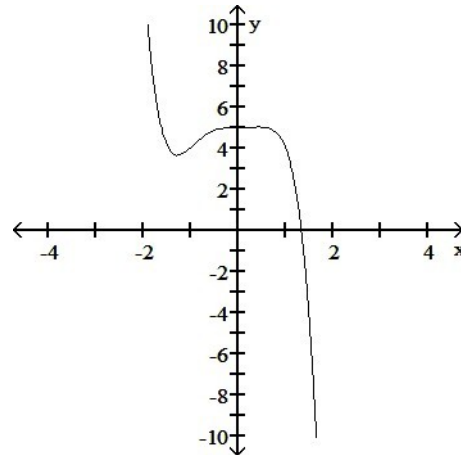
B)



C)



D)



Answer: A

Diff: 0 Type: BI

Use a graph to find an approximate solution to the equation. Round to the nearest thousandth.

132) $4^{e^{6x} - 1} = 16$

132) —

A) 0.064

B) 2.833

C) 0.398

D) 0.282

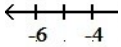
Answer: C

Diff: 0 Type: BI

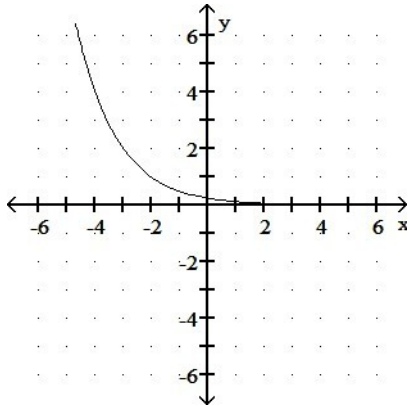
Graph the function.

133) $f(x) = \left(\frac{1}{2}\right)^x + 2$

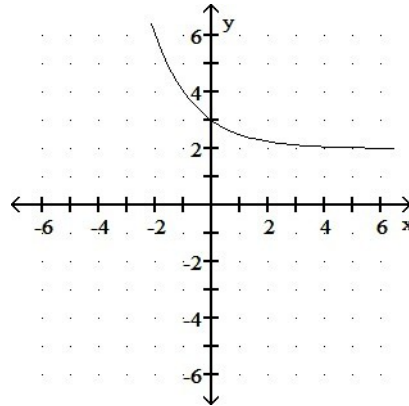
133)



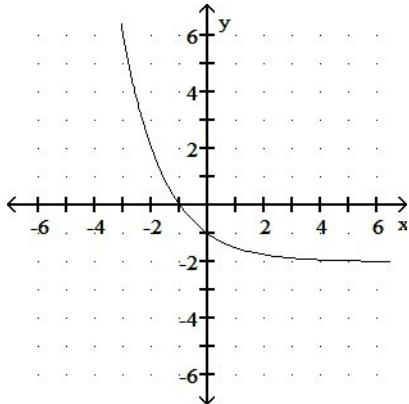
A)



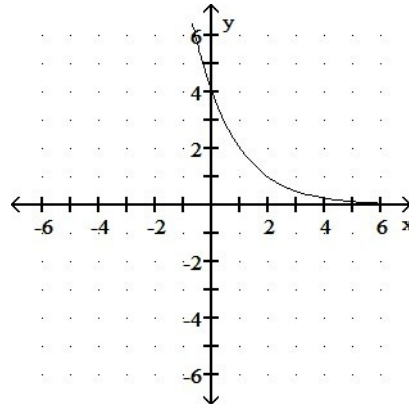
B)



C)



D)



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.

134) $y = -2 \cos(-\theta - 2\pi)$ Find B.

A) 2

B) -2π

C) 2π

D) 4

Answer: C

Diff: 0 Type: BI

Simplify the expression.

135) $\frac{1}{\log_7 7}$

A) 7

B) 1

C) 0

D) -1

134) _____

135) _____

Answer: D

Diff: 0 Type: BI

Solve for t or y, as appropriate.

136) $e^{\sqrt{t}} = x^2$

136) _____

A) x^4

B) $\sqrt{2 \ln x}$

C) $(\ln x^4)$

D) $4(\ln x)^2$

Answer: D

Diff: 0 Type: BI

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

Provide an appropriate response.

137) Derive the identity $\sec^{-1}(-x) = \pi - \sec^{-1} x$ by combining the following two equations: 137) _____

$\cos^{-1}(-x) = \pi - \cos^{-1} x$

$\sec^{-1} x = \cos^{-1}(1/x)$

Answer: $\sec^{-1}(-x) = \cos^{-1}(-1/x) = \pi - \cos^{-1}(1/x) = \pi - \sec^{-1} x$

Diff: 0 Type: SA

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

State the domain and range of the function.

138) $f(x) = \sqrt{4 + 7^{-x}}$

138) _____

A) domain: $(-\infty, \infty)$; range: $(2, \infty)$

B) domain: $(-\infty, \infty)$; range: $(0, 2)$

C) domain: $(-\infty, \infty)$; range: $(-\infty, \infty)$

D) domain: $(0, \infty)$; range: $(-\infty, \infty)$

Answer: A

Diff: 0 Type: BI

Solve for t or y, as appropriate.

139) $\ln(3 - 4y) = x$

139) _____

A) $\frac{e^x - 3}{4}$

B) $e^x + 1$

C) $\frac{3 - e^x}{4}$

D) $\frac{3 - \ln x}{4}$

Answer: C

Diff: 0 Type: BI

Simplify the expression.

140) $\ln(e^{4x})$

140) _____

A) e^4

B) $4x$

C) 4

D) $\frac{1}{4}$

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.

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

141) _____

A) $[-10, 20]$ by $[-50, 50]$

B) $[-4, 5]$ by $[-15, 25]$

C) $[-10, 10]$ by $[-10, 5]$

D) $[-4, 5]$ by $[-5, 5]$

Answer: B

Diff: 0 Type: MC

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

142)

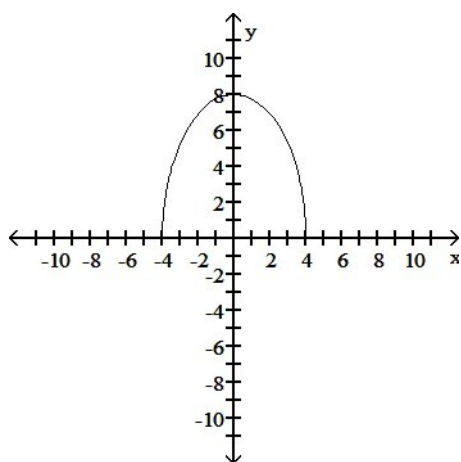
$y = 8$

$$\sqrt{\frac{16+x^2}{16}} \quad 142)$$

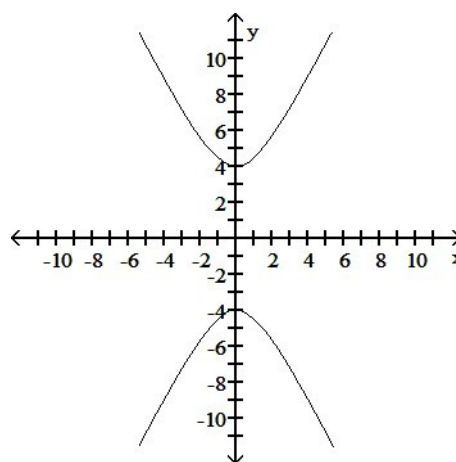
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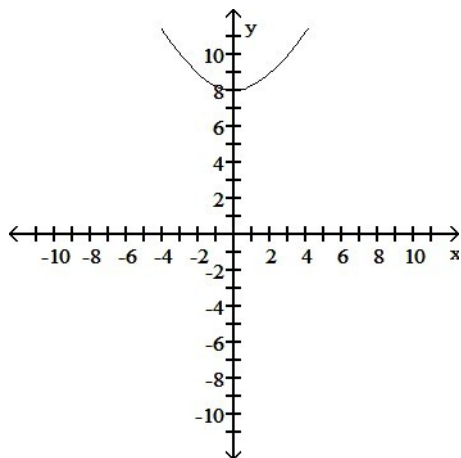
A)



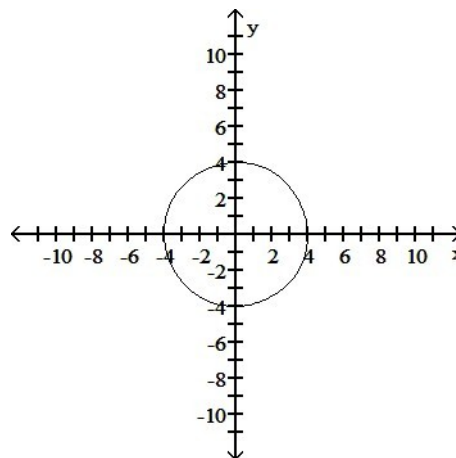
B)



C)



D)



Answer: C

Diff: 0 Type: BI

Provide an appropriate response.

143) Find the inverse of the function $f(x) = x + 7$. How is the graph of f^{-1} related to the graph of f ?

143) _____

A) $\frac{1}{x} + 7$

The graph of f^{-1} is a curve intersecting the graph of f at two points equidistant from the y -axis.

B) $f(x) = x - 7$. The graph of f^{-1} is a line parallel to the graph of f . The graphs of f and f^{-1} lie

on opposite sides of the line $y = x$ and are equidistant from that line.

C) $\frac{1}{7}$

$f(x) = x + \frac{1}{7}$. The graph of f^{-1} is a line parallel to the graph of f . The graphs of f and f^{-1} lie on the same side of the line $y = x$.

D) $f(x) = -x - 7$. The graph of f^{-1} is a line perpendicular to the graph of f at $x = 7$.

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.

144) $f(x) = |x^2 - 7|$

144) _____

A) $[0, 5]$ by $[-2, 10]$

B) $[-10, 10]$ by $[-15, 15]$

C) $[-5, 5]$ by $[-15, 15]$

D) $[-5, 5]$ by $[-2, 10]$

Answer: D

Diff: 0 Type: MC

Simplify the expression.

145) $e^{\ln 11x} - \ln 3$

145) _____

A) $\frac{11x}{3}$

B) $\frac{3x}{11}$

C) $33x$

D) $\frac{11x}{3}$

Answer: D

Diff: 0 Type: BI

146) $4 \ln \sqrt[4]{e}$

146) _____

A) $\frac{1}{4}$

B) 1

C) 4

D) e

Answer: B

Diff: 0 Type: BI

Rewrite the ratio as a ratio of natural logarithms and simplify.

147) $\frac{\log 81x}{\log 3x}$

147) _____

A) $\frac{1}{3^3}$

B) $\ln 4$

C) $\frac{1}{4}$

D) 3^3

Answer: C

Diff: 0 Type: BI

Express as a single logarithm and, if possible, simplify.

148) $\ln(3x^2 - 6x) + \ln\left(\frac{1}{3x}\right)$

148) _____

A) $\ln(x - 2)$

B) $\ln(9x^2(x - 2))$

C) $\ln\left(3x^2 - 6x + \frac{1}{3x}\right)$

D) $\ln(x - 6)$

Answer: A

Diff: 0 Type: BI

Solve the problem.

149) Find the amount of interest earned on the following deposit: \$1,000 at 6% compounded annually for 8 years 149) _____

- Diff: 0 Type: BI

150) _____

- Diff: 0 Type: BI

- Diff: 0 Type: BI

152) _____

- Diff: 0 Type: BI

153) _____

- Diff: 0 Type: BI

154) _____

155) _____

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156) _____

- Diff: 0 Type: BI

157) $(7-7)^{-6}$ 157) _____
 A) 7^{42} B) $\frac{1}{7^{42}}$ C) 7^{13} D) $\frac{1}{7^{13}}$

Answer: A

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.

158) $y = -5 \sin \left(4x + \frac{\pi}{2} \right)$ 158) _____
 Find A.
 A) -20 B) 4 C) $\frac{\pi}{2}$ D) -5

Answer: D

Diff: 0 Type: BI

Use a graph to find an approximate solution to the equation. Round to the nearest thousandth.

159) $5^{3x} = 8x + 1$ 159) _____
 A) -4.424 B) 0.756 C) 2.292 D) 1.292

Answer: B

Diff: 0 Type: BI

Solve the problem.

160) In the formula $N = I e^{kt}$, N is the number of items in terms of an initial population I at a given 160) _____
 time t and k is a growth constant equal to the percent of growth per unit time. There are
 currently 76 million cars in a certain country, increasing by 2.2% annually. How many years will
 it take for this country to have 88 million cars? Round to the nearest year.
 A) 4 yr B) 7 yr C) 5 yr D) 113 yr

Answer: B

Diff: 0 Type: BI

Find the domain and range of the inverse of the given function.

161) $f(x) = \frac{1}{9}x - 5$ 161) _____
 A) Domain and range: all real numbers
 B) Domain: $(-\infty, 9) \cup (9, \infty)$; range: all real numbers
 C) Domain: $(-\infty, 5) \cup (5, \infty)$; range: $(-\infty, 9) \cup (9, \infty)$
 D) Domain and range: $(-\infty, 9) \cup (9, \infty)$

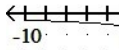
Answer: A

Diff: 0 Type: BI

Is the function graphed below one-to-one?

162)

162)



A) Yes

B) No

Answer: A

Diff: 0 Type: BI

Solve for t or y, as appropriate.

163) $\ln(y - 21) = 5x$

A) $\ln(5x) + 21$

B) $e^{5x} + 21$

C) $\frac{5x + 21}{e}$

D) $5x + 21$

163) _____

Answer: B

Diff: 0 Type: BI

Find the exact function value.

164) $\sin^{-1}\left(\frac{\sqrt{2}}{2}\right)$

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

B) $\frac{\pi}{3}$

C) $\frac{3\pi}{4}$

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

164) _____

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.

165) Use the angle sum formulas to derive $\sin(A - B) = \sin A \cos B - \cos A \sin B$.

165) _____

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.

Find the exact function value.

166) $\tan^{-1}\left(\frac{1}{\sqrt{3}}\right)$

A) $\frac{\pi}{3}$

B) $\frac{\pi}{6}$

C) $\frac{5\pi}{6}$

D) $\frac{6}{\pi}$

166) _____

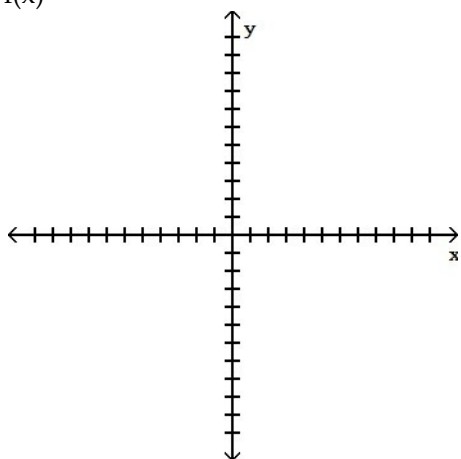
Answer: B

Diff: 0 Type: BI

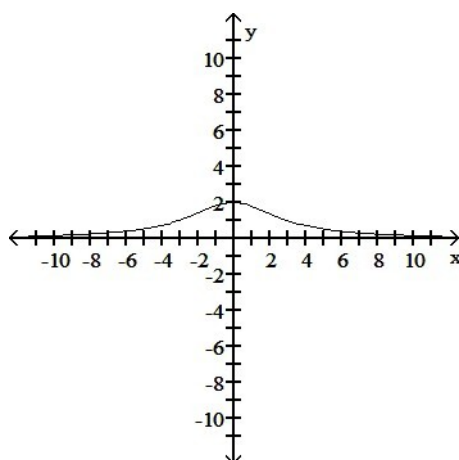
Determine an appropriate viewing window for the given function and use it to display its graph.

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

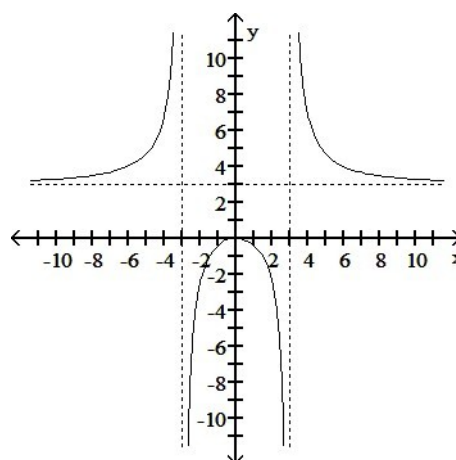
167) _____



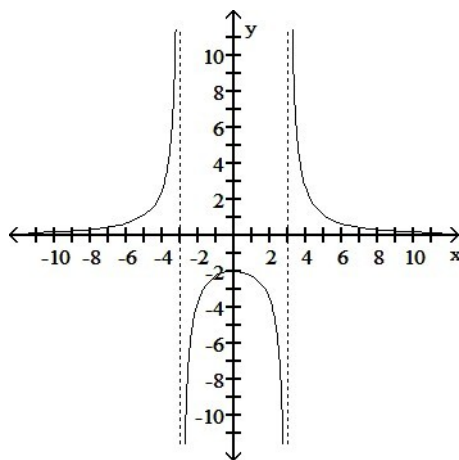
A)



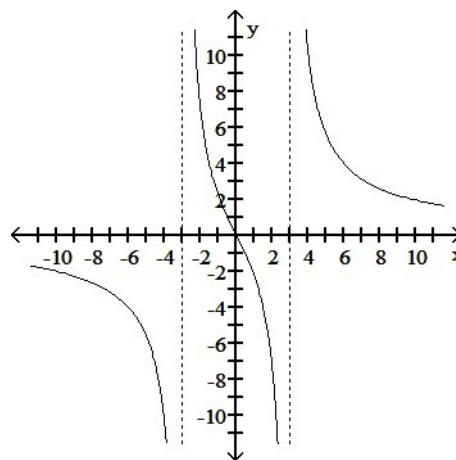
B)



C)



D)



Answer: B

Diff: 0 Type: BI

Provide an appropriate response.

168) Consider the graph of $f(x) = \sqrt{1 - x^2}$, $0 \leq x \leq 1$. What symmetry does the graph have? Is f its own inverse?

168) _____

- A) The graph of f is symmetric with respect to the y -axis. The function f is its own inverse because $(f \circ f)(x) = x$.
- B) The graph of f has no symmetry. The function f is not its own inverse because there is no symmetry.

- C) The graph of f is symmetric with respect to the y -axis. The function f is not its own inverse because $(f \circ f)(x) = |x|$.
- D) The graph of f is symmetric with respect to the line $y = x$. The function f is its own inverse because $(f \circ f)(x) = x$.

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.

- 169) A triangle has sides $a = 4$ and $b = 3$ and angle $C = 40^\circ$. Find the length of side c . 169) _____
- A) 3.976 B) 3.094 C) 6.615 D) 2.572

Answer: D

Diff: 0 Type: BI

Use a graph to find an approximate solution to the equation. Round to the nearest thousandth.

- 170) $6^x + 7 = 7^x$ 170) _____
- A) -81.364 B) 81.364 C) 79.554 D) 83.174

Answer: B

Diff: 0 Type: BI

Find the exact function value.

- 171) $\sec^{-1}(\sqrt{2})$ 171) _____
- A) $\frac{3\pi}{4}$ B) $\frac{7\pi}{4}$
- C) $\frac{\pi}{4} \pm 2\pi n, \frac{7\pi}{4} \pm 2\pi n$ D) $\frac{\pi}{4}$

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.

- 172) $y = -3 \sin \left(6x + \frac{\pi}{2} \right)$ Find B. 172) _____
- A) 3 B) 6 C) $\frac{\pi}{3}$ D) π

Answer: C

Diff: 0 Type: BI

Solve the problem.

- 173) In the formula $N = I e^{kt}$, N is the number of items in terms of an initial population I at a given time t and k is a growth constant equal to the percent of growth per unit time. How long will it take for the population of a certain country to triple if its annual growth rate is 6.5%? Round to the nearest year. 173) _____
- A) 1 yr B) 46 yr C) 7 yr D) 17 yr

Answer: D

Diff: 0 Type: BI

Simplify the expression.

- 174) $e^{-\ln x^7}$ 174) _____

A) $\frac{1}{x^7}$

B) 7

C) $\frac{1}{e^{x^7}}$

D) x^7

Answer: A

Diff: 0 Type: BI

Express the following logarithm as specified.

175) $\ln 0.75$ in terms of $\ln 2$ and $\ln 3$

A) $2 \ln 3 + \ln 2$

B) $\ln 3 - 2 \ln 2$

C) $\ln 3 + 2 \ln 2$

D) $\ln 3 - \ln 2$

175) _____

Answer: B

Diff: 0 Type: BI

Solve the problem.

176) The number of acres in a landfill decreases according to the function $B = 3400e^{-0.03t}$, where t is measured in years. How many acres will the landfill have after 7 years?

A) 2756 acres

B) 2096 acres

C) 2304 acres

D) 5306 acres

176) _____

Answer: A

Diff: 0 Type: BI

Determine from its graph if the function is one-to-one.

177)
$$f(x) = \begin{cases} 1 + \frac{x}{4}, & x \geq 0 \\ \frac{x}{x-4}, & x < 0 \end{cases}$$

177) _____

A) Yes

B) No

Answer: A

Diff: 0 Type: BI

Solve the problem.

178) The population of a small country increases according to the function $B = 1,100,000e^{0.04t}$, where t is measured in years. How many people will the country have after 9 years?

178) _____

A) 1,123,816 people

B) 488,067 people

C) 2,519,954 people

D) 1,576,662 people

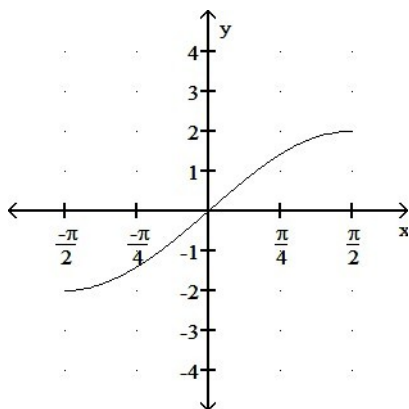
Answer: D

Diff: 0 Type: BI

Graph the inverse of the function plotted, on the same set of axes. Use a dashed curve for the inverse.

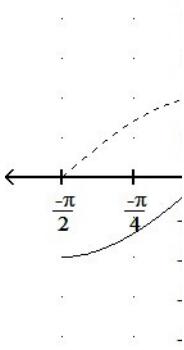
179)

179) _____



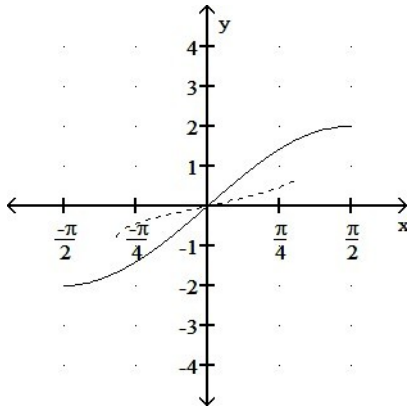
A)

B)

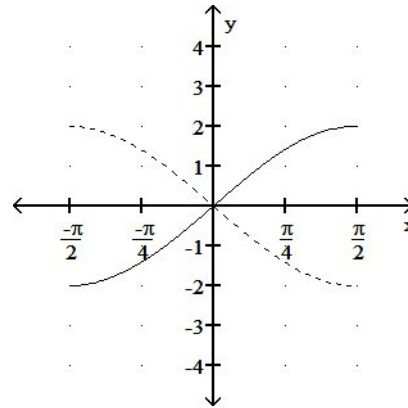


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C)



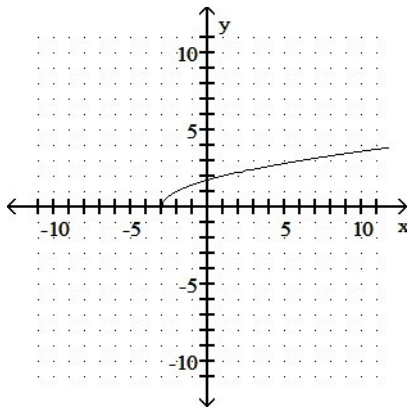
D)



Answer: C

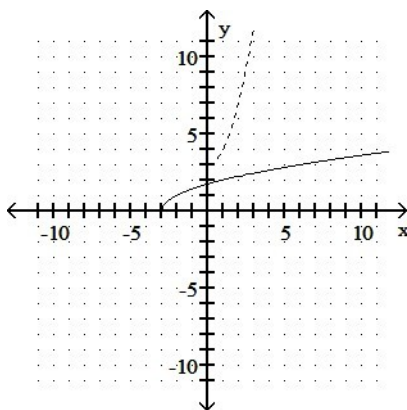
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180)

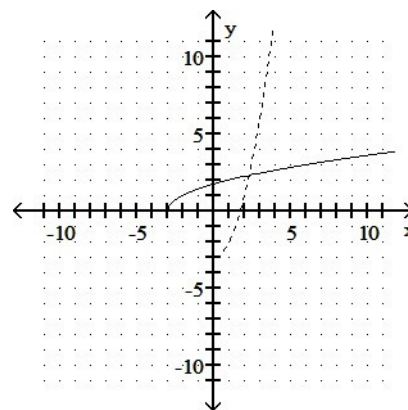


180) _____

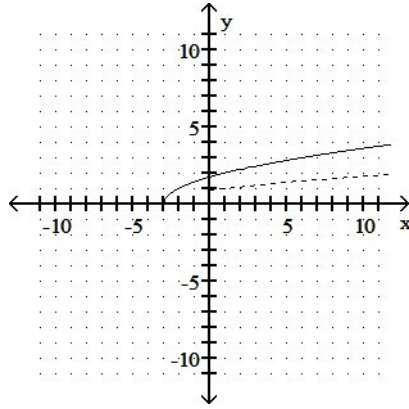
A)



B)



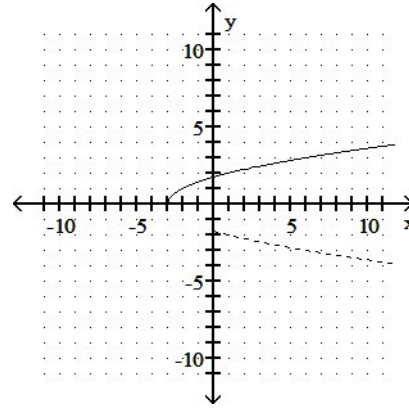
C)



Answer: B

Diff: 0 Type: BI

D)



Use a graph to find an approximate solution to the equation. Round to the nearest thousandth.

181) $11^3 - x = 22$

181) _____

A) -1.000

B) 1.711

C) 1.000

D) 3.776

Answer: B

Diff: 0 Type: BI

Find the domain and range of the inverse of the given function.

182) $f(x) = -\frac{1}{x}$

182) _____

A) Domain and range: all real numbers

B) Domain: $(-\infty, 0) \cup (0, \infty)$; range: $(-\infty, 0)$ C) Domain: $(0, \infty)$; range: $(-\infty, 0)$ D) Domain and range: $(-\infty, 0) \cup (0, \infty)$

Answer: D

Diff: 0 Type: BI

Solve for t or y, as appropriate.

183) $\ln(y - 9) - \ln 7 = x + \ln x$

183) _____

A) $7x e^x + 9$

B) $e^x + 7x + 9$

C) $2x + 16$

D) $(x + 7)e^x + 9$

Answer: A

Diff: 0 Type: BI

Solve the problem.

184) The decay of 220 mg of an isotope is given by $A(t) = 220e^{-0.016t}$, where t is time in years. Find the amount left after 73 years.

184) _____

A) 34 mg

B) 67 mg

C) 217 mg

D) 68 mg

Answer: D

Diff: 0 Type: BI

Simplify the expression.

185) $\log_8 \frac{1}{64}$

185) _____

A) -8

B) 2

C) 8

D) -2

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.

186) $y = 2 \sin(-3\theta + 2\pi)$ Find C.

186) _____

A) $\frac{\pi}{8}$

B) $\frac{\pi}{8}$

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

D) $\frac{4}{3}\pi$

Answer: C

Diff: 0 Type: BI

Rewrite the ratio as a ratio of natural logarithms and simplify.

187) $\frac{\log_{12} x}{\log_{13} x}$

187) _____

A) $\frac{12}{13}$

B) $\frac{\ln 12}{\ln 13}$

C) $\frac{13}{12}$

D) $\frac{\ln 13}{\ln 12}$

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.

188) 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?

188) _____

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.

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.

189) $y = 4 - \frac{1}{2} \sin \left(\frac{1}{2}\theta + 2\pi \right)$ Find D.

189) _____

A) 1

B) -4

C) π

D) 4

Answer: D

Diff: 0 Type: BI

Provide an appropriate response.

190) If $f(x)$ is one-to-one, is $g(x) = f(-x)$ also one-to-one? Explain.

190) _____

A) $g(x)$ is a reflection of $f(x)$ across the line $y = x$. It will not be one-to-one.

B) $g(x)$ is a reflection of $f(x)$ across the y -axis. It will be one-to-one.

C) $g(x)$ is a reflection of $f(x)$ across the x -axis. It will be one-to-one.

D) There is not enough information to determine whether $g(x)$ is one-to-one.

Answer: B

Diff: 0 Type: BI

Find the domain and range of the inverse of the given function.

191) $f(x) = x^6 + 9, x \geq 0$

191) _____

A) Domain: $[9, \infty)$; range: $[0, \infty)$

B) Domain and range: all real numbers

C) Domain: $[0, \infty)$; range: $[9, \infty)$

D) Domain: $(-\infty, 0]$; range: $(-\infty, 9]$

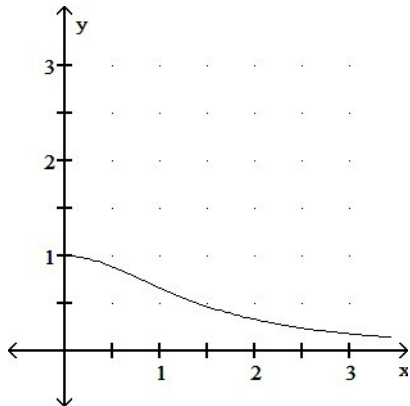
Answer: A

Diff: 0 Type: BI

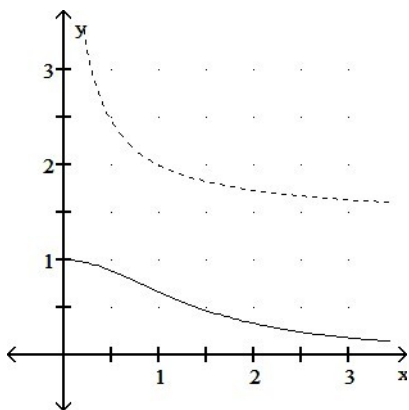
Graph the inverse of the function plotted, on the same set of axes. Use a dashed curve for the inverse.

192)

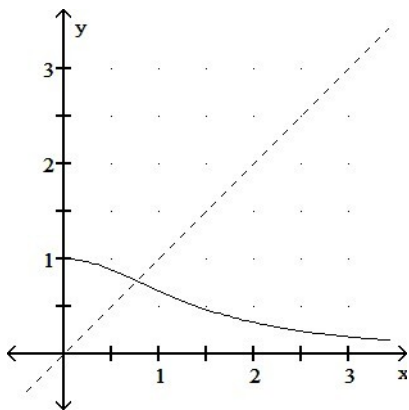
192) _____



A)



C)



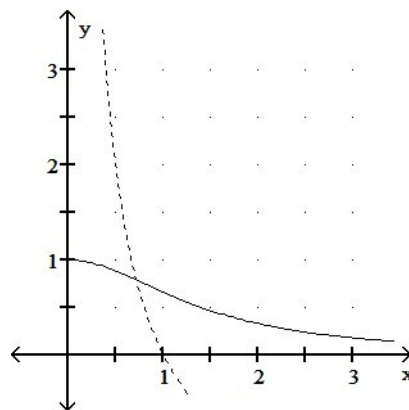
Answer: D

Diff: 0 Type: BI

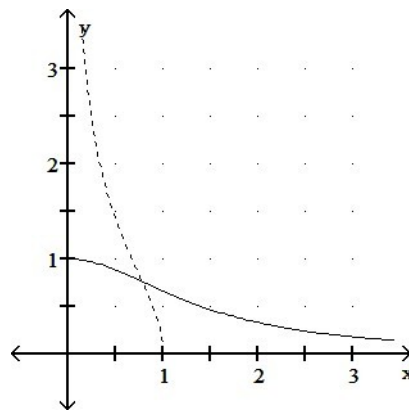
Graph the function.

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

B)



D)

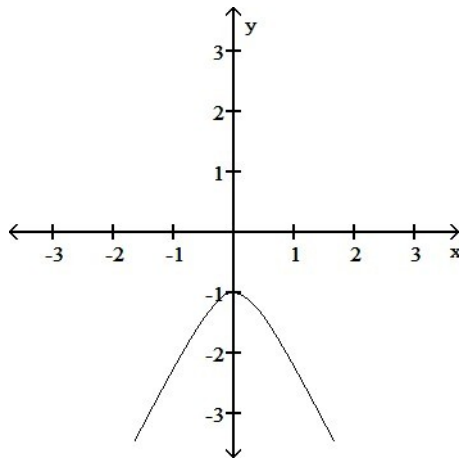


193)

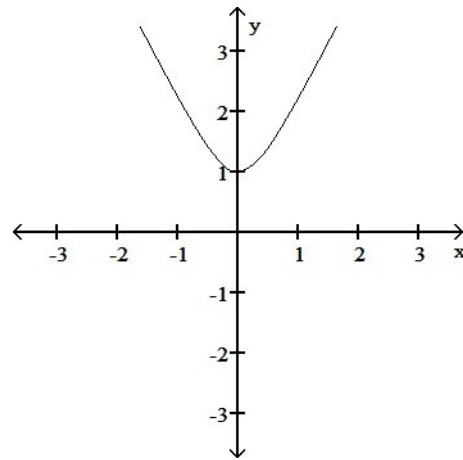
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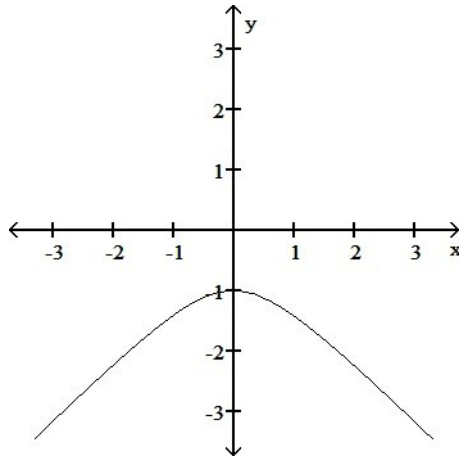
A)



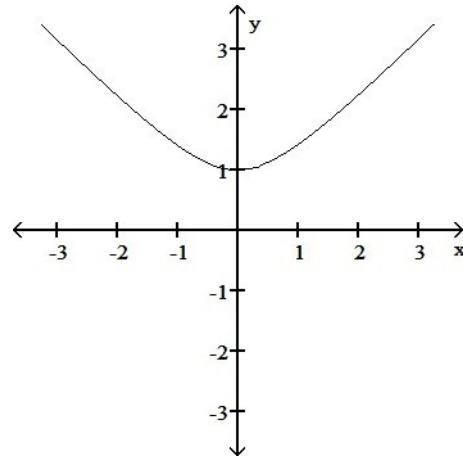
B)



C)



D)



Answer: A

Diff: 0 Type: BI

Find the exact function value.

194) $\operatorname{arccsc}(-2)$

A) $\frac{\pi}{6}$

B) $\frac{\pi}{3}$

C) $-\frac{\pi}{3}$

D) $-\frac{\pi}{6}$

194) _____

Answer: D

Diff: 0 Type: BI

195) $\tan^{-1}(1)$

A)

195) _____

k is a 200)

growth
constant
equal to
the
percent
of
growth
per unit
time.

How
long will
it take
for the
populati
on of a
certain
country
to
double if
its
annual
growth
rate is
4.3%?

Round to
the
nearest
year.

A) 7 yr

B) 16 yr

C) 47 yr

D) 1 yr

Answer: B

Diff: 0 Type: BI

- 1) B
- 2) B
- 3) C
- 4) A
- 5) C
- 6) A
- 7) A
- 8) A
- 9) A
- 10) D
- 11) A
- 12) A
- 13) B
- 14) C
- 15) D
- 16) D
- 17) A
- 18) 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 at a maximum point.
- 19) B
- 20) C
- 21) A
- 22) C
- 23) A
- 24) D
- 25) D
- 26) A
- 27) B
- 28) D
- 29) B
- 30) C
- 31) C
- 32) A
- 33) A
- 34) A
- 35) B
- 36) A
- 37) A
- 38) B
- 39) B
- 40)
$$\tan (A - B) = \frac{\sin (A - B)}{\cos (A - B)} = \frac{\sin A \cos B - \sin B \cos A}{\cos A \cos B + \sin A \sin B} = \frac{(\cos A \cos B)^{-1}(\sin A \cos B - \sin B \cos A)}{(\cos A \cos B)^{-1}(\cos A \cos B + \sin A \sin B)} = \frac{\tan A - \tan B}{1 + \tan A \tan B}.$$
- 41) C
- 42) B
- 43) A
- 44) D
- 45) C

- 46) A
- 47) C
- 48) B
- 49) D
- 50) B
- 51) A
- 52) C
- 53) A
- 54) B
- 55) A
- 56) A
- 57) A
- 58) C
- 59) D
- 60) C
- 61) D
- 62) D
- 63) B
- 64) A
- 65) D
- 66) B
- 67) D
- 68) D
- 69) C
- 70) C
- 71) D
- 72) B
- 73) A
- 74) A
- 75) D
- 76) D
- 77) C
- 78) C
- 79) C
- 80) C
- 81) B
- 82) C
- 83) D
- 84) A
- 85) D
- 86) A
- 87) C
- 88) B
- 89) B
- 90) D
- 91) C
- 92) D
- 93) D
- 94) C
- 95) B
- 96) A
- 97) C

- 98) C
- 99) D
- 100) B
- 101) C
- 102) A
- 103) D
- 104) C
- 105) B
- 106) A
- 107) D
- 108) D
- 109) B
- 110) B
- 111) C
- 112) B
- 113)

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.

- 114) A
- 115) B
- 116) A
- 117) D
- 118) D
- 119) D
- 120) C
- 121) C
- 122) A
- 123) A
- 124) B
- 125) B
- 126) D
- 127) B
- 128) C
- 129) B
- 130) B
- 131) A
- 132) C
- 133) B
- 134) C
- 135) D
- 136) D
- 137)
- 138) A
- 139) C
- 140) B
- 141) B
- 142) C
- 143) B
- 144) D

$$137) \sec^{-1}(-x) = \cos^{-1}(-1/x) = \pi - \cos^{-1}(1/x) = \pi - \sec^{-1} x$$

- 145) D
- 146) B
- 147) C
- 148) A
- 149) D
- 150) B
- 151) B
- 152) D
- 153) B
- 154) C
- 155) A
- 156) D
- 157) A
- 158) D
- 159) B
- 160) B
- 161) A
- 162) A
- 163) B
- 164) D
- 165) $\sin (A - B)$
 $= \sin (A + (-B))$
 $= \sin A \cos (-B) + \cos A \sin (-B)$
 $= \sin A \cos B - \cos A \sin B$
- 166) B
- 167) B
- 168) D
- 169) D
- 170) B
- 171) D
- 172) C
- 173) D
- 174) A
- 175) B
- 176) A
- 177) A
- 178) D
- 179) C
- 180) B
- 181) B
- 182) D
- 183) A
- 184) D
- 185) D
- 186) C
- 187) D
- 188) 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.
- 189) D
- 190) B
- 191) A

- 192) D
- 193) A
- 194) D
- 195) A
- 196) B
- 197) D
- 198) A
- 199) B
- 200) B