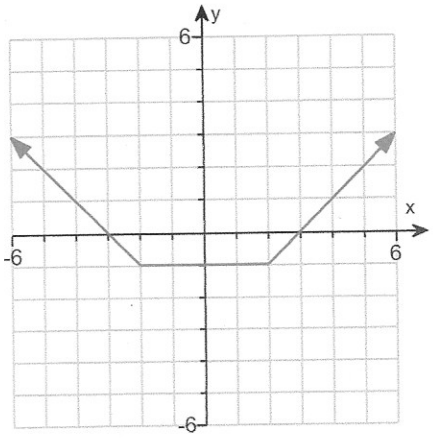
1. From the graph of the function, state the intervals on which the function is increasing, decreasing, or constant.



The function is increasing on what interval?

- A. $(2, \infty)$
- B. $[-1, \infty]$
- C. $(-1, \infty)$
- D. $[2, \infty)$

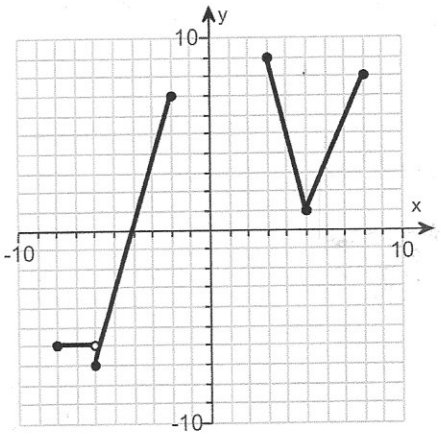
The function is constant on what interval?

- A. $[-2, 2]$
- B. $[-1, 2]$
- C. $(-1, 4)$
- D. $(-2, 2)$

The function is decreasing on what interval?

- A. $(-\infty, -2]$
- B. $(-1, \infty)$
- C. $(-\infty, -2)$
- D. $[-2, 2]$

2. Determine intervals on which the function is increasing, decreasing, and constant.



On what intervals is the function increasing?

- A. $(-6, -2)$
- B. $(-6, -2)$ and $(5,8)$
- C. $(-8, -6)$ and $(3,8)$
- D. $(3,8)$

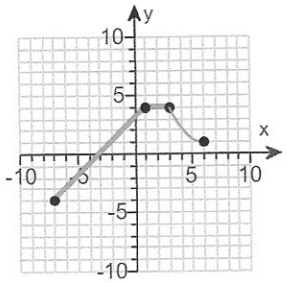
On what interval is the function decreasing?

(_____, _____)

On what interval is the function constant?

(_____, _____)

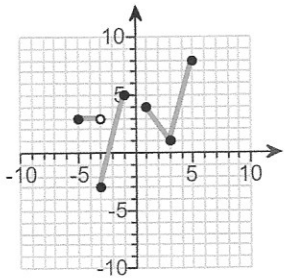
3. Determine the domain and the range of the given graph of a function.



The domain of the graph of the function is _____.
(Type your answer in interval notation.)

The range of the graph of the function is _____.
(Type your answer in interval notation.)

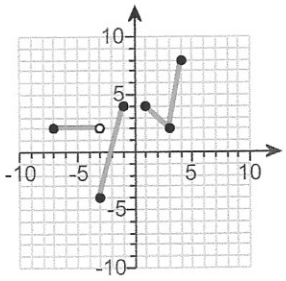
4. Determine the domain and the range of the given graph of a function.



The domain of the graph of the function is _____.
(Type your answer in interval notation.)

The range of the graph of the function is _____.
(Type your answer in interval notation.)

5. Determine the domain and the range of the given graph of a function.



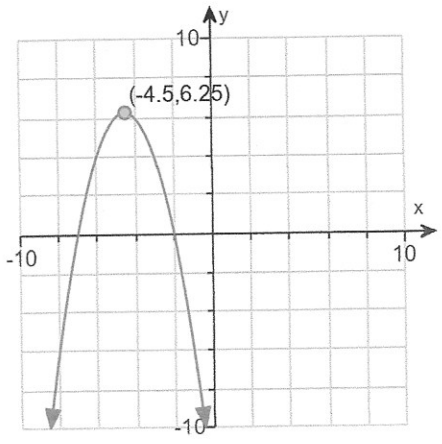
The domain of the graph of the function is _____.
(Type your answer in interval notation.)

The range of the graph of the function is _____.
(Type your answer in interval notation.)

6.

Determine any relative maxima or minima of the function and the intervals on which the function is increasing or decreasing.

$f(x) = -x^2 - 9x - 14$



Does the function have a relative maximum or minimum?

- ○ Relative minimum
- ○ Relative maximum

The relative maximum occurs at $x =$ _____ and has a value of _____.

On what interval is the function increasing?

- ○ **A.** $(-\infty, -4.5)$
- ○ **B.** $(-\infty, 6.25)$
- ○ **C.** $(6.25, \infty)$
- ○ **D.** $(-4.5, \infty)$

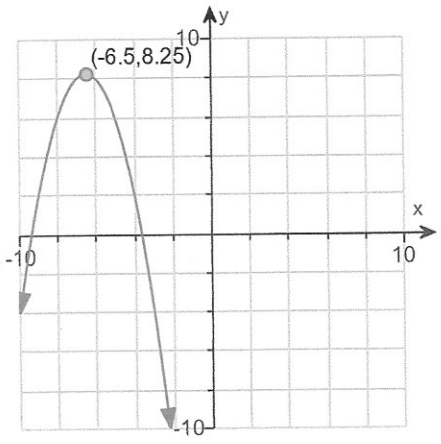
On what interval is the function decreasing?

- ○ **A.** $(-\infty, 6.25)$
- ○ **B.** $(-\infty, -4.5)$
- ○ **C.** $(-4.5, \infty)$
- ○ **D.** $(6.25, \infty)$

7.

Determine any relative maxima or minima of the function and the intervals on which the function is increasing or decreasing.

$f(x) = -x^2 - 13x - 34$



Does the function have a relative maximum or minimum?

- ○ Relative maximum
- ○ Relative minimum

The relative maximum occurs at x = _____ and has a value of _____.

On what interval is the function increasing?

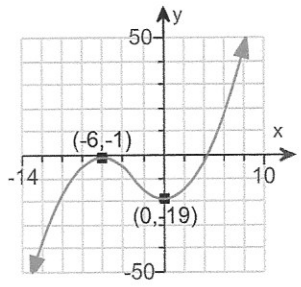
- ○ **A.** $(-\infty, -6.5)$
- ○ **B.** $(8.25, \infty)$
- ○ **C.** $(-6.5, \infty)$
- ○ **D.** $(-\infty, 8.25)$

On what interval is the function decreasing?

- ○ **A.** $(-\infty, 8.25)$
- ○ **B.** $(-\infty, -6.5)$
- ○ **C.** $(-6.5, \infty)$
- ○ **D.** $(8.25, \infty)$

8.

Identify any relative maxima or minima, and intervals on which the function is decreasing and increasing.



The relative maximum is _____ at x = _____.

The relative minimum is _____ at x = _____.

On which intervals is the function increasing?

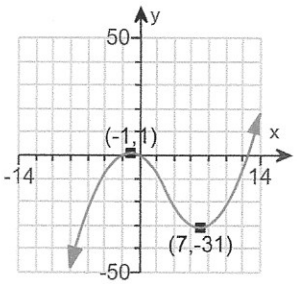
- **A.** $(-6, 0)$ and $(0, \infty)$
- **B.** $(-6, -1)$ and $(0, -19)$
- **C.** $(-\infty, -6)$ and $(0, \infty)$
- **D.** $(-\infty, -6)$ and $(-3, 0)$

On which interval is the function decreasing?

- **A.** $(-\infty, -6)$
- **B.** $(-6, 0)$
- **C.** $(0, \infty)$
- **D.** $(-6, -1)$

9.

Identify any relative maxima or minima, and intervals on which the function is decreasing and increasing.



The relative maximum is _____ at x = _____.

The relative minimum is _____ at x = _____.

On which intervals is the function increasing?

- **A.** $(-1, 1)$ and $(7, -31)$
- **B.** $(-\infty, -1)$ and $(7, \infty)$
- **C.** $(-1, 7)$ and $(7, \infty)$
- **D.** $(-\infty, -1)$ and $(3, 7)$

On which interval is the function decreasing?

- **A.** $(-1, 1)$
- **B.** $(7, \infty)$
- **C.** $(-\infty, -1)$
- **D.** $(-1, 7)$

10. Yardbird Landscaping has 60 m of fencing with which to enclose a rectangular garden. If the garden is x meters long, express the garden's area as a function of the length.

Which of the following expresses the area of the garden as a function of the length?

- **A.** $A(x) = 30x - x^2$
- **B.** $A(x) = 60x + x^2$
- **C.** $A(x) = 30x + x^2$
- **D.** $A(x) = 60x - x^2$

1. Given that $f(x) = x - 1$ and $g(x) = x^2 - x$, find $(f+g)(2)$, if it exists.

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. $(f+g)(2) =$ _____ (Simplify your answer.)
- B. The value for $(f+g)(2)$ does not exist.

2. Given that $f(x) = x^2 - 6$ and $g(x) = 5 - x$, find $(f-g)(-8)$, if it exists.

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. $(f-g)(-8) =$ _____ (Simplify your answer.)
- B. The value for $(f-g)(-8)$ does not exist.

3. Given that $f(x) = x^2 - 3$ and $g(x) = -5x + 2$, find $\left(\frac{f}{g}\right)\left(\frac{2}{5}\right)$, if it exists.

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. $\left(\frac{f}{g}\right)\left(\frac{2}{5}\right) =$ _____
- B. The value for $\left(\frac{f}{g}\right)\left(\frac{2}{5}\right)$ does not exist.

4. Given that $f(x) = x^2 - 6$ and $g(x) = 2x + 1$, find $(fg)\left(-\frac{1}{2}\right)$, if it exists.

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. $(fg)\left(-\frac{1}{2}\right) =$ _____ (Simplify your answer.)
- B. The value for $(fg)\left(-\frac{1}{2}\right)$ does not exist.

5. For the pair of functions, find the indicated sum, difference, product, or quotient.

$f(x) = 8x - 9$, $g(x) = 5x - 2$

Find $(f-g)(x)$.

- A. $-3x + 7$
- B. $3x - 11$
- C. $13x - 11$
- D. $3x - 7$

6. Given that $f(x) = x^2 - 7$ and $g(x) = 5x + 14$, find $(g - f)(0)$, if it exists.

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** $(g - f)(0) =$ _____ (Simplify your answer.)
- **B.** $(g - f)(0)$ does not exist.

7. Given that $h(x) = x + 7$ and $g(x) = \sqrt{x - 4}$, find $(h / g)(4)$, if it exists.

Choose the correct answer below.

- **A.** 4
- **B.** -4
- **C.** undefined
- **D.** 0

8. Given that $f(x) = x^2 - 11$ and $g(x) = 8 - x$, find $(f - g)(-1)$, if it exists.

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** $(f - g)(-1) =$ _____ (Simplify your answer.)
- **B.** The value for $(f - g)(-1)$ does not exist.

9. The functions f and g are defined as $f(x) = x^3$ and $g(x) = 3x^2 + 13x - 10$.

a) Find the domain of f, g, f + g, f − g, fg, ff, $\frac{f}{g}$, and $\frac{g}{f}$.

b) Find (f + g)(x), (f − g)(x), (fg)(x), (ff)(x), $\left(\frac{f}{g}\right)(x)$, and $\left(\frac{g}{f}\right)(x)$.

a) The domain of f is _____.
(Type your answer in interval notation.)

The domain of g is _____.
(Type your answer in interval notation.)

The domain of f + g is _____.
(Type your answer in interval notation.)

The domain of f − g is _____.
(Type your answer in interval notation.)

The domain of fg is _____.
(Type your answer in interval notation.)

The domain of ff is _____.
(Type your answer in interval notation.)

The domain of $\frac{f}{g}$ is _____.
(Type your answer in interval notation.)

The domain of $\frac{g}{f}$ is _____.
(Type your answer in interval notation.)

b) (f + g)(x) = _____ (Simplify your answer.)

(f − g)(x) = _____ (Simplify your answer.)

(fg)(x) = _____ (Simplify your answer.)

(ff)(x) = _____ (Simplify your answer.)

$\left(\frac{f}{g}\right)(x)$ = _____ (Simplify your answer.)

$\left(\frac{g}{f}\right)(x)$ = _____ (Simplify your answer.)

10. Given that $f(x) = x + 1$ and $g(x) = x^2 - x$, find (f + g)(4), if it exists.

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** (f + g)(4) = _____ (Simplify your answer.)
- **B.** The value for (f + g)(4) does not exist.

11. Given that $f(x) = x^2 - 9$ and $g(x) = 2x + 11$, find $(g - f)(-9)$, if it exists.

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** $(g - f)(-9) =$ _____ (Simplify your answer.)
- **B.** $(g - f)(-9)$ does not exist.

12. For the pair of functions, find the indicated sum, difference, product, or quotient.

$f(x) = 6x - 7$, $g(x) = 2x - 3$

Find $(f - g)(x)$.

- **A.** $4x - 10$
- **B.** $8x - 10$
- **C.** $4x - 4$
- **D.** $-4x + 4$

1. Let $f(x) = -5x - 1$ and $g(x) = x^2 + 2$.

Find $(f \circ g)(-1)$.

Then $(f \circ g)(-1) =$ _____. (Simplify your answer.)

2. Given that $f(x) = 2x + 1$ and $h(x) = x^3$, find $(h \circ f)(3)$.

$(h \circ f)(3) =$ _____
(Simplify your answer.)

3. Given that $f(x) = 3x + 5$ and $g(x) = x^2 - 4x - 6$, find $(g \circ f)(7)$.

$(g \circ f)(7) =$ _____
(Simplify your answer.)

4. Given that $f(x) = 3x + 4$ and $g(x) = x^3$, find $(f \circ g)(-5)$.

$(f \circ g)(-5) =$ _____

5. Find $(f \circ g)(x)$ and $(g \circ f)(x)$ and the domain of each.

$f(x) = x + 20$, $g(x) = x - 20$

$(f \circ g)(x) =$ _____ (Simplify your answer.)

$(g \circ f)(x) =$ _____ (Simplify your answer.)

The domain of $(f \circ g)(x)$ is _____. (Type your answer in interval notation.)

The domain of $(g \circ f)(x)$ is _____. (Type your answer in interval notation.)

6. Find $(f \circ g)(x)$ and $(g \circ f)(x)$ and the domain of each.

$f(x) = x + 4$, $g(x) = 2x^2 - 7x - 4$

$(f \circ g)(x) =$ _____ (Simplify your answer.)

The domain of $(f \circ g)(x)$ is _____. (Type your answer in interval notation.)

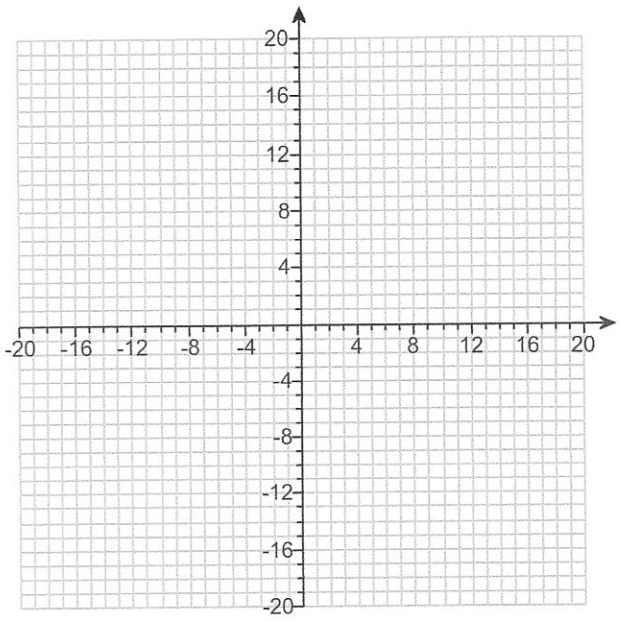
$(g \circ f)(x) =$ _____ (Simplify your answer.)

The domain of $(g \circ f)(x)$ is _____. (Type your answer in interval notation.)

1.

Describe how the given function can be obtained from one of the basic graphs. Then graph the function.

$g(x) = -(x-11)^3$



Select the correct choice below and fill in the answer box to complete your choice.

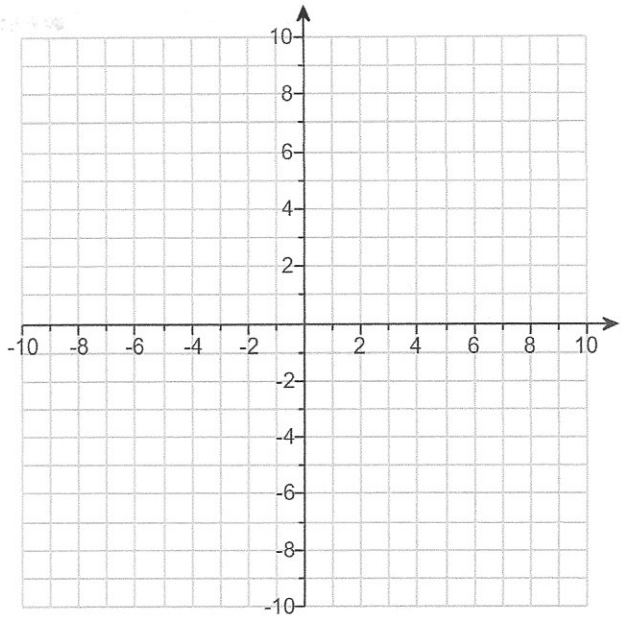
- **A.** Start with the graph of $f(x) =$ _____. Shift it right 11 units and then reflect it across the x-axis.
- **B.** Start with the graph of $f(x) =$ _____. Shift it left 11 units and then reflect it across the x-axis.
- **C.** Start with the graph of $f(x) =$ _____. Shift it left 11 units and then reflect it across the y-axis.
- **D.** Start with the graph of $f(x) =$ _____. Shift it right 11 units and then reflect it across the y-axis.

Use the graphing tool to graph the equation.

2.

Describe how the given function can be obtained from one of the basic graphs. Then graph the function.

$g(x) = (x + 4)^2 - 1$



Describe how the given function can be obtained from one of the basic graphs.

Start with the graph of f(x) = _____. Shift it

(1) _____ 4 units and then shift it

(2) _____ 1 unit.

Use the graphing tool to graph the equation.

(1) ○ up ○ right ○ left ○ down

(2) ○ up ○ right ○ down ○ left

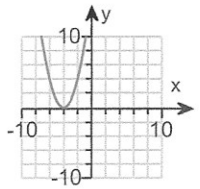
*3.

Graph the following function.

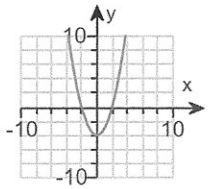
$y = x^2 - 4$

Choose the correct graph.

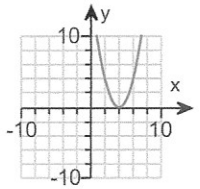
○ **A.**



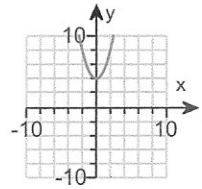
○ **B.**



○ **C.**



○ **D.**



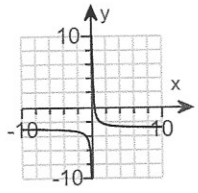
*4. Describe how the graph of $h(x) = \frac{1}{x} - 3$ can be obtained from the graph of $f(x) = \frac{1}{x}$. Then graph the function h(x).

How can the graph of $h(x) = \frac{1}{x} - 3$ be obtained from the graph of $f(x) = \frac{1}{x}$?

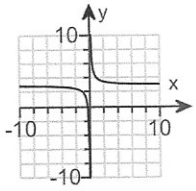
- **A.** Shift the graph 3 units down.
- **B.** Shift the graph 3 units up.
- **C.** Shift the graph 3 units right.
- **D.** Shift the graph 3 units left.

What is the graph of $h(x) = \frac{1}{x} - 3$?

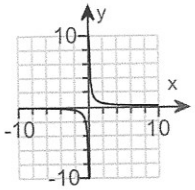
A.



B.



C.

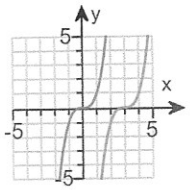


*5. Graph the function.

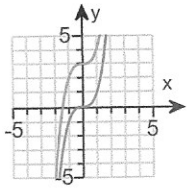
$g(x) = (x + 3)^3$

Each grid shows $f(x) = x^3$ in blue. Which grid also shows $g(x) = (x + 3)^3$?

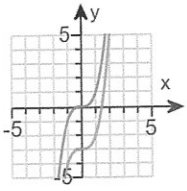
A.



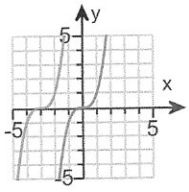
B.



C.



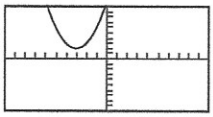
D.



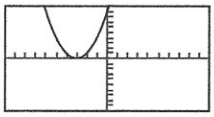
*6. Without using your calculator, choose the graph that matches the function $y = (x + 3)^2 + 2$.

Choose the correct graph.

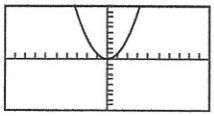
○ A.



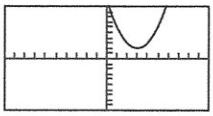
○ B.



○ C.



○ D.



Each graph is [− 10,10] by [− 10,10] with Xscl = 1 and Yscl = 1.

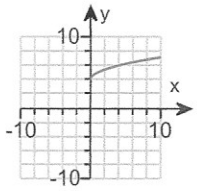
*7.

Graph the following function.

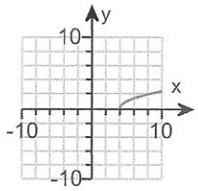
$y = \sqrt{x+4}$

Choose the best graph.

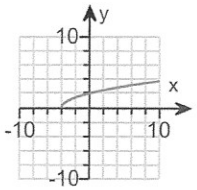
○ A.



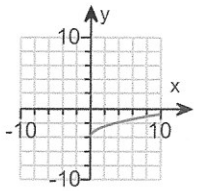
○ B.



○ C.



○ D.



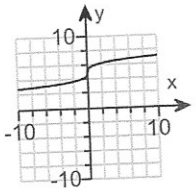
*8. Describe how the graph of $g(x) = \sqrt[3]{x} + 5$ can be obtained from the graph of $f(x) = \sqrt[3]{x}$. Then graph the function g(x).

How can the graph of $g(x) = \sqrt[3]{x} + 5$ be obtained from the graph of $f(x) = \sqrt[3]{x}$?

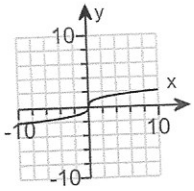
- **A.** Shift the graph 5 units down.
- **B.** Shift the graph 5 units left.
- **C.** Shift the graph 5 units right.
- **D.** Shift the graph 5 units up.

What is the graph of $g(x) = \sqrt[3]{x} + 5$?

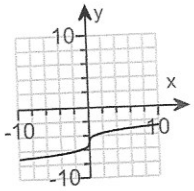
A.



B.



C.



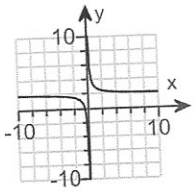
*9. Describe how the graph of $h(x) = \frac{1}{x} - 2$ can be obtained from the graph of $f(x) = \frac{1}{x}$. Then graph the function h(x).

How can the graph of $h(x) = \frac{1}{x} - 2$ be obtained from the graph of $f(x) = \frac{1}{x}$?

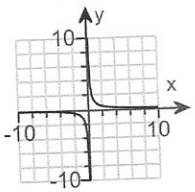
- **A.** Shift the graph 2 units left.
- **B.** Shift the graph 2 units down.
- **C.** Shift the graph 2 units up.
- **D.** Shift the graph 2 units right.

What is the graph of $h(x) = \frac{1}{x} - 2$?

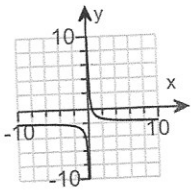
A.



B.



C.

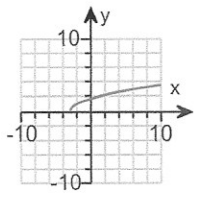


*10. Graph the following function.

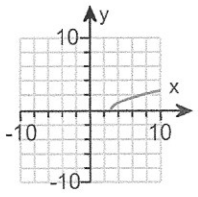
$y = \sqrt{x} + 3$

Choose the best graph.

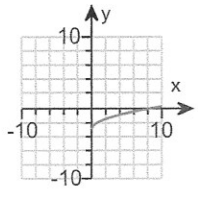
A.



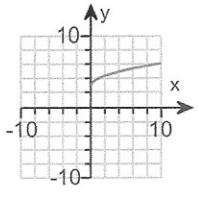
B.



C.



D.



*11. Describe how the graph of $g(x) = \frac{1}{x+5} + 4$ can be obtained from the graph of $f(x) = \frac{1}{x}$.

How can the graph of $g(x) = \frac{1}{x+5} + 4$ be obtained from the graph of $f(x) = \frac{1}{x}$?

- **A.** Shift the graph right 5 units and down 4 units.
- **B.** Shift the graph right 5 units and up 4 units.
- **C.** Shift the graph left 5 units and down 4 units.
- **D.** Shift the graph left 5 units and up 4 units.

*12. Write an equation for a function that has a graph with the given characteristics.

The shape of $y = x^2$, but upside-down and shifted right 7 units.

Which of the following is the equation of the function?

- **A.** $y = -x^2 + 7$
- **B.** $y = -x^2 - 7$
- **C.** $y = -(x+7)^2$
- **D.** $y = -(x-7)^2$

*13. Write an equation for a function that has a graph with the given characteristics.

The shape of $y = x^2$, but upside-down and shifted right 7 units.

Which of the following is the equation of the function?

- **A.** $y = -(x-7)^2$
- **B.** $y = -x^2 - 7$
- **C.** $y = -x^2 + 7$
- **D.** $y = -(x+7)^2$

*14. Write an equation for a function that has a graph with the given characteristics.

The shape of $y = |x|$, but shifted left 3 units and up 5 units.

Which of the following is the equation of the function?

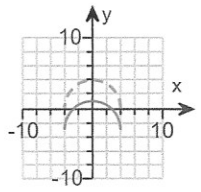
- **A.** $y = |x + 3| - 5$
- **B.** $y = |x - 3| - 5$
- **C.** $y = |x - 3| + 5$
- **D.** $y = |x + 3| + 5$

---

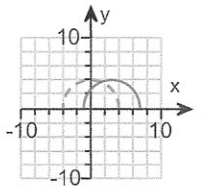
*15. The graph of $y = f(x)$ is shown with dashed red lines. Graph $y = f(x) + 3$.

Choose the correct graph (in solid blue).

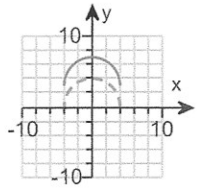
A.



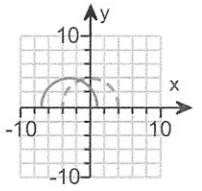
B.



C.



D.



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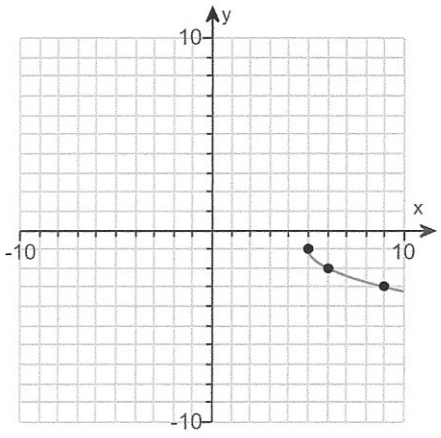
*16. Find the equation of the given graph.

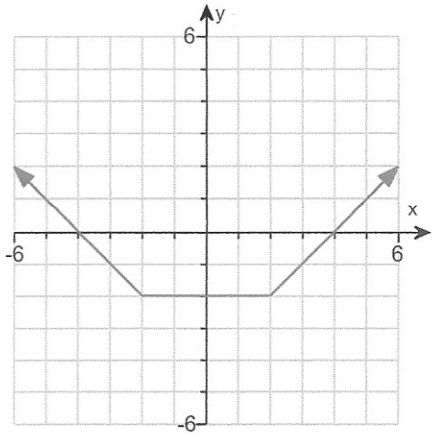


Choose the correct equation.

- **A.** $y = -\sqrt{x - 5} - 1$
- **B.** $y = \sqrt{x - 5} - 1$
- **C.** $y = -\sqrt{x} - 5 + 1$

1.

From the graph of the function, state the intervals on which the function is increasing, decreasing, or constant.



The function is increasing on what interval?

- A. $(-2, \infty)$
- B. $[2, \infty)$
- C. $[-2, \infty]$
- D. $(2, \infty)$

The function is constant on what interval?

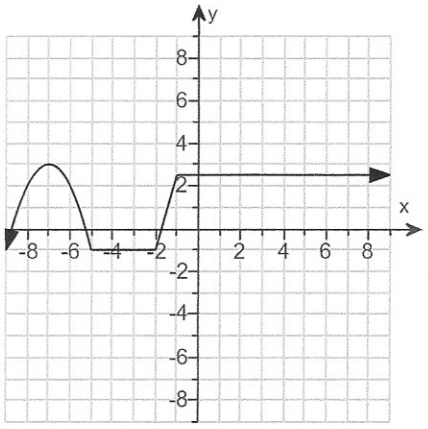
- A. $[-2, 2]$
- B. $(-2, 2)$
- C. $[-2, 2]$
- D. $(-2, 4)$

The function is decreasing on what interval?

- A. $(-2, \infty)$
- B. $(-\infty, -2]$
- C. $[-2, 2]$
- D. $(-\infty, -2)$

2.

Determine the intervals on which the function is increasing, decreasing, and constant.



List the interval(s) on which the function is increasing.

_____

(Type your answer in interval notation. Use a comma to separate answers as needed.)

List the interval(s) on which the function is decreasing.

_____

(Type your answer in interval notation. Use a comma to separate answers as needed.)

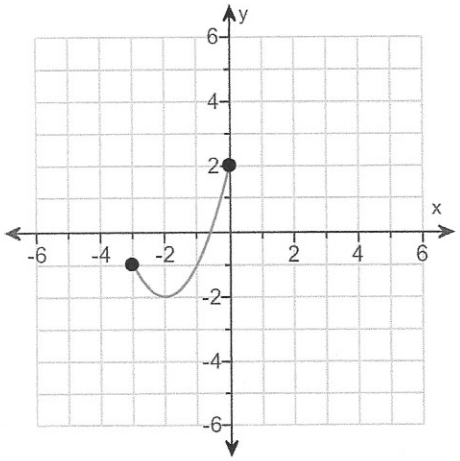
List the interval(s) on which the function is constant.

_____

(Type your answer in interval notation. Use a comma to separate answers as needed.)

3.

Determine the domain and range of the function.

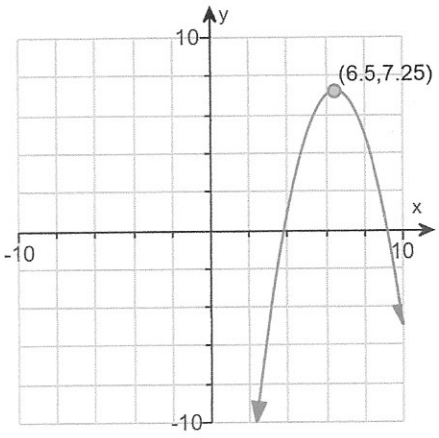


- **A.** domain: $[-2,2]$; range: $[-3,0]$
- **B.** domain: $[-3,0]$; range: $[-2,2]$
- **C.** domain: $[0,3]$; range: $(-\infty,2]$
- **D.** domain: $(-\infty,2]$; range: $[0,3]$

4.

Determine any relative maxima or minima of the function and the intervals on which the function is increasing or decreasing.

$f(x) = -x^2 + 13x - 35$



Does the function have a relative maximum or minimum?

- Relative maximum
- Relative minimum

The relative maximum occurs at $x =$ _____ and has a value of _____.

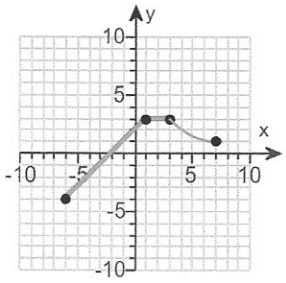
On what interval is the function increasing?

- **A.** $(-\infty,7.25)$
- **B.** $(6.5,\infty)$
- **C.** $(-\infty,6.5)$
- **D.** $(7.25,\infty)$

On what interval is the function decreasing?

- **A.** $(6.5,\infty)$
- **B.** $(-\infty,6.5)$
- **C.** $(7.25,\infty)$
- **D.** $(-\infty,7.25)$

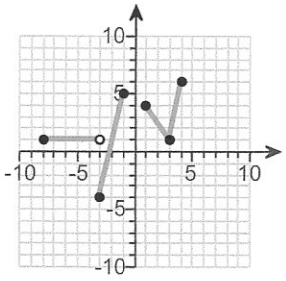
5. Determine the domain and the range of the given graph of a function.



The domain of the graph of the function is _____.
(Type your answer in interval notation.)

The range of the graph of the function is _____.
(Type your answer in interval notation.)

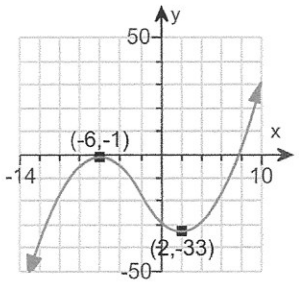
6. Determine the domain and the range of the given graph of a function.



The domain of the graph of the function is _____.
(Type your answer in interval notation.)

The range of the graph of the function is _____.
(Type your answer in interval notation.)

8. Identify any relative maxima or minima, and intervals on which the function is decreasing and increasing.



The relative maximum is _____ at x = _____.

The relative minimum is _____ at x = _____.

On which intervals is the function increasing?

- **A.** $(-6, 2)$ and $(2, \infty)$
- **B.** $(-\infty, -6)$ and $(2, \infty)$
- **C.** $(-\infty, -6)$ and $(-2, 2)$
- **D.** $(-6, -1)$ and $(2, -33)$

On which interval is the function decreasing?

- **A.** $(-6, 2)$
- **B.** $(2, \infty)$
- **C.** $(-6, -1)$
- **D.** $(-\infty, -6)$

---

9. For the pair of functions, find the indicated sum, difference, product, or quotient.

$f(x) = -5x^2 - 6$, $g(x) = x + 6$

Find $(f - g)(-5)$.

- **A.** -132
- **B.** 149
- **C.** -115
- **D.** -149

---

10. Given that $f(x) = x + 1$ and $g(x) = x^2 - x$, find $(f + g)(2)$, if it exists.

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** $(f + g)(2) =$ _____ (Simplify your answer.)
- **B.** The value for $(f + g)(2)$ does not exist.

---

11. Given that $f(x) = x^2 - 18$ and $g(x) = 14 - x$, find $(f - g)(6)$, if it exists.

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** $(f - g)(6) =$ _____ (Simplify your answer.)
- **B.** The value for $(f - g)(6)$ does not exist.

---

12. For the pair of functions, find the indicated sum, difference, product, or quotient.

$f(x) = 5x - 3$, $g(x) = 3x^2 + 14x + 4$

Find $(f \div g)(-3)$.

- A. $\frac{18}{11}$
- B. $-\frac{3}{11}$
- C. $\frac{1}{4}$
- D. $-\frac{5}{11}$

13. For the pair of functions, find the indicated sum, difference, product, or quotient.

$f(x) = 2x - 6$, $g(x) = 6x - 9$

Find $(f - g)(x)$.

- A. $-4x - 15$
- B. $-4x + 3$
- C. $4x - 3$
- D. $8x - 15$

14. For the pair of functions, find the indicated sum, difference, product, or quotient.

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

Find $(f + g)(x)$.

- A. $-13x + 16$
- B. $-3x + 16$
- C. $-5x + 8$
- D. $3x$

15. Let $f(x) = 3x - 1$ and $g(x) = x^2 + 5$.

Find $(f \circ g)(1)$.

Then $(f \circ g)(1) =$ _____. (Simplify your answer.)

16. Given that $f(x) = x^2 - 2$ and $g(x) = 3x + 11$, find $(g - f)(-10)$, if it exists.

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. $(g - f)(-10) =$ _____ (Simplify your answer.)
- B. $(g - f)(-10)$ does not exist.

17. Given that $h(x) = x + 7$ and $g(x) = \sqrt{x - 4}$, find $(g / h)(4)$, if it exists.

Choose the correct answer below.

- **A.** 0
- **B.** undefined
- **C.** 4
- **D.** -4

18. Given that $f(x) = 3x + 2$ and $h(x) = x^3$, find $(h \circ f)(2)$.

$(h \circ f)(2) =$ _____
(Simplify your answer.)

19. Given that $f(x) = 3x + 5$ and $g(x) = x^2 - 3x - 4$, find $(g \circ f)(5)$.

$(g \circ f)(5) =$ _____
(Simplify your answer.)

20. Given that $f(x) = 5x + 2$ and $g(x) = x^3$, find $(f \circ g)(-5)$.

$(f \circ g)(-5) =$ _____

21. Find $(f \circ g)(x)$ and $(g \circ f)(x)$ and the domain of each.

$f(x) = x + 2$, $g(x) = x - 2$

$(f \circ g)(x) =$ _____ (Simplify your answer.)

$(g \circ f)(x) =$ _____ (Simplify your answer.)

The domain of $(f \circ g)(x)$ is _____. (Type your answer in interval notation.)

The domain of $(g \circ f)(x)$ is _____. (Type your answer in interval notation.)

22. Find $(f \circ g)(x)$ and $(g \circ f)(x)$ and the domain of each.

$f(x) = x + 4$, $g(x) = 2x^2 - 7x - 4$

$(f \circ g)(x) =$ _____ (Simplify your answer.)

The domain of $(f \circ g)(x)$ is _____. (Type your answer in interval notation.)

$(g \circ f)(x) =$ _____ (Simplify your answer.)

The domain of $(g \circ f)(x)$ is _____. (Type your answer in interval notation.)

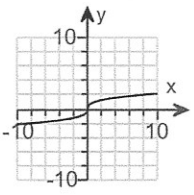
23. Describe how the graph of $g(x) = \sqrt[3]{x} + 6$ can be obtained from the graph of $f(x) = \sqrt[3]{x}$. Then graph the function g(x).

How can the graph of $g(x) = \sqrt[3]{x} + 6$ be obtained from the graph of $f(x) = \sqrt[3]{x}$?

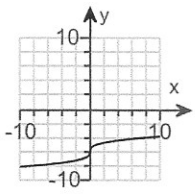
- **A.** Shift the graph 6 units down.
- **B.** Shift the graph 6 units left.
- **C.** Shift the graph 6 units right.
- **D.** Shift the graph 6 units up.

What is the graph of $g(x) = \sqrt[3]{x} + 6$?

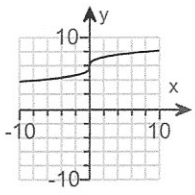
A.



B.

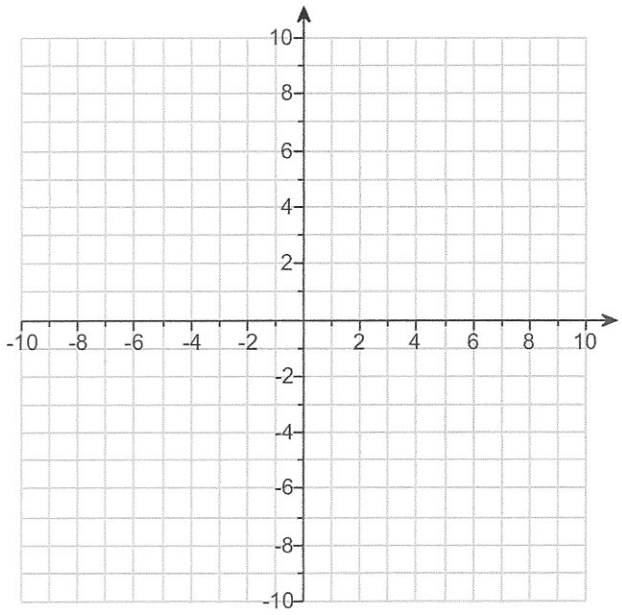


C.



24. Describe how the given function can be obtained from one of the basic graphs. Then graph the function.

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



Describe how the given function can be obtained from one of the basic graphs.

Start with the graph of $f(x) =$ _____. Shift it

(1) _____ 2 units and then shift it

(2) _____ 4 units.

Use the graphing tool to graph the equation.

(1)
- right
- down
- up
- left

(2)
- right
- down
- left
- up

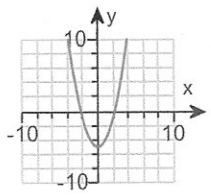
*25.

Graph the following function.

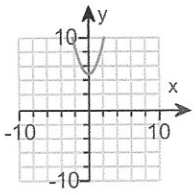
$y = x^2 - 5$

Choose the correct graph.

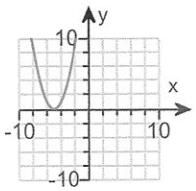
○ **A.**



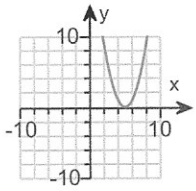
○ **B.**



○ **C.**



○ **D.**



*26.

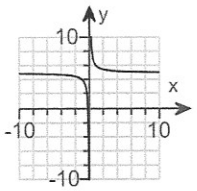
Describe how the graph of $h(x) = \frac{1}{x} - 5$ can be obtained from the graph of $f(x) = \frac{1}{x}$. Then graph the function h(x).

How can the graph of $h(x) = \frac{1}{x} - 5$ be obtained from the graph of $f(x) = \frac{1}{x}$?

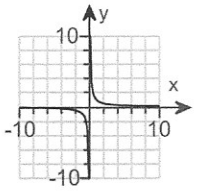
○ **A.** Shift the graph 5 units up.
○ **B.** Shift the graph 5 units right.
○ **C.** Shift the graph 5 units down.
○ **D.** Shift the graph 5 units left.

What is the graph of $h(x) = \frac{1}{x} - 5$?

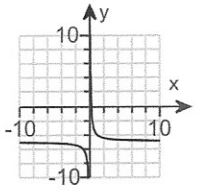
○ **A.**



○ **B.**



○ **C.**



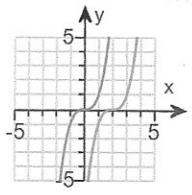
*27.

Graph the function.

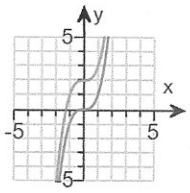
$g(x) = (x-2)^3$

Each grid shows $f(x) = x^3$ in blue. Which grid also shows $g(x) = (x-2)^3$?

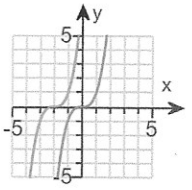
A.



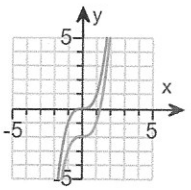
B.



C.



D.



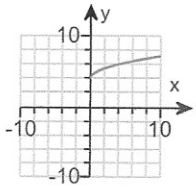
*28.

Graph the following function.

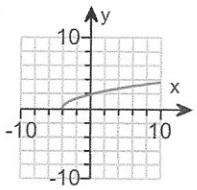
$y = \sqrt{x+4}$

Choose the best graph.

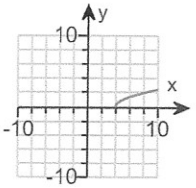
A.



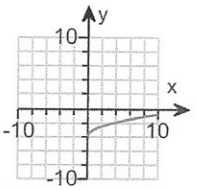
B.



C.



D.



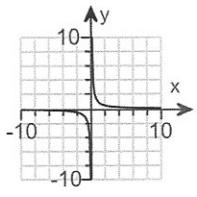
*29. Describe how the graph of $h(x) = \frac{1}{x} - 4$ can be obtained from the graph of $f(x) = \frac{1}{x}$. Then graph the function h(x).

How can the graph of $h(x) = \frac{1}{x} - 4$ be obtained from the graph of $f(x) = \frac{1}{x}$?

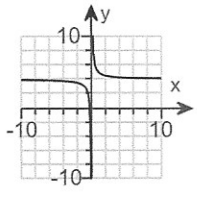
- **A.** Shift the graph 4 units down.
- **B.** Shift the graph 4 units right.
- **C.** Shift the graph 4 units left.
- **D.** Shift the graph 4 units up.

What is the graph of $h(x) = \frac{1}{x} - 4$?

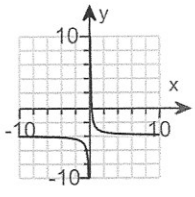
A.



B.



C.

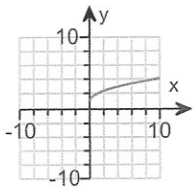


*30. Graph the following function.

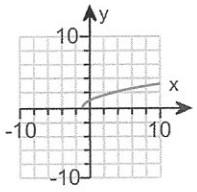
$y = \sqrt{x} + 1$

Choose the best graph.

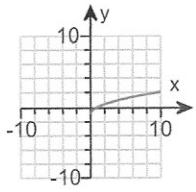
A.



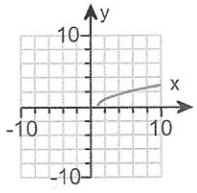
B.



C.



D.



*31. Write an equation for a function that has a graph with the given characteristics.

The shape of $y = |x|$, but shifted left 4 units and up 9 units.

Which of the following is the equation of the function?

- **A.** $y = |x + 4| + 9$
- **B.** $y = |x - 4| - 9$
- **C.** $y = |x - 4| + 9$
- **D.** $y = |x + 4| - 9$

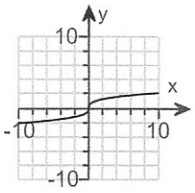
32. Describe how the graph of $g(x) = \sqrt[3]{x} + 6$ can be obtained from the graph of $f(x) = \sqrt[3]{x}$. Then graph the function g(x).

How can the graph of $g(x) = \sqrt[3]{x} + 6$ be obtained from the graph of $f(x) = \sqrt[3]{x}$?

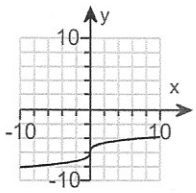
- **A.** Shift the graph 6 units left.
- **B.** Shift the graph 6 units up.
- **C.** Shift the graph 6 units right.
- **D.** Shift the graph 6 units down.

What is the graph of $g(x) = \sqrt[3]{x} + 6$?

A.



B.



C.