Student: Cole Lamers **Date:** 06/16/19	**Instructor:** Kelly Galarneau **Course:** CA&T Internet (70263) Galarneau	**Assignment:** 2.6, 2.7 A Library of Functions; Transformations

1. Fill in the blank so that the resulting statement is true.

   The graph of the linear function f(x) = b is a(n) _____ line.

   The graph of the linear function f(x) = b is a(n) horizontal line.

2. Write a linear function f that has the indicated values. Sketch the graph of f.

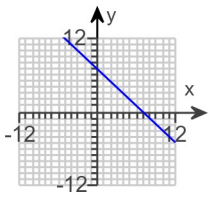
   f(0) = 7, f(− 7) = 0

   f(x) = x + 7

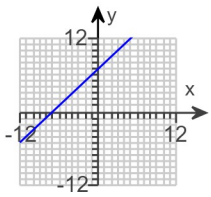
   (Simplify your answer. Type an expression using x as the variable. Type your answer in slope-intercept form.)

   Choose the correct graph of the linear function below.

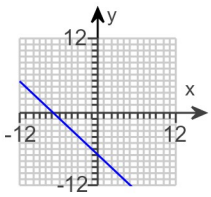
   A.

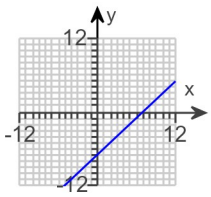
   B.

   C.

   D.

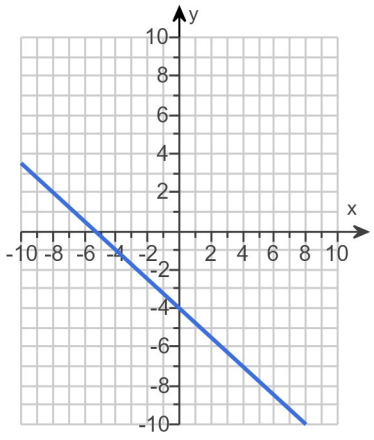
3. Write a linear function f that has the indicated values. Sketch the graph of f.

   f(0) = − 4, f(4) = − 7

   f(x) = $-\frac{3}{4}x - 4$

   (Simplify your answer. Type an expression using x as the variable. Type your answer in slope-intercept form.)

   Use the graphing tool to graph the function.

4. Let $f(x) = \begin{cases} x \text{ if } x \geq 3 \\ 3 \text{ if } x < 3 \end{cases}$. **a.** Find f(2), f(3), and f(6). **b.** Sketch the graph of y = f(x).

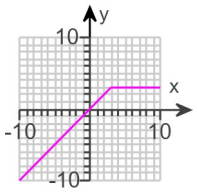
a. f(2) = 3

f(3) = 3

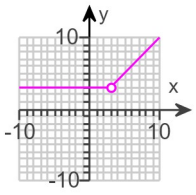
f(6) = 6

b. Choose the correct graph of y = f(x) below.

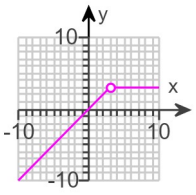
○ **A.**



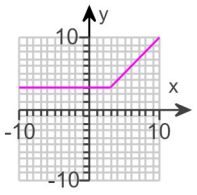
○ **B.**



○ **C.**



✓ **D.**



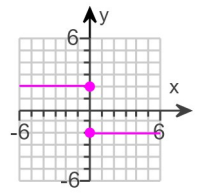
5. Let $f(x) = \begin{cases} 2 \text{ if } x > 0 \\ -2 \text{ if } x < 0 \end{cases}$. **a.** Find f(− 13) and f(14). **b.** Sketch the graph of y = f(x).
c. Find the domain and range of f.

a. f(− 13) = − 2

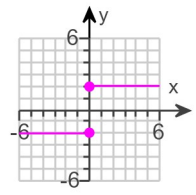
f(14) = 2

b. Choose the correct graph of y = f(x) below.

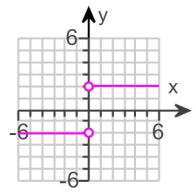
○ **A.**



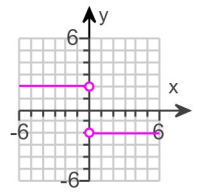
○ **B.**



✓ **C.**



○ **D.**



c. What is the domain of the function?

$(-\infty,0)\cup(0,\infty)$ (Type your answer in interval notation.)

What is the range of the function?

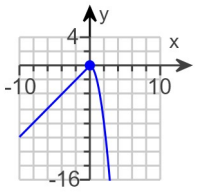
$\{-2,2\}$ (Use a comma to separate answers as needed.)

6. Sketch the graph of the piecewise-defined function. Write the domain and range of the function.

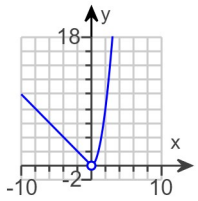
$$f(x) = \begin{cases} |x|, & x \le 0 \\ 2x^2, & x > 0 \end{cases}$$

Sketch the graph. Choose the correct graph below.

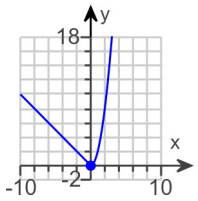
A.



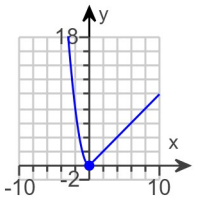
B.



C.



D.



Choose the correct domain below.

A. $\{x \mid x \ge 0\}$

B. $\{x \mid x \le 0\}$

C. All real numbers

D. $\{x \mid x > 0\}$

Choose the correct range below.

A. $\{y \mid y \le 0\}$

B. All real numbers

C. $\{y \mid y > 0\}$

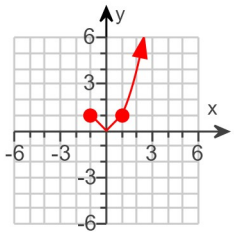
D. $\{y \mid y \ge 0\}$

7. Sketch the graph of the function shown below. From the graph, find its domain and range.

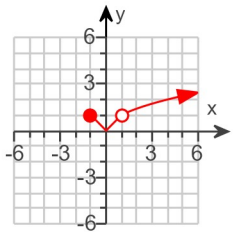
$$f(x) = \begin{cases} |x| & \text{if } -1 \le x < 1 \\ \sqrt{x} & \text{if } x \ge 1 \end{cases}$$

Choose the correct graph of f(x).

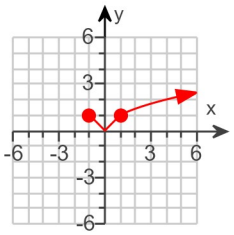
A.



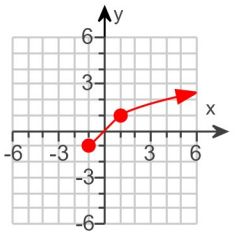
B.



C.



D.



What is the domain of f(x)?

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

What is the range of f(x)?

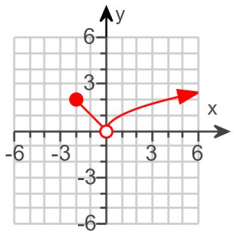
- **A.** $(-\infty,\infty)$
- **B.** $[0,\infty)$
- **C.** $[-1,\infty)$
- **D.** $[1,\infty)$

8. Sketch the graph of the function shown below. From the graph, find its domain and range.

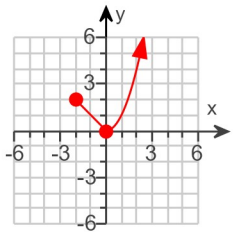
$$f(x)=\begin{cases}|x| & \text{if } -2\le x<0\\ \sqrt{x} & \text{if } x\ge 0\end{cases}$$

Choose the correct graph of f(x).

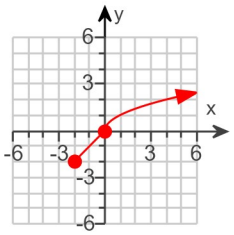
A.



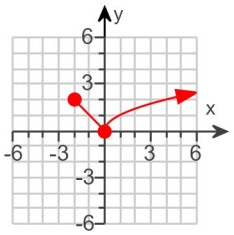
B.



C.



D.



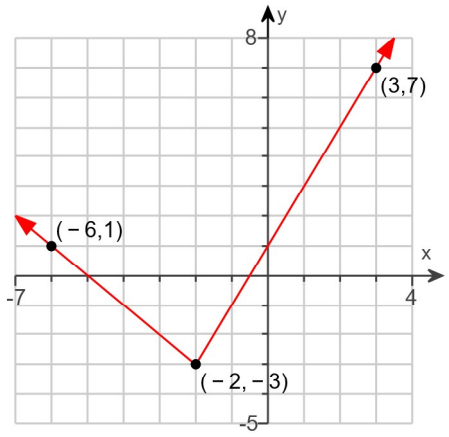
What is the domain of f(x)?

A. $(-\infty,\infty)$
B. $[0,\infty)$
C. $[-2,\infty)$
D. $(-\infty,0]\cup[0,\infty)$

What is the range of f(x)?

A. $[0,\infty)$
B. $[-2,\infty)$
C. $(-\infty,\infty)$
D. $[2,\infty)$

9. Write a piecewise function for the graph given below.



Choose the correct answer below.

A. $f(x)=\begin{cases}-2x-5 & \text{for } x\ge -2\\ 2x+1 & \text{for } x<-2\end{cases}$

B. $f(x)=\begin{cases}-x-5 & \text{for } x\ge -2\\ 2x+1 & \text{for } x<-2\end{cases}$

C. $f(x)=\begin{cases}2x+1 & \text{for } x\ge -2\\ -2x-5 & \text{for } x<-2\end{cases}$

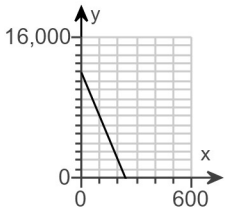
D. $f(x)=\begin{cases}2x+1 & \text{for } x\ge -2\\ -x-5 & \text{for } x<-2\end{cases}$

10. A manufacturer of printers has a total cost per day consisting of a fixed overhead of $6000 plus product costs of $50 per printer.
a. Express the total cost C as a function of the number x of printers produced.
b. Draw the graph of y = C(x). Interpret the y-intercept.
c. How many printers were manufactured on a day when the total cost was $11,500?

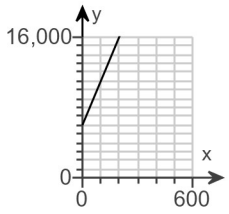
a. C(x) = 50x + 6000

b. Draw the graph of y = C(x). Choose the correct graph below.

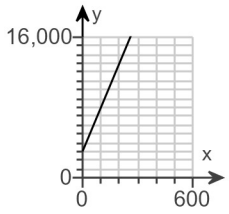
○ **A.**



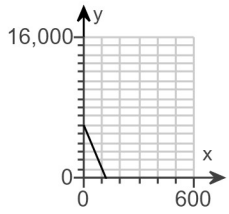
✓ **B.**



○ **C.**



○ **D.**



Interpret the y-intercept. Choose the correct graph below.

○ **A.** The y-intercept is the total cost of printers produced.
○ **B.** The y-intercept is the variable cost.
○ **C.** The y-intercept is the cost of each printer.
✓ **D.** The y-intercept is the fixed overhead cost.

c. The number of printers that were manufactured on a day when the total cost was $11,500 is 110. (Simplify your answer.)

11. Let $f(x) = \begin{cases} 4x+7 & \text{if } -4 \le x < -2 \\ 3x+1 & \text{if } -2 \le x < 3 \\ 3-x & \text{if } 3 \le x \le 5 \end{cases}$.

a. Find the following.

(i) $f(-3)$ **(ii)** $f(-2)$ **(iii)** $f(4)$

b. Find x when $f(x) = 8$.

c. Sketch a graph of $y = f(x)$.

a. (i) $f(-3) =$ -5

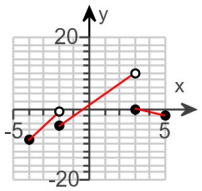
(ii) $f(-2) =$ -5

(iii) $f(4) =$ -1

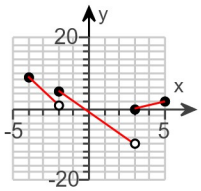
b. When $f(x) = 8$, $x =$ $\frac{7}{3}$.

c. Choose the correct graph below.

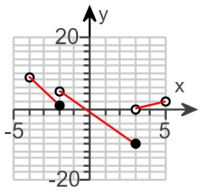
A.



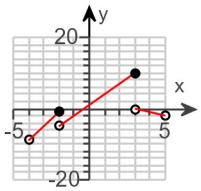
B.



C.



D.

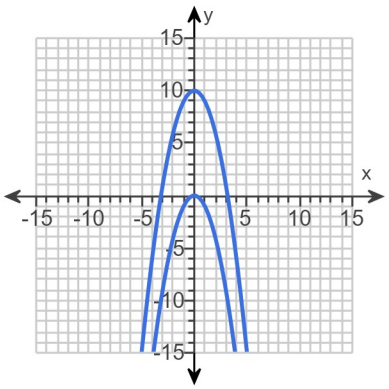


12. Sketch the graphs of f and g on the same coordinate axes.

$f(x) = -x^2$

$g(x) = -x^2 + 10$

Use the graphing tool to graph the functions.



13. Describe the transformations that produce the graphs of g and h from the graph of f.

$f(x) = \sqrt{x}$

(a) $g(x) = \sqrt{x} + 1$ **(b)** $h(x) = \sqrt{x} - 5$

(a) Describe the transformations that produce the graph of g from the graph of f. Choose the correct answer below.

- **A.** Shift 1 unit to the right
- **B.** Shift 1 unit to the left
- **C.** Shift 1 unit down
- **D.** Shift 1 unit up ✓

(b) Describe the transformations that produce the graph of h from the graph of f. Choose the correct answer below.

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

14. Describe the transformations that produce the graphs of g and h from the graph of f.

$f(x) = x^2$

(a) $g(x) = (x + 3)^2$ **(b)** $h(x) = (x - 4)^2$

(a) Describe the transformations that produce the graph of g from the graph of f. Choose the correct answer below.

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

(b) Describe the transformations that produce the graph of h from the graph of f. Choose the correct answer below.

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

15. Describe the transformations that produce the graphs of g and h from the graph of $f(x) = \sqrt{x}$.

a. $g(x) = \sqrt{x + 1} - 5$ **b.** $h(x) = \sqrt{x - 2} + 3$

a. Describe the transformations that produce the graph of g from the graph of f. Choose the correct answer below.

- **A.** Shift the graph of f(x) 1 unit left and 5 units up.
- **B.** Shift the graph of f(x) 1 unit left and 5 units down. ✓
- **C.** Shift the graph of f(x) 1 unit right and 5 units up.
- **D.** Shift the graph of f(x) 1 unit right and 5 units down.

b. Describe the transformations that produce the graph of h from the graph of f. Choose the correct answer below.

- **A.** Shift the graph of f(x) 2 units right and 3 units down.
- **B.** Shift the graph of f(x) 2 units left and 3 units down.
- **C.** Shift the graph of f(x) 2 units left and 3 units up.
- **D.** Shift the graph of f(x) 2 units right and 3 units up. ✓

16. Describe the transformations that produce the graphs of g and h from the graph of f.

$f(x) = |5x|$

(a) $g(x) = -|5x|$ **(b)** $h(x) = |-5x|$

(a) Describe the transformations that produce the graph of g from the graph of f. Choose the correct answer below.

- **A.** reflection in the y-axis
- **B.** reflection in the x-axis
- **C.** horizontal stretch by a factor of 5
- **D.** vertical stretch by a factor of 5

(b) Describe the transformations that produce the graph of h from the graph of f. Choose the correct answer below.

- **A.** reflection in the y-axis
- **B.** reflection in the x-axis
- **C.** vertical stretch by a factor of 5
- **D.** horizontal stretch by a factor of 5

17. Describe the transformations that produce the graphs of g and h from the graph of f.

$f(x) = x^3$

(a) $g(x) = (x-2)^3 + 1$ **(b)** $h(x) = -(x+5)^3 + 3$

(a) Describe the transformations that produce the graph of g from the graph of f. Choose the correct answer below.

- **A.** Shift 2 units to the left, shift 1 unit down
- **B.** Shift 2 units down, shift 1 unit to the left
- **C.** Shift 2 units up, shift 1 unit to the right
- **D.** Shift 2 units to the right, shift 1 unit up

(b) Describe the transformations that produce the graph of h from the graph of f. Choose the correct answer below.

- **A.** Shift 3 units to the left, reflect in the y-axis, shift 5 units down
- **B.** Shift 3 units to the right, reflect in the x-axis, shift 5 units up
- **C.** Shift 5 units to the left, reflect in the x-axis, shift 3 units up
- **D.** Shift 5 units to the left, reflect in the y-axis, shift 3 units down

18. Describe the transformations that produce the graphs of g and h from the graph of f.

$f(x) = \sqrt[3]{x}$, $g(x) = \sqrt[3]{x+4}$, $h(x) = \sqrt[3]{x} + 4$

a. What transformation produces the graph of g from the graph of f?

- Shift 4 units left
- Shift 4 units up
- Shift 4 units right
- Shift 4 units down

b. What transformation produces the graph of h from the graph of f?

- Shift 4 units left
- Shift 4 units up
- Shift 4 units down
- Shift 4 units right

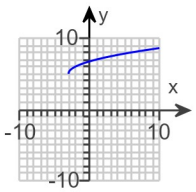
19. Watch the video and then solve the problem given below.

Click here to watch the video.[1]

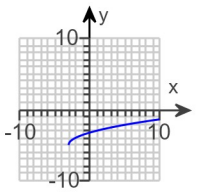
Sketch the graph of the function $f(x) = \sqrt{x-3} + 5$.

Choose the correct answer below.

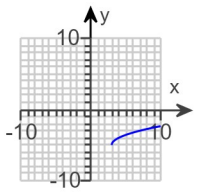
A.



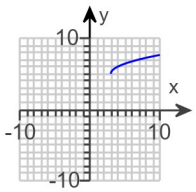
B.



C.



D.



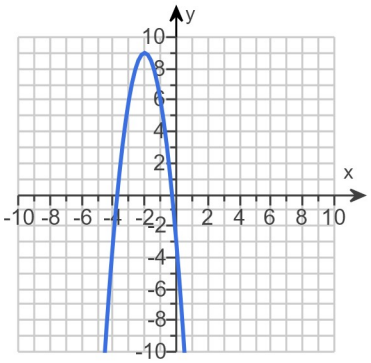
1: http://mediaplayer.pearsoncmg.com/assets/aZK4mqLe4lUrNiBz0F5salIxNmOiaiTa?clip=3

20. Watch the video and then solve the problem given below.

Click here to watch the video.[2]

Sketch the graph of the function $f(x) = 9 - 3(x+2)^2$.

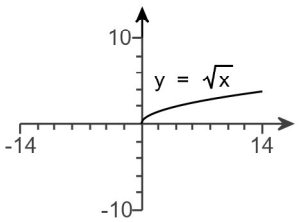
Use the graphing tool to graph the function.



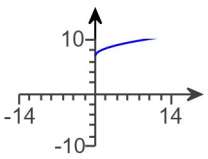
2: http://mediaplayer.pearsoncmg.com/assets/aZK4mqLe4lUrNiBz0F5salIxNmOiaiTa?clip=7

21. Graph the function using the techniques of shifting, compressing, stretching, and/or reflecting. Start with the graph of the basic function shown below.

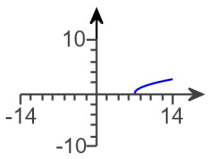
$h(x) = \sqrt{x-7}$



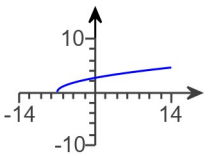
A.



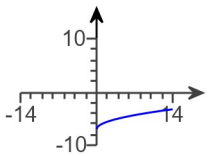
B.



C.

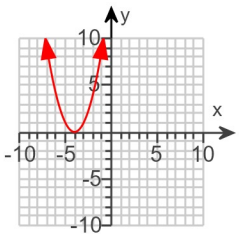


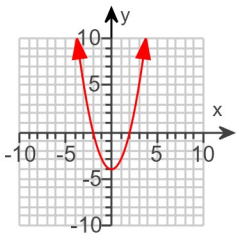
D.

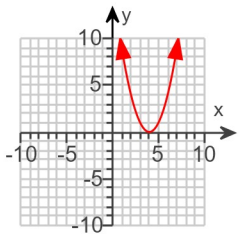


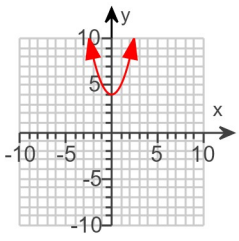
22. Graph the function $y = (x + 4)^2$.

Choose the correct graph of the function below.

A. 

B. 

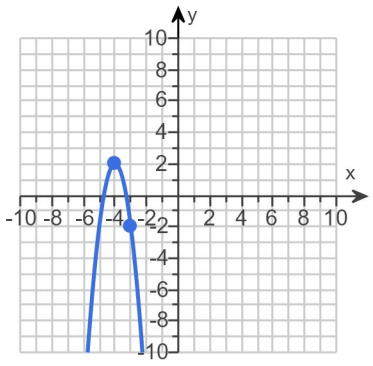
C. 

D. 

23. Use transformations of $f(x) = x^2$ to graph the following function.

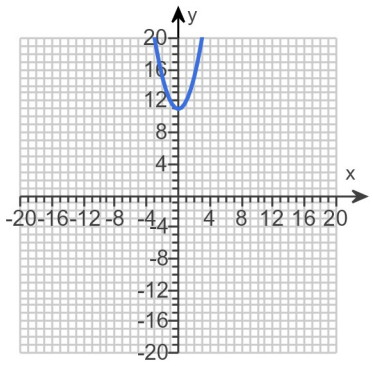
$$g(x) = -4(x + 4)^2 + 2$$

Use the graphing tool to graph the function.



24. Use the transformations on $f(x) = x^2$ to graph the function $f(x) = x^2 + 11$.

Use the graphing tool to graph the function.



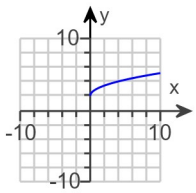
25.

Graph the following function.

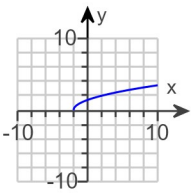
$y = \sqrt{x} + 2$

Choose the best graph.

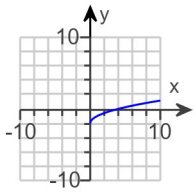
A.



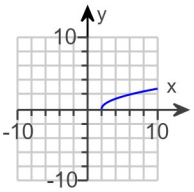
B.



C.



D.

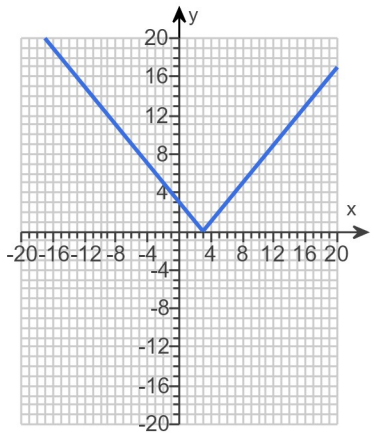


26.

Graph the following function by starting with a function from the library of functions and then using the techniques of shifting, compressing, stretching, and/or reflecting.

$g(x) = |x - 3|$

Use the graphing tool to graph the functions.

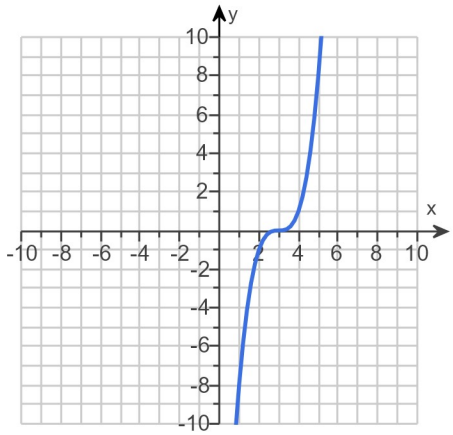


27.

Graph the following function by starting with a function from the library of functions and then using the techniques of shifting, compressing, stretching, and/or reflecting.

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

Use the graphing tool to graph the function.

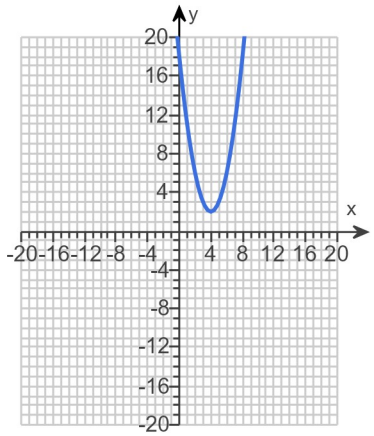


28.

Graph the following function by starting with a function from the library of functions and then using the techniques of shifting, compressing, stretching, and/or reflecting.

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

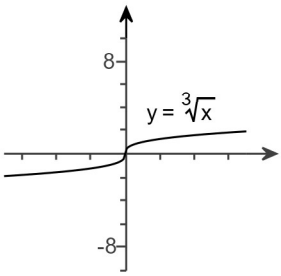
Use the graphing tool to graph the function.



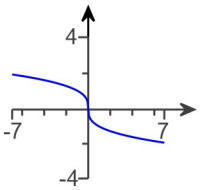
29.

Graph the function using the techniques of shifting, compressing, stretching, and/or reflecting. Start with the graph of the basic function shown below.

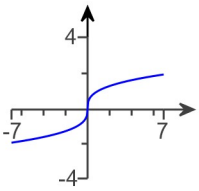
$f(x) = -\sqrt[3]{x}$



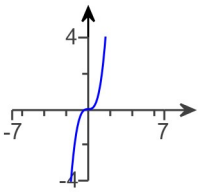
A.



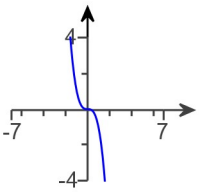
B.



C.



D.

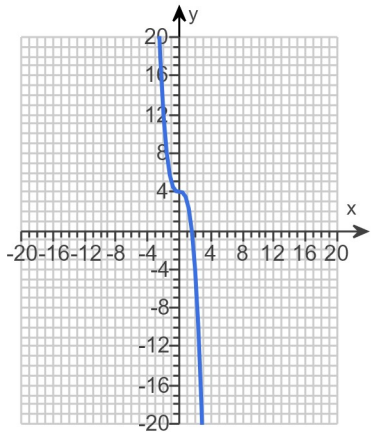


30.

Graph the following function by starting with a function from the library of functions and then using the techniques of shifting, compressing, stretching, and/or reflecting.

$g(x) = -x^3 + 4$

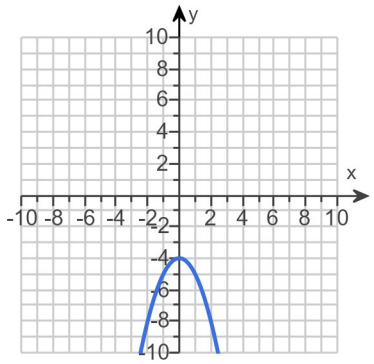
Use the graphing tool to graph the function.



31. Graph the following function by starting with a function from the library of functions and then using the techniques of shifting, compressing, stretching, and/or reflecting.

$f(x) = -x^2 - 4$

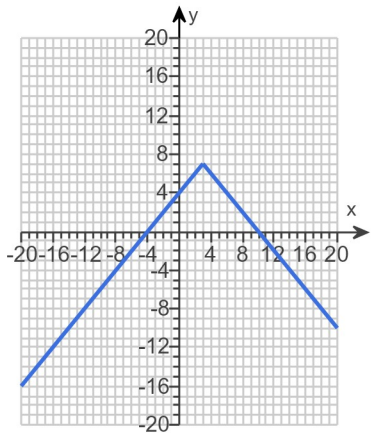
Use the graphing tool to graph the function.



32. Graph the following function by starting with a function from the library of functions and then using the techniques of shifting, compressing, stretching, and/or reflecting.

$g(x) = -|x - 3| + 7$

Use the graphing tool to graph the function.



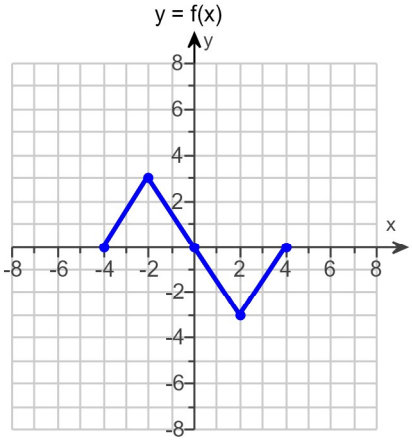
33. Write an equation for a function whose graph fits the following description.

The graph of $f(x) = x^2$ is shifted 4 units right 3 units down.

Choose the correct answer below.

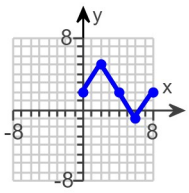
- $y = (x + 4)^2 + 3$
- $y = (x + 4)^2 - 3$
- ✔ $y = (x - 4)^2 - 3$
- $y = (x - 4)^2 + 3$

34. Use the graph of y = f(x) to graph the function g(x) = f(x − 4) − 2.

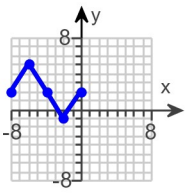


Choose the correct graph of g below.

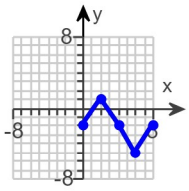
A.



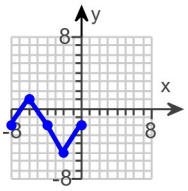
B.



C.



D.



35. Find the domain of the rational expression.

$$f(x) = \frac{3}{x^2 + 2x - 35}$$

Choose the answer that represents the domain.

- **A.** $(-\infty, -5) \cup (-5,7) \cup (7,\infty)$
- **B.** $(-\infty,3) \cup (3,\infty)$
- **C.** $(-\infty, -7) \cup (-7,5) \cup (5,\infty)$
- **D.** All real numbers.

36. Find the domain of the function $f(x) = \sqrt{5x - 6}$.

The domain is $\left[\frac{6}{5},\infty\right)$.

(Type your answer in interval notation.)