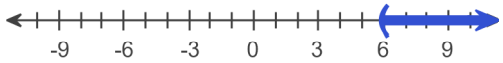
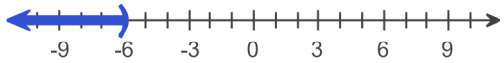
Student: _____	**Instructor:** Alfredo Alvarez	**Assignment:**
Date: _____	**Course:** Math 1314 Sullivan Coreq	finalm1314COC050sullljjRZZ04

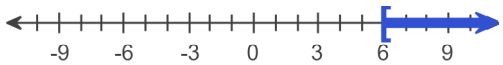
1. Solve the inequality $13 - 4x < -11$. Graph the solution set.

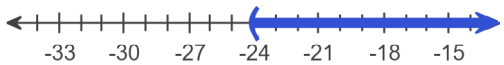
In set notation, the solution is $\{x \mid \square\}$. (Type an inequality.)

Graph the solution set. Choose the correct graph below.

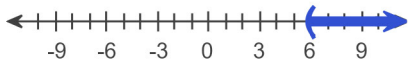
A. 

B. 

C. 

D. 

Answers $x > 6$

A. 

ID: 1.1.4

2. Find the following for the function $f(x) = 4x^2 + 4x - 4$.

(a) f(0) **(b)** f(3) **(c)** f(− 3) **(d)** f(− x)
(e) − f(x) **(f)** f(x + 3) **(g)** f(4x) **(h)** f(x + h)

(a) f(0) = [ ] (Simplify your answer.)

(b) f(3) = [ ] (Simplify your answer.)

(c) f(− 3) = [ ] (Simplify your answer.)

(d) f(− x) = [ ] (Simplify your answer.)

(e) − f(x) = [ ] (Simplify your answer.)

(f) f(x + 3) = [ ] (Simplify your answer.)

(g) f(4x) = [ ] (Simplify your answer.)

(h) f(x + h) = [ ] (Simplify your answer.)

Answers -4

44

20

$4x^2 - 4x - 4$

$-4x^2 - 4x + 4$

$4x^2 + 28x + 44$

$64x^2 + 16x - 4$

$4x^2 + 8hx + 4h^2 + 4x + 4h - 4$

ID: 1.1.43

3. Find the domain of the function.

$f(x) = \sqrt{2x - 16}$

The domain is [ ]. (Type your answer in interval notation.)

Answer: $[8,\infty)$

ID: 1.1.59

4. For the given functions f and g, complete parts (a)-(h). For parts (a)-(d), also find the domain.

$f(x) = 3x + 8$; $g(x) = 5x - 3$

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

$(f + g)(x) =$ ☐ (Simplify your answer.)

What is the domain of $f + g$? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The domain is $\{x \mid$ ☐ $\}$.
  (Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)
- **B.** The domain is {x| x is any real number}.

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

$(f - g)(x) =$ ☐ (Simplify your answer.)

What is the domain of $f - g$? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The domain is $\{x \mid$ ☐ $\}$.
  (Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)
- **B.** The domain is {x| x is any real number}.

(c) Find $(f \cdot g)(x)$.

$(f \cdot g)(x) =$ ☐ (Simplify your answer.)

What is the domain of $f \cdot g$? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The domain is $\{x \mid$ ☐ $\}$.
  (Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)
- **B.** The domain is {x| x is any real number}.

(d) Find $\left(\frac{f}{g}\right)(x)$.

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

What is the domain of $\frac{f}{g}$? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The domain is $\{x \mid$ ☐ $\}$.
  (Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)
- **B.** The domain is {x| x is any real number}.

(e) Find $(f + g)(3)$.

$(f+g)(3) =$ ☐ (Type an integer or a simplified fraction.)

(f) Find $(f-g)(2)$.

$(f-g)(2) =$ ☐ (Type an integer or a simplified fraction.)

(g) Find $(f \cdot g)(4)$.

$(f \cdot g)(4) =$ ☐ (Type an integer or a simplified fraction.)

(h) Find $\left(\frac{f}{g}\right)(1)$.

$\left(\frac{f}{g}\right)(1) =$ ☐ (Type an integer or a simplified fraction.)

Answers $8x + 5$

B. The domain is $\{x \mid x \text{ is any real number}\}$.

$-2x + 11$

B. The domain is $\{x \mid x \text{ is any real number}\}$.

$15x^2 + 31x - 24$

B. The domain is $\{x \mid x \text{ is any real number}\}$.

$\frac{3x+8}{5x-3}$

A. The domain is $\left\{x \middle|\ \boxed{x \neq \frac{3}{5}}\right\}$.

(Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)

29

7

340

$\frac{11}{2}$

ID: 1.1.67

5. For the given functions f and g, complete parts (a)-(h). For parts (a)-(d), also find the domain.

$f(x) = x - 4$; $g(x) = 6x^2$

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

$(f + g)(x) =$ ☐ (Simplify your answer.)

What is the domain of $f + g$? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The domain is $\{x \mid$ ☐ $\}$.
  (Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)
- **B.** The domain is $\{x \mid x$ is any real number$\}$.

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

$(f - g)(x) =$ ☐ (Simplify your answer.)

What is the domain of $f - g$? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The domain is $\{x \mid$ ☐ $\}$.
  (Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)
- **B.** The domain is $\{x \mid x$ is any real number$\}$.

(c) Find $(f \cdot g)(x)$.

$(f \cdot g)(x) =$ ☐ (Simplify your answer.)

What is the domain of $f \cdot g$? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The domain is $\{x \mid$ ☐ $\}$.
  (Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)
- **B.** The domain is $\{x \mid x$ is any real number$\}$.

(d) Find $\left(\frac{f}{g}\right)(x)$.

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

What is the domain of $\frac{f}{g}$? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The domain is $\{x \mid$ ☐ $\}$.
  (Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)
- **B.** The domain is $\{x \mid x$ is any real number$\}$.

(e) Find $(f + g)(2)$.

$(f+g)(2) =$ ☐ (Type an integer or a simplified fraction.)

(f) Find $(f-g)(4)$.

$(f-g)(4) =$ ☐ (Type an integer or a simplified fraction.)

(g) Find $(f \cdot g)(3)$.

$(f \cdot g)(3) =$ ☐ (Type an integer or a simplified fraction.)

(h) Find $\left(\frac{f}{g}\right)(1)$.

$\left(\frac{f}{g}\right)(1) =$ ☐ (Type an integer or a simplified fraction.)

Answers $6x^2 + x - 4$

B. The domain is {x| x is any real number}.

$-6x^2 + x - 4$

B. The domain is {x| x is any real number}.

$6x^3 - 24x^2$

B. The domain is {x| x is any real number}.

$\frac{x-4}{6x^2}$

A. The domain is $\{x \mid$ **$x \neq 0$** $\}$.
(Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)

22

-96

-54

$-\frac{1}{2}$

ID: 1.1.69

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6. Find the difference quotient of f; that is, find $\frac{f(x+h)-f(x)}{h}$, $h \neq 0$, for the following function. Be sure to simplify.

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

$\frac{f(x+h)-f(x)}{h} =$ ☐

Answer: $2x + h - 4$

ID: 1.1.83

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7. Given $f(x) = x^2 - 4x + 3$, find the value(s) for x such that $f(x) = 15$.

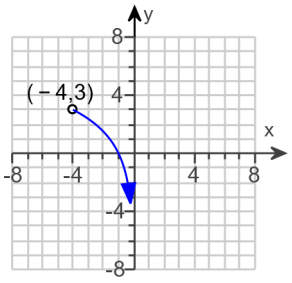
The solution set is $\{\ \}$.

Answer: $-2,6$

ID: 1.1.91

8. Determine whether the graph on the right is that of a function by using the vertical-line test. If it is, use the graph to find the following.

(a) the domain and range
(b) the intercepts, if any
(c) any symmetry with respect to the x-axis, y-axis, or the origin



Does the graph represent a function? Choose the correct answer below.

- **A.** No, the graph is not a function because a vertical line $x = -3$ intersects the graph at only one point.
- **B.** Yes, the graph is a function because every vertical line intersects the graph in at most one point.
- **C.** No, the graph is not a function because a vertical line $x = -3$ intersects the graph at two points.
- **D.** Yes, the graph is a function because every vertical line intersects the graph in more than one point.

(a) What are the domain and range of the function? Select the correct choice below and, if necessary, fill in the answer box(es) to complete your choice.

- **A.** The domain is _____. The range is _____.
  (Type your answers in interval notation. Use integers or fractions for any numbers in the expressions.)
- **B.** The graph is not that of a function.

(b) What is/are the intercept(s)? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The intercept(s) is/are _____.
  (Type an ordered pair. Use a comma to separate answers as needed.)
- **B.** There are no intercepts.
- **C.** The graph is not that of a function.

(c) Determine if the graph is symmetric with respect to the x-axis, y-axis, or the origin. Select all that apply.

- ☐ **A.** The graph is symmetric with respect to the y-axis.
- ☐ **B.** The graph is symmetric with respect to the origin.
- ☐ **C.** The graph is symmetric with respect to the x-axis.
- ☐ **D.** The graph has no symmetry.
- ☐ **E.** The graph is not that of a function.

Answers B. Yes, the graph is a function because every vertical line intersects the graph in at most one point.

A. The domain is $(-4,0)$. The range is $(-\infty,3)$.

(Type your answers in interval notation. Use integers or fractions for any numbers in the expressions.)

A. The intercept(s) is/are $(-1,0)$.(Type an ordered pair. Use a comma to separate answers as needed.)

D. The graph has no symmetry.

ID: 1.2.19

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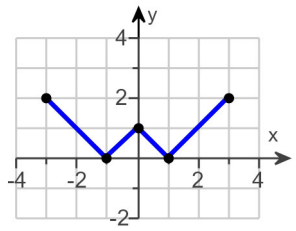
9. Using the given graph of the function f, find the following.

(a) the intercepts, if any
(b) its domain and range
(c) the intervals on which it is increasing, decreasing, or constant
(d) whether it is even, odd, or neither



(a) What are the intercepts?

[ ]
(Simplify your answer. Type an ordered pair. Use a comma to separate answers as needed.)

(b) The domain is [ ].
(Type your answer in interval notation.)

The range is [ ].
(Type your answer in interval notation.)

(c) On which interval(s) is the graph increasing? Select the correct choice below and fill in any answer boxes within your choice.

- **A.** The graph is increasing on _____.
  (Type your answer in interval notation. Use a comma to separate answers as needed.)
- **B.** The graph is not increasing on any interval.

On which interval(s) is the graph decreasing? Select the correct choice below and fill in any answer boxes within your choice.

- **A.** The graph is decreasing on _____.
  (Type your answer in interval notation. Use a comma to separate answers as needed.)
- **B.** The graph is not decreasing on any interval.

On which interval(s) is the graph constant? Select the correct choice below and fill in any answer boxes within your choice.

- **A.** The graph is constant on _____.
  (Type your answer in interval notation. Use a comma to separate answers as needed.)
- **B.** The graph is not constant on any interval.

(d) The function is (1) [ ]

(1)
- neither odd nor even.
- odd.
- even.

Answers $(-1,0),(1,0),(0,1)$

$[-3,3]$

$[0,2]$

A. The graph is increasing on **$[-1,0],[1,3]$**.
(Type your answer in interval notation. Use a comma to separate answers as needed.)

A. The graph is decreasing on **$[-3,-1],[0,1]$**.
(Type your answer in interval notation. Use a comma to separate answers as needed.)

B. The graph is not constant on any interval.

(1) even.

ID: 1.3.25

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10. The function f is defined as follows.

$$f(x) = \begin{cases} -3x + 4 & \text{if } x < 1 \\ 3x - 2 & \text{if } x \geq 1 \end{cases}$$

(a) Find the domain of the function.
(b) Locate any intercepts.
(c) Graph the function.
(d) Based on the graph, find the range.

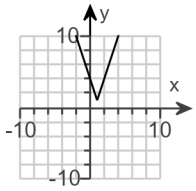
(a) The domain of the function f is [ ].
(Type your answer in interval notation.)

(b) Locate any intercepts. Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

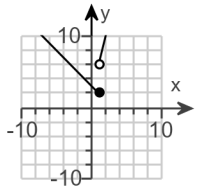
- **A.** The intercept(s) is/are [ ].
  (Type an ordered pair. Use a comma to separate answers as needed.)
- **B.** There are no intercepts.

(c) Choose the correct graph below.

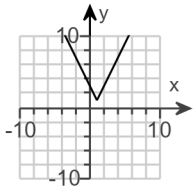
A.



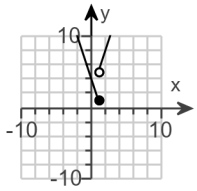
B.



C.



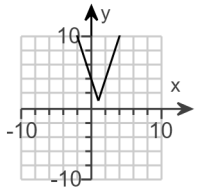
D.



(d) The range of the function f is [ ].
(Type your answer in interval notation.)

Answers $(-\infty, \infty)$

A. The intercept(s) is/are **(0,4)**.
(Type an ordered pair. Use a comma to separate answers as needed.)



A.

$[1, \infty)$

ID: 1.4.33

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11. The function f is defined as follows.

$$f(x) = \begin{cases} 4 + x & \text{if } x < 0 \\ x^2 & \text{if } x \geq 0 \end{cases}$$

(a) Find the domain of the function.
(b) Locate any intercepts.
(c) Graph the function.
(d) Based on the graph, find the range.

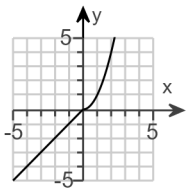
(a) The domain of the function f is [ ].
(Type your answer in interval notation.)

(b) Locate any intercepts. Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

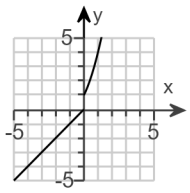
- **A.** The intercept(s) is/are _____.
  (Type an ordered pair. Use a comma to separate answers as needed.)
- **B.** There are no intercepts.

(c) Choose the correct graph of f(x) below.

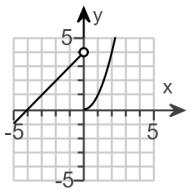
A.



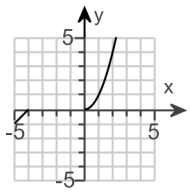
B.



C.



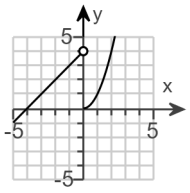
D.



(d) The range of the function f is [ ].
(Type your answer in interval notation.)

Answers $(-\infty,\infty)$

A. The intercept(s) is/are **$(-4,0),(0,0)$**.
(Type an ordered pair. Use a comma to separate answers as needed.)



C.

$(-\infty,\infty)$

ID: 1.4.37

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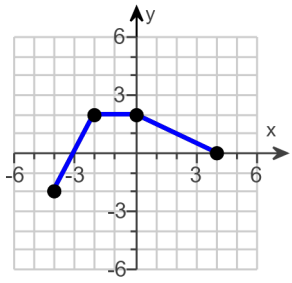
12. The graph of a function f is illustrated to the right. Use the graph of f as the first step toward graphing each of the following functions.



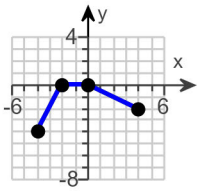
(a) $F(x) = f(x) + 2$ (b) $G(x) = f(x + 3)$ (c) $P(x) = -f(x)$

(d) $H(x) = f(x + 1) - 3$ (e) $Q(x) = \frac{1}{2}f(x)$ (f) $g(x) = f(-x)$

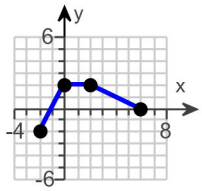
(g) $h(x) = f(2x)$

(a) Choose the correct graph of $F(x) = f(x) + 2$ below.

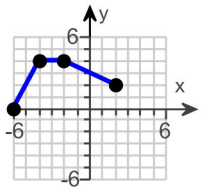
A.



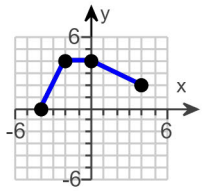
B.



C.

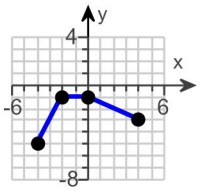


D.

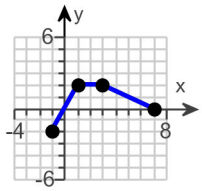


(b) Choose the correct graph of $G(x) = f(x + 3)$ below.

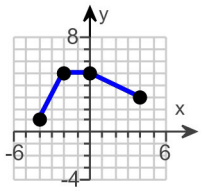
A.



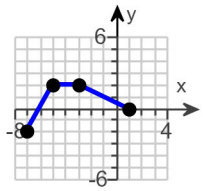
B.



C.

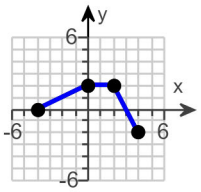


D.

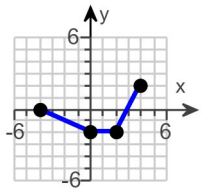


(c) Choose the correct graph of $P(x) = -f(x)$ below.

A.



B.



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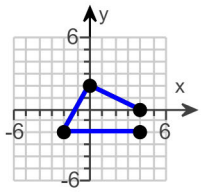

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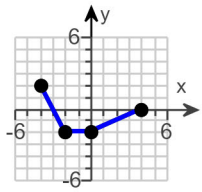
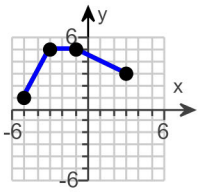
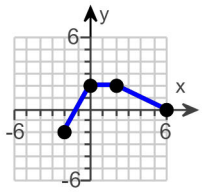


(d) Choose the correct graph of $H(x) = f(x + 1) - 3$ below.

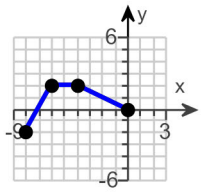
A.



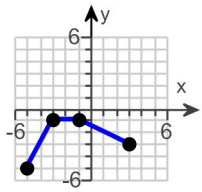
B.



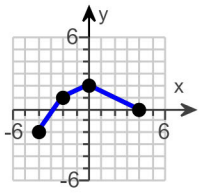
C.

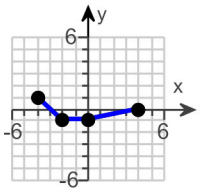


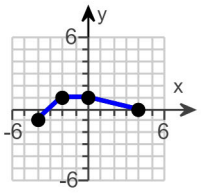
D.

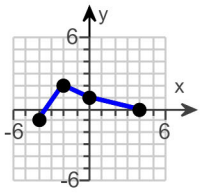


(e) Choose the correct graph of $Q(x) = \frac{1}{2}f(x)$ below.



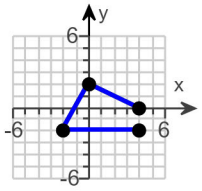




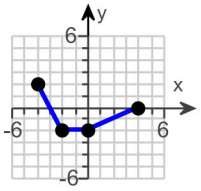


(f) Choose the correct graph of $g(x) = f(-x)$ below.

A.



B.



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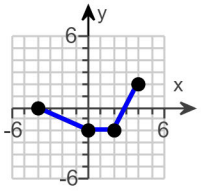
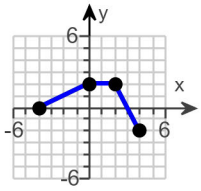
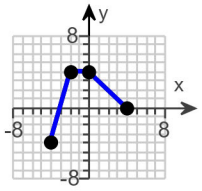


D.

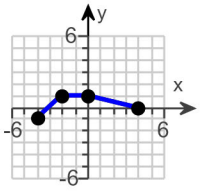


(g) Choose the correct graph of $h(x) = f(2x)$ below.

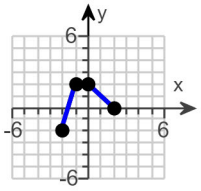
A.



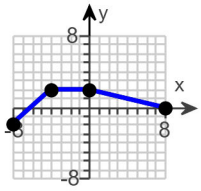
B.



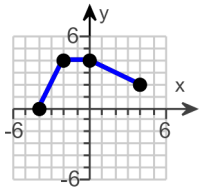
C.



D.



Answers



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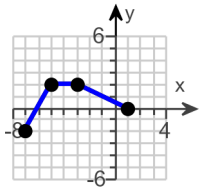
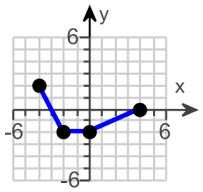


D.



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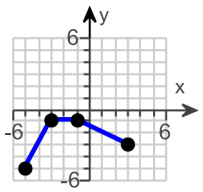

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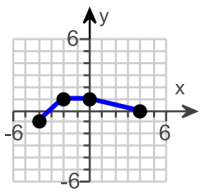

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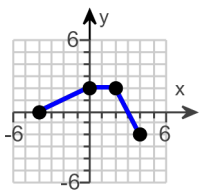
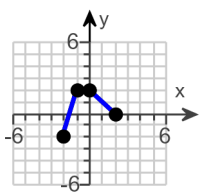


D.

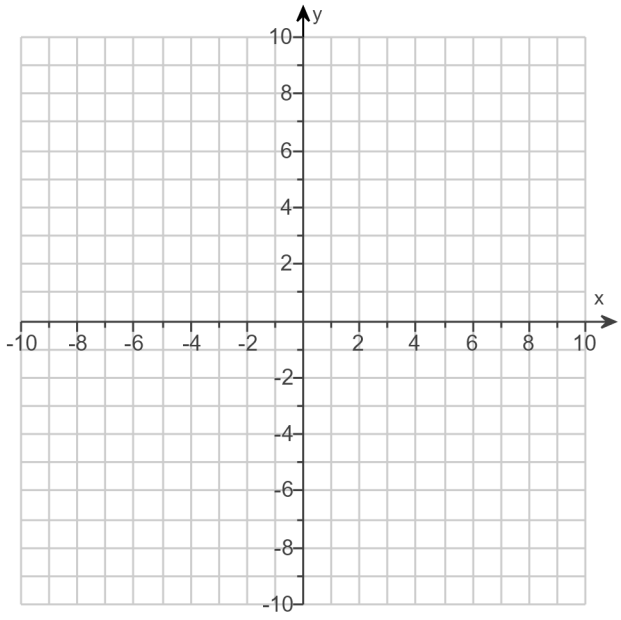


C.

ID: 1.5.63

13.

(a) Graph $f(x) = |x + 2| - 3$ using transformations.
(b) Find the area of the region bounded by f and the x-axis that lies below the x-axis.

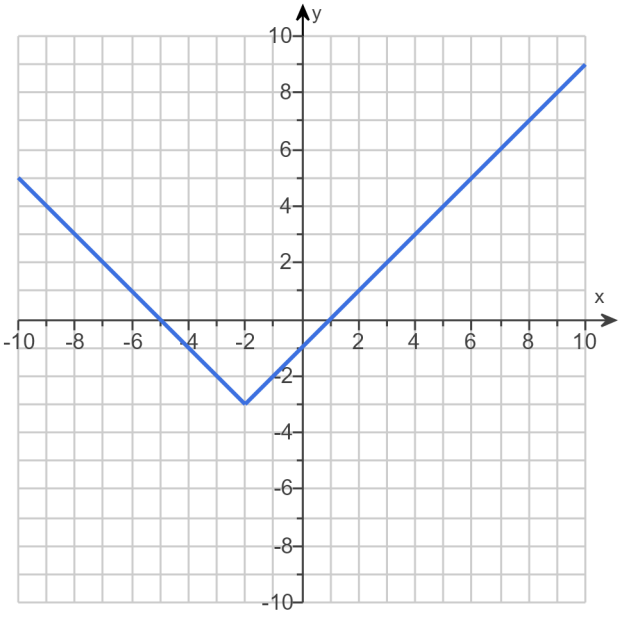


(a) Graph f(x).

(Use the graphing tool provided to graph the function.)

(b) The area of the region bounded by f and the x-axis that lies below the x-axis is [ ] square units.
(Simplify your answer.)

Answers



9

ID: 1.5.81

14. Factor the given polynomial completely. If the polynomial cannot be factored, say that it is prime.

$x^2 + 18x + 77$

Select the correct choice below and fill in any answer boxes within your choice.

- **A.** $x^2 + 18x + 77 =$ _____
- **B.** The polynomial is prime.

Answer: A. $x^2 + 18x + 77 =$ **(x + 11)(x + 7)**

ID: 2.3.1

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15. Solve the equation.

$(x - 4)(4x + 9) = 0$

The solution set is { } . (Use a comma to separate answers as needed.)

Answer: $4, -\frac{9}{4}$

ID: 2.3.3

---

16. Find the zeros of the quadratic function by factoring. What are the x-intercepts of the graph of the function?

$F(x) = x^2 + x - 2$

Select the correct choice below and fill in the answer box to complete your choice.
(Use a comma to separate answers as needed. Type an integer or a simplified fraction.)

- **A.** The zeros and the x-intercepts are the same. They are _____ .
- **B.** The zeros and the x-intercepts are different. The zeros are _____, the x-intercepts are _____ .

Answer: A. The zeros and the x-intercepts are the same. They are **− 2,1** .

ID: 2.3.17

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17. Find the zeros of the quadratic function by factoring. What are the x-intercepts of the graph of the function?

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

Select the correct choice below and fill in the answer box to complete your choice.
(Use a comma to separate answers as needed. Type an integer or a simplified fraction.)

- **A.** The zeros and the x-intercepts are different. The zeros are _____, the x-intercepts are _____.
- **B.** The zeros and the x-intercepts are the same. They are _____.

Answer: B. The zeros and the x-intercepts are the same. They are $-\frac{1}{2}, 2$.

ID: 2.3.19

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18. Find the zeros of the following quadratic function by factoring. What are the x-intercepts of the graph of the function?

$g(x) = x(x + 9) + 14$

Select the correct choice below and fill in the answer box to complete your choice.
(Simplify your answer. Use a comma to separate answers as needed.)

- **A.** The zeros and the x-intercepts are different. The zeros are _____, the x-intercepts are _____.
- **B.** The zeros and the x-intercepts are the same. They are _____.

Answer: B. The zeros and the x-intercepts are the same. They are $-2, -7$.

ID: 2.3.23

---

19. Find the zeros of the quadratic function using the square root method. What are the x-intercepts of the graph of the function?

$g(x) = (x - 5)^2 - 16$

Select the correct choice below and fill in the answer box to complete your choice.
(Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)

- **A.** The zeros and the x-intercepts are the same. They are _____.
- **B.** The zeros and the x-intercepts are different. The zeros are _____, the x-intercepts are _____.

Answer: A. The zeros and the x-intercepts are the same. They are $9, 1$.

ID: 2.3.29

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20. Find the zeros of the following quadratic function by completing the square. What are the x-intercepts of the graph of the function?

$f(x) = x^2 + 8x - 32$

Select the correct choice below and fill in the answer box to complete your choice.
(Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)

- **A.** The zeros and the x-intercepts are the same. They are _____.
- **B.** The zeros and the x-intercepts are different. The zeros are _____, the x-intercepts are _____.

Answer: A. The zeros and the x-intercepts are the same. They are $\boxed{-4+4\sqrt{3}, -4-4\sqrt{3}}$.

ID: 2.3.33

21. Find the zeros, if any, of the quadratic function using the quadratic formula. What are the x-intercepts, if any, of the graph of the function?

$f(x) = 8x^2 + 1 + 12x$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.
(Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)

- **A.** The zeros and the x-intercepts are different. The zeros are _____, the x-intercepts are _____.
- **B.** The zeros and the x-intercepts are the same. They are _____.
- **C.** There is no real zero solution and no x-intercept.

Answer: B. The zeros and the x-intercepts are the same. They are $\boxed{\frac{-3+\sqrt{7}}{4}, \frac{-3-\sqrt{7}}{4}}$.

ID: 2.3.47

22. Find the real zeros, if any, of the following quadratic function using the quadratic formula. What are the x-intercepts, if any, of the graph of the function?

$G(x) = 2x(x + 2) - 4$

Select the correct choice below and, if necessary, fill in the answer box to complete your choice.
(Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)

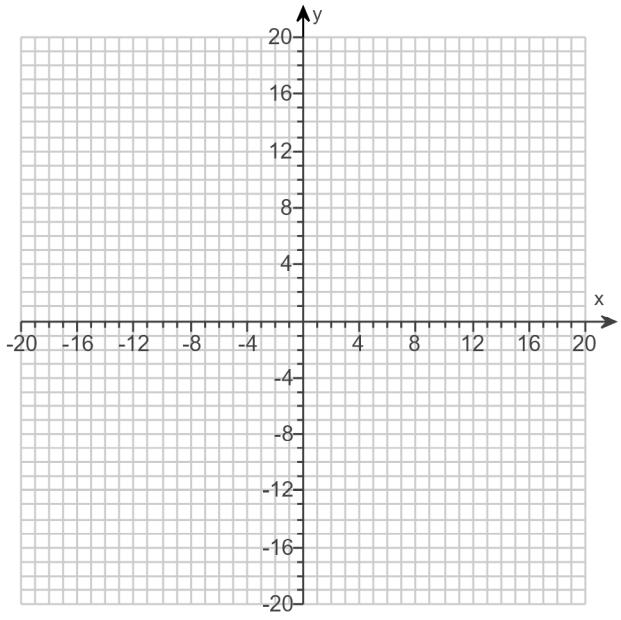
- **A.** The zeros and the x-intercepts are the same. They are _____.
- **B.** The zeros and the x-intercepts are different. The zeros are _____, the x-intercepts are _____.
- **C.** There is no real zero solution and no x-intercept.

Answer: A. The zeros and the x-intercepts are the same. They are $\boxed{-1+\sqrt{3}, -1-\sqrt{3}}$.

ID: 2.3.49

23.

Graph the function $f(x) = -x^2 + 2x$ by starting with the graph of $y = x^2$ and using transformations (shifting, stretching/compressing, and/or reflecting).

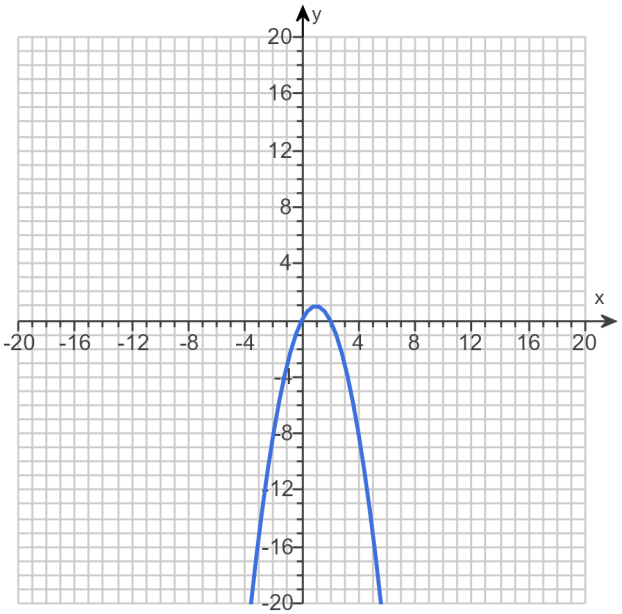


Select all the transformations needed to graph the given function using $y = x^2$.

- ☐ **A.** Stretch the graph vertically by a factor of 1.
- ☐ **B.** Shift the graph to the left 1 unit.
- ☐ **C.** Reflect the graph about the y-axis.
- ☐ **D.** Shift the graph down 1 unit.
- ☐ **E.** Reflect the graph about the x-axis.
- ☐ **F.** Compress the graph vertically by a factor of 1.
- ☐ **G.** Shift the graph up 1 unit.
- ☐ **H.** Shift the graph to the right 1 unit.

Use the graphing tool to graph the function.

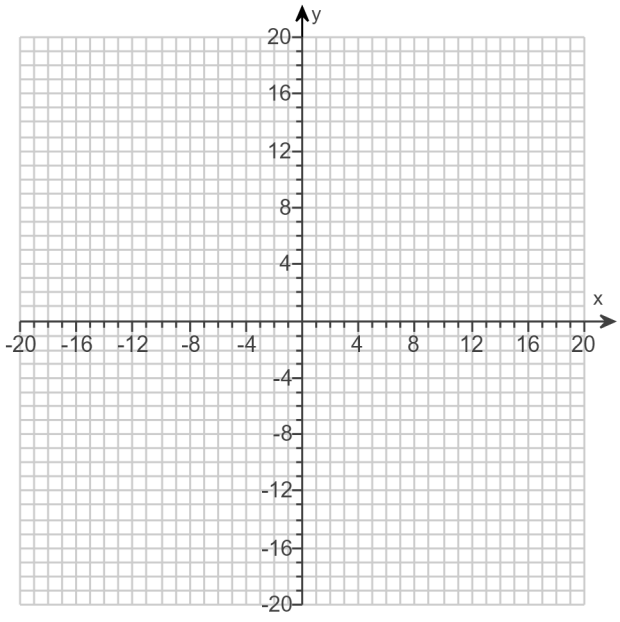
Answers E. Reflect the graph about the x-axis., G. Shift the graph up 1 unit., H. Shift the graph to the right 1 unit.



ID: 2.4.29-Setup & Solve

24.

For the quadratic function $f(x) = x^2 + 6x - 7$, answer parts **(a)** through **(c)**.



(a) Graph the quadratic function by determining whether its graph opens up or down and by finding its vertex, axis of symmetry, y-intercept, and x-intercepts, if any.

Does the graph of f open up or down?

- down
- up

What are the coordinates of the vertex?

The vertex of the parabola is [ ].
(Type an ordered pair. Use integers or fractions for any numbers in the expression.)

What is the equation of the axis of symmetry?

The axis of symmetry is [ ].
(Type an equation.)

What is/are the x-intercept(s)? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The x-intercept(s) is/are _____.
  (Type an integer or a decimal. Use a comma to separate answers as needed.)
- **B.** There are no x-intercepts.

What is the y-intercept? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The y-intercept is _____.
  (Type an integer or a decimal.)
- **B.** There is no y-intercept.

Use the graphing tool to graph the function.

(b) Determine the domain and the range of the function.

The domain of f is [ ].
(Type your answer in interval notation.)

The range of f is [ ].
(Type your answer in interval notation.)

(c) Determine where the function is increasing and where it is decreasing.

The function is increasing on the interval [ ].
(Type your answer in interval notation.)

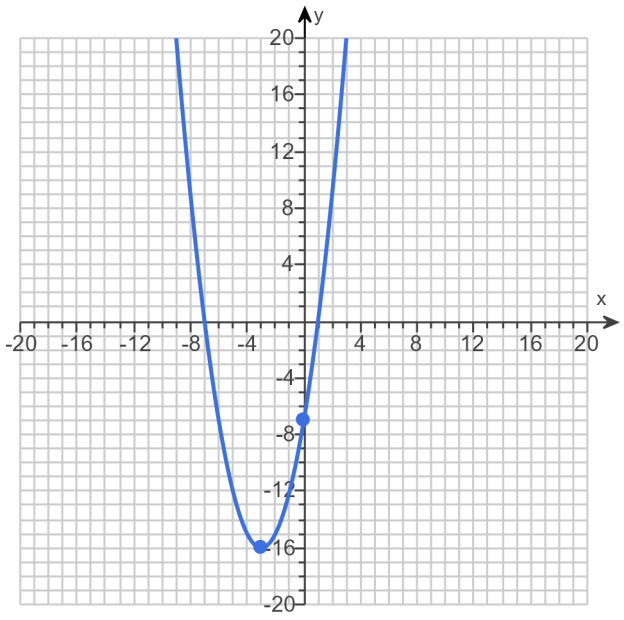
Answers up

$(-3,-16)$

$x=-3$

A. The x-intercept(s) is/are **−7,1**.
(Type an integer or a decimal. Use a comma to separate answers as needed.)

A. The y-intercept is **−7**.(Type an integer or a decimal.)



$(-\infty,\infty)$

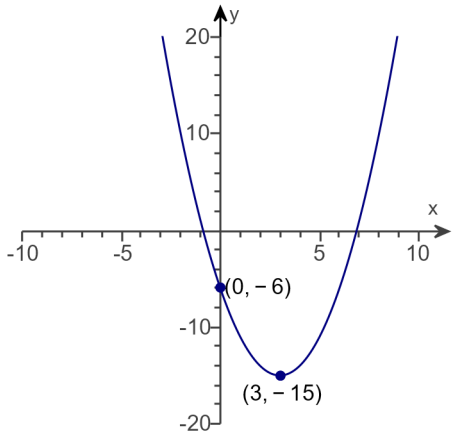
$[-16,\infty)$

$[-3,\infty)$

$(-\infty,-3]$

ID: 2.4.37

25. Determine the quadratic function whose graph is given below.



The quadratic function which describes the given graph is $f(x) =$ [ ].
(Type an expression.)

Answer: $x^2 - 6x - 6$

ID: 2.4.49

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26. Determine, without graphing, whether the given quadratic function has a maximum value or a minimum value and then find the value.

$f(x) = -3x^2 + 30x - 6$

Does the quadratic function f have a minimum value or a maximum value?

- ○ The function f has a minimum value.
- ○ The function f has a maximum value.

What is this minimum or maximum value?

[ ]
(Simplify your answer.)

Answers The function f has a maximum value.

69

ID: 2.4.59

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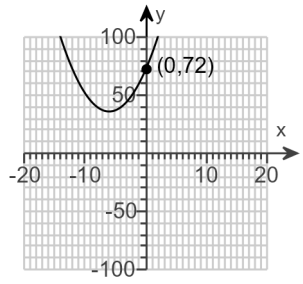
27. Find the complex zeros of the quadratic function. Graph the function and label the intercepts.

$f(x) = x^2 - 12x + 72$

The zeros of the function are [ ].
(Simplify your answer, including any radicals and i as needed. Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)

Choose the correct graph below.

A.



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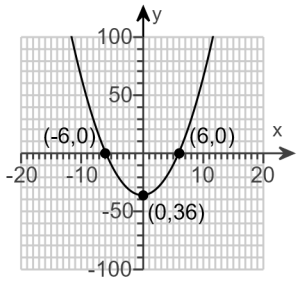
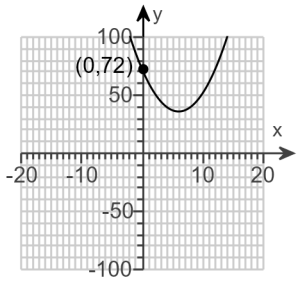
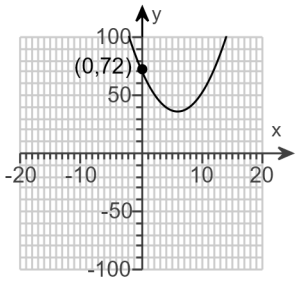


C.



Answers $6 - 6i, 6 + 6i$



C.

ID: 2.7.13

28. Use the rational zeros theorem to find all the real zeros of the polynomial function. Use the zeros to factor f over the real numbers.

$f(x) = x^3 + 9x^2 - 25x - 33$

Find the real zeros of f. Select the correct choice below and, if necessary, fill in the answer box to complete your answer.

○ **A.** x = _____
(Simplify your answer. Type an exact answer, using radicals as needed. Use integers or fractions for any rational numbers in the expression. Use a comma to separate answers as needed.)

○ **B.** There are no real zeros.

Use the real zeros to factor f.

f(x) = [ ]
(Simplify your answer. Type your answer in factored form. Type an exact answer, using radicals as needed. Use integers or fractions for any rational numbers in the expression.)

Answers A. x = **−11, −1, 3**
(Simplify your answer. Type an exact answer, using radicals as needed. Use integers or fractions for any rational numbers in the expression. Use a comma to separate answers as needed.)

$(x + 1)(x + 11)(x - 3)$

ID: 3.2.45

29. Use the rational zeros theorem to find all the real zeros of the polynomial function. Use the zeros to factor f over the real numbers.

$f(x) = x^4 + 10x^3 - 20x^2 - 90x + 99$

What are the real zeros? Select the correct choice below and, if necessary, fill in the answer box to complete your answer.

○ **A.** x = _____
(Simplify your answer. Type an exact answer, using radicals as needed. Use integers or fractions for any rational numbers in the expression. Use a comma to separate answers as needed.)

○ **B.** There are no real zeros.

Use the real zeros to factor f.

f(x) = [ ]
(Simplify your answer. Type your answer in factored form. Type an exact answer, using radicals as needed. Use integers or fractions for any rational numbers in the expression.)

Answers A. x = **−11,1,3, −3**
(Simplify your answer. Type an exact answer, using radicals as needed. Use integers or fractions for any rational numbers in the expression. Use a comma to separate answers as needed.)

$(x + 11)(x - 1)(x + 3)(x - 3)$

ID: 3.2.53

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30. Solve the equation in the real number system.

$5x^4 - 36x^3 + 87x^2 - 76x + 12 = 0$

What are the real solutions of the equation? Select the correct choice below and fill in any answer boxes in your choice.

○ **A.** x = _____
(Simplify your answer. Type an exact answer, using radicals as needed. Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed. Type each answer only once; do not duplicate answers in the case of repeated roots.)

○ **B.** There are no real solutions.

Answer: A. x = **$\frac{1}{5}$, 2, 3**
(Simplify your answer. Type an exact answer, using radicals as needed. Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed. Type each answer only once; do not duplicate answers in the case of repeated roots.)

ID: 3.2.67

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31. Find the vertical, horizontal, and oblique asymptotes, if any, for the following rational function.

$$R(x) = \frac{13x}{x + 20}$$

Select the correct choice below and fill in any answer boxes within your choice.

- **A.** The vertical asymptote(s) is/are x = _____.
  (Use a comma to separate answers as needed.)
- **B.** There is no vertical asymptote.

Select the correct choice below and fill in any answer boxes within your choice.

- **A.** The horizontal asymptote(s) is/are y = _____.
  (Use a comma to separate answers as needed.)
- **B.** There is no horizontal asymptote.

Select the correct choice below and fill in any answer boxes within your choice.

- **A.** The oblique asymptote(s) is/are y = _____.
  (Use a comma to separate answers as needed.)
- **B.** There is no oblique asymptote.

Answers A. The vertical asymptote(s) is/are x = **−20**.(Use a comma to separate answers as needed.)

A. The horizontal asymptote(s) is/are y = **13**.(Use a comma to separate answers as needed.)

B. There is no oblique asymptote.

ID: 3.4.45

32. For $f(x) = 6x + 2$ and $g(x) = 8x$, find the following composite functions and state the domain of each.

(a) $f \circ g$ (b) $g \circ f$ (c) $f \circ f$ (d) $g \circ g$

(a) $(f \circ g)(x) =$ [ ] (Simplify your answer.)

Select the correct choice below and fill in any answer boxes within your choice.

- **A.** The domain of $f \circ g$ is $\{x \mid$ [ ] $\}$.
  (Type an inequality. Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)
- **B.** The domain of $f \circ g$ is all real numbers.

(b) $(g \circ f)(x) =$ [ ] (Simplify your answer.)

Select the correct choice below and fill in any answer boxes within your choice.

- **A.** The domain of $g \circ f$ is $\{x \mid$ [ ] $\}$.
  (Type an inequality. Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)
- **B.** The domain of $g \circ f$ is all real numbers.

(c) $(f \circ f)(x) =$ [ ] (Simplify your answer.)

Select the correct choice below and fill in any answer boxes within your choice.

- **A.** The domain of $f \circ f$ is $\{x \mid$ [ ] $\}$.
  (Type an inequality. Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)
- **B.** The domain of $f \circ f$ is all real numbers.

(d) $(g \circ g)(x) =$ [ ] (Simplify your answer.)

Select the correct choice below and fill in any answer boxes within your choice.

- **A.** The domain of $g \circ g$ is $\{x \mid$ [ ] $\}$.
  (Type an inequality. Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)
- **B.** The domain of $g \circ g$ is all real numbers.

Answers $48x + 2$

B. The domain of $f \circ g$ is all real numbers.

$48x + 16$

B. The domain of $g \circ f$ is all real numbers.

$36x + 14$

B. The domain of $f \circ f$ is all real numbers.

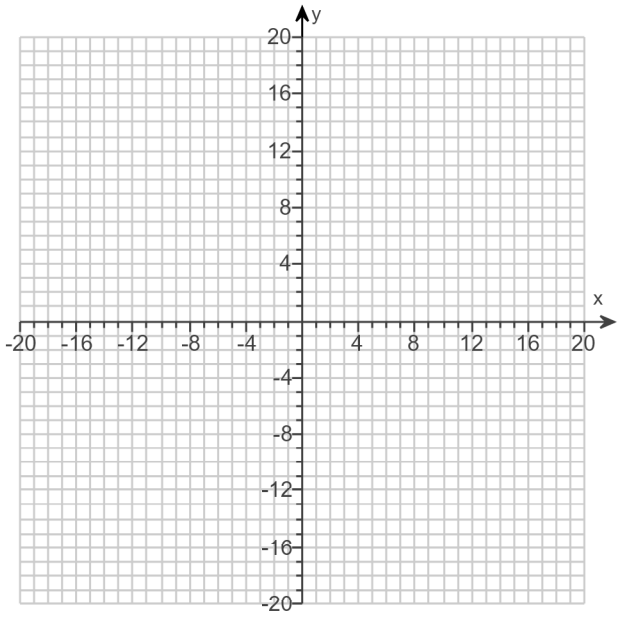
$64x$

B. The domain of $g \circ g$ is all real numbers.

ID: 4.1.23

33.

The function $f(x) = 3x + 1$ is one-to-one.
(a) Find the inverse of f and check the answer.
(b) Find the domain and the range of f and f^{-1}.
(c) Graph f, f^{-1}, and $y = x$ on the same coordinate axes.



(a) $f^{-1}(x) =$ ☐
(Simplify your answer. Use integers or fractions for any numbers in the expression.)

(b) Find the domain of f. Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The domain is $\{x|x \neq$ ☐$\}$.
- **B.** The domain is $\{x|x \leq$ ☐$\}$.
- **C.** The domain is $\{x|x \geq$ ☐$\}$.
- **D.** The domain is the set of all real numbers.

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

- **A.** The range is $\{y|y \geq$ ☐$\}$.
- **B.** The range is $\{y|y \leq$ ☐$\}$.
- **C.** The range is $\{y|y \neq$ ☐$\}$.
- **D.** The range is the set of all real numbers.

Find the domain of f^{-1}. Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The domain is $\{x|x \neq$ ☐$\}$.
- **B.** The domain is $\{x|x \leq$ ☐$\}$.
- **C.** The domain is $\{x|x \geq$ ☐$\}$.
- **D.** The domain is the set of all real numbers.

Find the range of f^{-1}. Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- **A.** The range is $\{y|y \leq$ ☐$\}$.
- **B.** The range is $\{y|y \geq$ ☐$\}$.
- **C.** The range is $\{y|y \neq$ ☐$\}$.
- **D.** The range is the set of all real numbers.

(c) Graph f, f^{-1}, and $y = x$ on the same coordinate axes. Use the graphing tool to graph the functions.

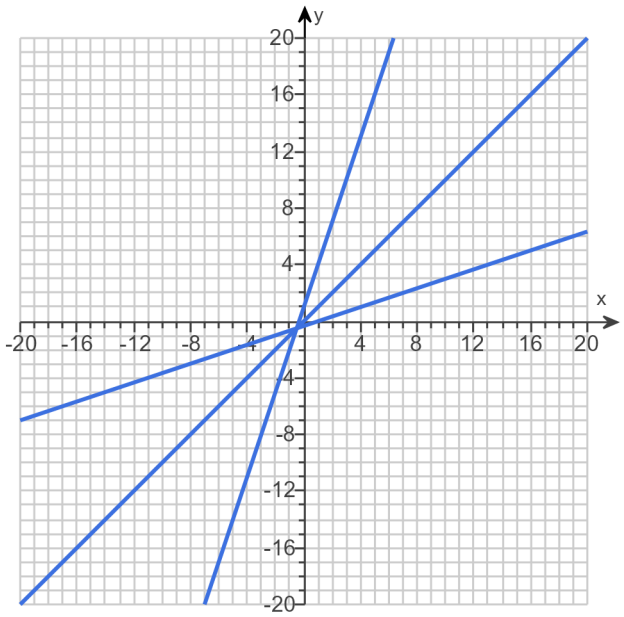
Answers $\frac{x-1}{3}$

D. The domain is the set of all real numbers.

D. The range is the set of all real numbers.

D. The domain is the set of all real numbers.

D. The range is the set of all real numbers.



ID: 4.2.53

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34. Solve the equation.

$32^{-x+24} = 128^{x}$

The solution set is { }.
(Type an integer or a simplified fraction. Use a comma to separate answers as needed.)

Answer: 10

ID: 4.3.73

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35. Solve the equation.

$\log_2(8x + 5) = 4$

Change the given logarithmic equation to exponential form.

[ ]
(Type an equation. Do not simplify.)

The solution set is { }.
(Simplify your answer. Use a comma to separate answers as needed.)

Answers $8x + 5 = 2^4$

$\frac{11}{8}$

ID: 4.4.91-Setup & Solve

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36. Solve by using the quadratic formula.

$x^2 - 2x - 15 = 0$

The solution set is { }.
(Simplify your answer. Use a comma to separate answers as needed. Express complex numbers in terms of i. Type an exact answer, using radicals as needed.)

Answer: $-3, 5$

ID: 4.6.1

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37. Solve the following logarithmic equation.

$\log_2 x = 2$

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

- **A.** The solution set is { }.
  (Simplify your answer. Type an exact answer. Use a comma to separate answers as needed.)
- **B.** There is no solution.

Answer: A. The solution set is { **4** }.
(Simplify your answer. Type an exact answer. Use a comma to separate answers as needed.)

ID: 4.6.5

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38. Solve the following logarithmic equation.

$\log_3(3x) = 3$

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

- **A.** The solution set is { } .
  (Simplify your answer. Type an exact answer. Use a comma to separate answers as needed.)
- **B.** There is no solution.

Answer: A. The solution set is { **9** } .
(Simplify your answer. Type an exact answer. Use a comma to separate answers as needed.)

ID: 4.6.7

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39. Solve the logarithmic equation.

$\log_2(x + 3) = \log_2 13$

Determine the equation to be solved after removing the logarithm.

(Type an equation. Do not simplify.)

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

- **A.** The solution set is { } .
  (Simplify your answer. Type an exact answer. Use a comma to separate answers as needed.)
- **B.** There is no solution.

Answers $x + 3 = 13$

A. The solution set is { **10** } .
(Simplify your answer. Type an exact answer. Use a comma to separate answers as needed.)

ID: 4.6.9-Setup & Solve

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40. Solve the logarithmic equation.

$\log x + \log (x + 9) = 1$

Determine the equation to be solved after removing the logarithm.

[ ]
(Type an equation. Do not simplify.)

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

- **A.** The solution set is { [ ] }.
  (Simplify your answer. Type an exact answer. Use a comma to separate answers as needed.)
- **B.** There is no solution.

Answers $x(x + 9) = 10$

A. The solution set is { **1** }.
(Simplify your answer. Type an exact answer. Use a comma to separate answers as needed.)

ID: 4.6.17-Setup & Solve

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41. Find the amount that results from the given investment.

$100 invested at 10% compounded quarterly after a period of 4 years

After 4 years, the investment results in $[ ].
(Round to the nearest cent as needed.)

Answer: 148.45

ID: 4.7.7

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42. Find the amount that results from the given investment.

$100 invested at 2% compounded daily after a period of 2 years

After 2 years, the investment results in $[ ].
(Round to the nearest cent as needed.)

Answer: 104.08

ID: 4.7.11

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43. How long does it take for an investment to double in value if it is invested at 5% compounded quarterly? Compounded continuously?

At 5% compounded quarterly, the investment doubles in about ____ years.
(Round to two decimal places as needed.)

At 5% compounded continuously, the investment doubles in about ____ years.
(Round to two decimal places as needed.)

Answers 13.95

13.86

ID: 4.7.35

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44. If Tanisha has $1,000 to invest at 5% per annum compounded semiannually, how long will it be before she has $1,400? If the compounding is continuous, how long will it be?

Compounding semiannually, it will be about ____ years before Tanisha has $1,400.
(Round to two decimal places as needed.)

Compounding continuously, it will be about ____ years before Tanisha has $1,400.
(Round to two decimal places as needed.)

Answers 6.81

6.73

ID: 4.7.39

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45. How many years will it take for an initial investment of $10,000 to grow to $35,000? Assume a rate of interest of 20% compounded continuously.

It will take about ____ years for the investment to grow to $35,000.
(Round to two decimal places as needed.)

Answer: 6.26

ID: 4.7.41

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46. The half-life of carbon-14 is 5600 years. If a piece of charcoal made from the wood of a tree shows only 63% of the carbon-14 expected in living matter, when did the tree die?

The tree died about ____ years ago.
(Do not round until the final answer. Then round to the nearest whole number.)

Answer: 3733

ID: 4.8.11

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47. Solve the system of equations. If the system has no solution, say that it is inconsistent.

$$\begin{cases} 3x - 5y = -1 \\ 5x + y = 17 \end{cases}$$

Select the correct choice below and, if necessary, fill in any answer boxes within your choice.

- **A.** The solution of the system is x = _____ and y = _____.
  (Type an integers or simplified fractions.)
- **B.** There are infinitely many solutions. Using ordered pairs, the solution can be written as $\{(x,y) \mid x =$ _____, y any real number$\}$.
  (Simplify your answer. Type an expression using y as the variable as needed.)
- **C.** The system is inconsistent.

Answer: A. The solution of the system is x = **3** and y = **2**.
(Type an integers or simplified fractions.)

ID: 6.1.33

48. Solve the given system of equations. If the system has no solution, say that it is inconsistent.

$$\begin{cases} x - 3y + 4z = 13 \\ 2x + y + z = 5 \\ -2x + 3y - 3z = -15 \end{cases}$$

Select the correct choice below and fill in any answer boxes within your choice.

- **A.** The solution is x = _____, y = _____, and z = _____. (Type integers or simplified fractions.)
- **B.** There are infinitely many solutions. Using ordered triplets, they can be expressed as $\{(x,y,z) \mid x =$ _____, y = _____, z any real number$\}$.
  (Simplify your answers. Type expressions using z as the variable as needed.)
- **C.** There are infinitely many solutions. Using ordered triplets, they can be expressed as $\{(x,y,z) \mid x =$ _____, y any real number, z any real number$\}$.
  (Simplify your answer. Type an expression using y and z as the variables as needed.)
- **D.** The system is inconsistent.

Answer: A.
The solution is x = **3**, y = **−2**, and z = **1**. (Type integers or simplified fractions.)

ID: 6.1.45

49. Find the sum of the sequence.

$$\sum_{k=1}^{5} (7k + 9)$$

$\sum_{k=1}^{5} (7k + 9) =$ [ ]

Answer: 150

ID: 7.1.73

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50. Expand the expression using the binomial theorem.

$$(x + 3)^4$$

$(x + 3)^4 =$ [ ]

Answer: $x^4 + 12x^3 + 54x^2 + 108x + 81$

ID: 7.5.17