Student: _____ **Instructor:** Alfredo Alvarez **Assignment:** finalm1314COC055sullllj55YY
Date: _____ **Course:** Math 1314 Sullivan Coreq

1. Solve the quadratic equation by factoring.

$t^2 - 3t = 54$

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

Answer: $-6, 9$

ID: Quick Check PF.4.9

2. Solve the equation.

$8x^3 + x^2 - 32x - 4 = 0$

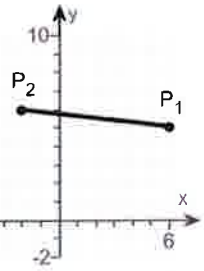
The solution set is { }.
(Simplify your answer. Type an integer or a simplified fraction. Use a comma to separate answers as needed.)

Answer: $-\frac{1}{8}, -2, 2$

ID: PF.4.39

3. Find the distance $d(P_1, P_2)$ between the given points P_1 and P_2.

$P_1 = (6,5)$
$P_2 = (-2,6)$



$d(P_1, P_2)$ = _____
(Simplify your answer. Type an exact answer, using radicals as needed.)

Answer: $\sqrt{65}$

ID: F.1.21

$d = 8.062257748$ or Round

$d = 8.06$

4. Find the midpoint of the line segment joining the points P_1 and P_2.

$P_1 = (4, -3)$; $P_2 = (6, 5)$

The midpoint of the line segment joining the points P_1 and P_2 is _____.
(Simplify your answer. Type an ordered pair.)

Answer: (5,1)

ID: F.1.39

$(4, -3)$ $(6, 5)$
x_1 y_1 x_2 y_2

$$\text{Midpoint} = \left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$$

$$\text{Midpoint} = \left(\frac{(4)+(6)}{2}, \frac{(-3)+(5)}{2}\right)$$

$$\text{Midpoint} = \left(\frac{4+6}{2}, \frac{-3+5}{2}\right)$$

$$\text{Midpoint} = \left(\frac{10}{2}, \frac{2}{2}\right)$$

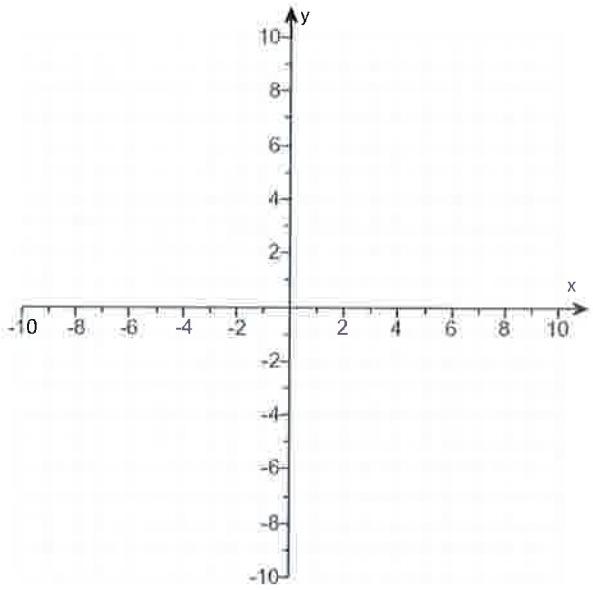
$$\text{Midpoint} = (5, 1)$$

Complete the square

5.

For the equation $x^2 + y^2 - 2x - 4y - 31 = 0$, do the following.

(a) Find the center (h,k) and radius r of the circle.
(b) Graph the circle.
(c) Find the intercepts, if any.



(a) The center is _____.
(Type an ordered pair.)

The radius is r = _____.

(b) Use the graphing tool to graph the circle.

(c) Find the intercepts, if any. 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. Type exact answers for each coordinate, using radicals as needed.)

○ **B.** There is no intercept.

$x^2+y^2-2x-4y-31=0$

$x^2-2x+y^2-4y=31$ rewrite

$x^2-2x+\left(\frac{1}{2}(-2)\right)^2+y^2-4y+\left(\frac{1}{2}(-4)\right)^2=31+\left(\frac{1}{2}(-2)\right)^2+\left(\frac{1}{2}(-4)\right)^2$

$x^2-2x+(-1)^2+y^2-4y+(-2)^2=31+(-1)^2+(-2)^2$

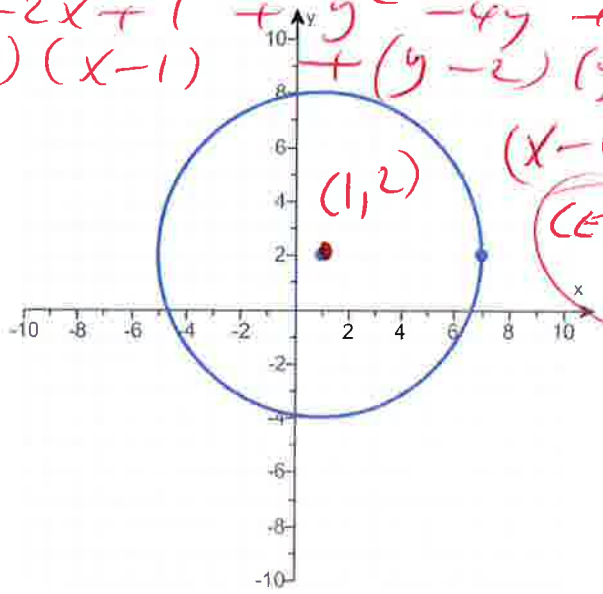
$x^2-2x+1+y^2-4y+4=31+1+4$

$(x-1)(x-1)+(y-2)(y-2)=36$

$(x-1)^2+(y-2)^2=36$

CENTER $=(1,2)$

Radius $=\sqrt{36}=6$



Answers (1,2)
6

A. The intercept(s) is/are $(1-4\sqrt{2},0),(1+4\sqrt{2},0),(0,2-\sqrt{35}),(0,2+\sqrt{35})$.
(Type an ordered pair. Use a comma to separate answers as needed. Type exact answers for each coordinate, using radicals as needed.)

ID: F.4.27

6. Find the domain of the function.

$f(x) = \sqrt{3x - 27}$

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

Answer: [9,∞)

ID: 1.1.59

$f(x) = \sqrt{3x-27}$

let $3x - 27 \geq 0$

$3x - 27 + 27 \geq 0 + 27$

$3x \geq 27$

$\frac{3x}{3} \geq \frac{27}{3}$

$x \geq 9$

$[9, \infty)$

domain

$f(x) = \sqrt{Ax+B}$

let $Ax + B \geq 0$

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

$f(x) = 5x + 1$; $g(x) = 3x - 7$

(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 $\{x|$ _____ $\}$.
  (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 $\{x|$ _____ $\}$.
  (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 $\{x|$ _____ $\}$.
  (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 $\{x|$ _____ $\}$.
  (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 $(f + g)(2)$.

$(f+g)(x) =$
$f(x) + g(x) =$
$(5x+1) + (3x-7) =$
$5x + 1 + 3x - 7 =$
$8x - 6 =$
domain: $(-\infty, \infty)$

$(f-g)(x) =$
$f(x) - g(x) =$
$(5x+1) - (3x-7) =$
$5x + 1 - 3x + 7 =$
$2x + 8 =$
domain: $(-\infty, \infty)$

$(f \cdot g)(x) =$
$f(x) \cdot g(x) =$
$(5x+1)(3x-7) =$
$15x^2 - 35x + 3x - 7 =$
$15x^2 - 32x - 7 =$
domain: $(-\infty, \infty)$

$\left(\frac{f}{g}\right)(x) =$
$\frac{f(x)}{g(x)} =$
$\frac{5x+1}{3x-7}$
but $3x - 7 \neq 0$
$3x - 7 + 7 \neq 0 + 7$
$3x \neq 7$
$\frac{3x}{3} \neq \frac{7}{3}$
$x \neq \frac{7}{3}$
domain: $x \neq \frac{7}{3}$

$(f+g)(x) = 8x - 6$
$(f+g)(2) = 8(2) - 6$
$(f+g)(2) = 16 - 6$
$(f+g)(2) = 10$

$(f+g)(2) =$ _____ (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 $8x-6$

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

$2x+8$

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

$15x^2-32x-7$

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

$\frac{5x+1}{3x-7}$

A. The domain is $\left\{x \middle| x \neq \frac{7}{3}\right\}$.

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

10

16

32

$-\frac{3}{2}$

ID: 1.1.67

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

$f(x) = x - 6;\ g(x) = 5x^2$

(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 $\{x|$ _____ $\}$. (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 $\{x|$ _____ $\}$. (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 $\{x|$ _____ $\}$. (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 $\{x|$ _____ $\}$. (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 $(f+g)(3)$.

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

domain $(-\infty, \infty)$

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

domain $(-\infty, \infty)$

$(f \cdot g)(x) = f(x) \cdot g(x) = (x-6)(5x^2) = 5x^3 - 30x^2$

domain $(-\infty, \infty)$

$\left(\frac{f}{g}\right)(x) = \frac{f(x)}{g(x)} = \frac{x-6}{5x^2}$

But $5x^2 = 0$

$\frac{5x^2}{5} = \frac{0}{5}$

$x^2 = 0$

$\sqrt{x^2} = \sqrt{0}$

$x = 0$

domain $x \neq 0$

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

$(f+g)(3) = 5(3)^2 + (3) - 6$

$(f+g)(3) = 5(3)(3) + (3) - 6$

$(f+g)(3) = 45 + 3 - 6$

$(f+g)(3) = 42$

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

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

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

(g) Find $(f \cdot g)(2)$.

$(f \cdot g)(2) =$ _____ (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 $5x^2 + x - 6$

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

$-5x^2 + x - 6$

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

$5x^3 - 30x^2$

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

$\frac{x-6}{5x^2}$

A. The domain is {x| x ≠ 0}.

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

42

−82

−80

−1

ID: 1.1.69

9. 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.

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

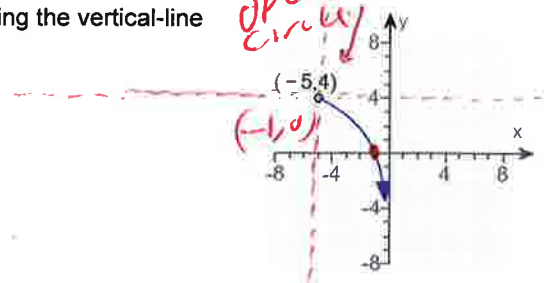
$\frac{f(x+h)-f(x)}{h} =$ _____

Answer: $2x + h - 4$

ID: 1.1.83

10. 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 $x = -4$ intersects the graph at two points.
- B. No, the graph is not a function because a vertical line $x = -4$ intersects the graph at only one point.
- C. Yes, the graph is a function because every vertical line intersects the graph in more than one point.
- D. Yes, the graph is a function because every vertical line intersects the graph in at most 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 $(-5, 0]$. The range is $(-\infty, 4]$.
  (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 $(-1, 0)$.
  (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.
- [x] D. The graph has no symmetry.
- [ ] E. The graph is not that of a function.

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

A. The domain is $(-5,0)$. The range is $(-\infty,4)$.
(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

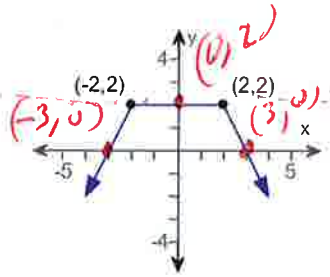
11.

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

(a) its domain and range.

(b) the intercepts, if any.

(c) any symmetry with respect to the x-axis, y-axis, or the origin.



Is the graph that of a function?

- (●) Yes
- ( ) No

If the graph is that of a function, what are the domain and range of the function? Select the correct choice below and fill in any answer boxes within your choice. (left, right) (bottom, top]

- (●) **A.** The domain is $(-\infty, \infty)$. The range is $(-\infty, 2]$.
  (Type your answers in interval notation.)
- ( ) **B.** The graph is not a function.

What are the intercepts? Select the correct choice below and fill in any answer boxes within your choice.

- (●) **A.** $(-3, 0)$ $(3, 0)$ $(0, 2)$
  (x-intercept, x-intercept, y-intercept)
  (Type an ordered pair. Use a comma to separate answers as needed.)
- ( ) **B.** There are no intercepts.
- ( ) **C.** The graph is not a function.

Determine if the graph is symmetrical.

- (●) **A.** It is symmetrical with respect to the y-axis.
- ( ) **B.** It is symmetrical with respect to the origin.
- ( ) **C.** It is symmetrical with respect to the x-axis.
- ( ) **D.** The graph is not symmetrical.
- ( ) **E.** The graph is not a function.

Answers Yes

A. The domain is $(-\infty,\infty)$. The range is $(-\infty,2]$. (Type your answers in interval notation.)

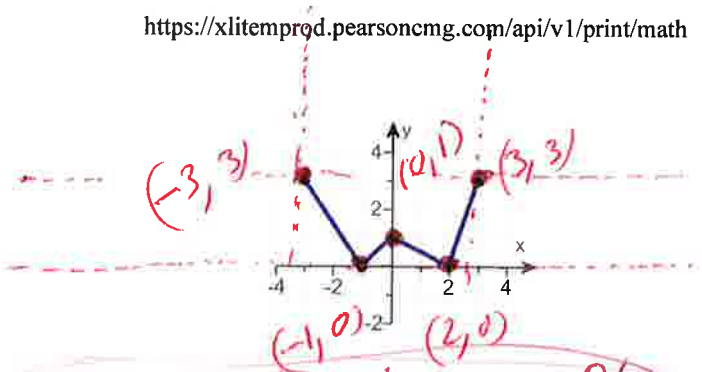
A. $(3,0),(-3,0),(0,2)$ (Type an ordered pair. Use a comma to separate answers as needed.)

A. It is symmetrical with respect to the y-axis.

ID: 1.2.21

12. 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? x-intercepts y-intercept
(-1, 0) (2, 0) (0, 1)
(Simplify your answer. Type an ordered pair. Use a comma to separate answers as needed.)

(b) The domain is [-3, 3] ← [left, right]
(Type your answer in interval notation.)

The range is [0, 3] ← [bottom, TOP]
(Type your answer in interval notation.)

Favorite hamburger Place
Double meat, double cheese
double bacon, hamburger
with diet soda.

(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 [-1, 0] [2, 3]
(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 [-3, -1] [0, 2]
(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) odd.
even.
neither odd nor even.

Answers $(-1,0),(2,0),(0,1)$

$[-3,3]$

$[0,3]$

A. The graph is increasing on $[-1,0],[2,3]$.
(Type your answer in interval notation. Use a comma to separate answers as needed.)

A. The graph is decreasing on $[-3,-1],[0,2]$.
(Type your answer in interval notation. Use a comma to separate answers as needed.)

B. The graph is not constant on any interval.

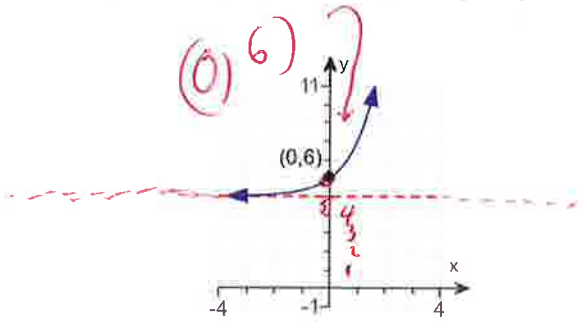
(1) neither odd nor even.

ID: 1.3.25

---

13. 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?

(0, 6) y-intercept

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

(b) The domain is $(-\infty, \infty)$ ← (left, right)

(Type your answer in interval notation. Round to the nearest integer as needed.)

The range is $(5, \infty)$ ← (bottom, TOP)

(Type your answer in interval notation. Round to the nearest integer as needed.)

(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 $(-\infty, \infty)$

  (Type your answer in interval notation. Use a comma to separate answers as needed.)
- B. There is no interval on which the graph is increasing.

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. There is no interval on which the graph is decreasing.

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. There is no interval on which the graph is constant.

(d) The function is (1) _____

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

Answers (0,6)

$(-\infty,\infty)$

$(5,\infty)$

A. The graph is increasing on $(-\infty,\infty)$.
(Type your answer in interval notation. Use a comma to separate answers as needed.)

B. There is no interval on which the graph is decreasing.

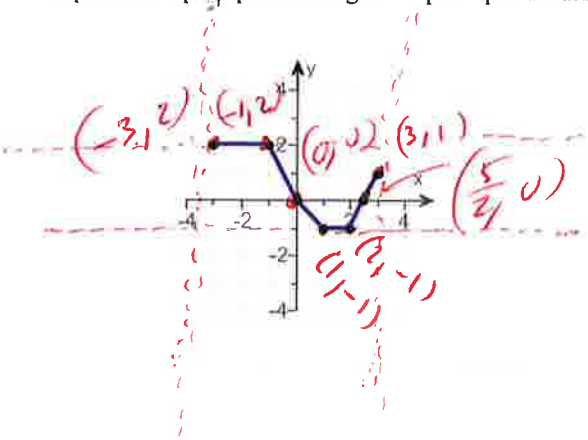
B. There is no interval on which the graph is constant.

(1) neither even nor odd.

ID: 1.3.27

14. 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?

(0,0) x-intercept (5/2, 0) x-intercept

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

(b) The domain is [-3, 3] ← [left, right]

(Type your answer in interval notation.)

The range is [-1, 2] ← [bottom, TOP]

(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 [2, 3]
  (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 [-1, 1]
  (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 [-3, -1] [1, 2]
  (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.
- even.
- odd.

Answers $(0,0), \left(\frac{5}{2},0\right)$

$[-3,3]$

$[-1,2]$

A. The graph is increasing on **[2,3]**.
(Type your answer in interval notation. Use a comma to separate answers as needed.)

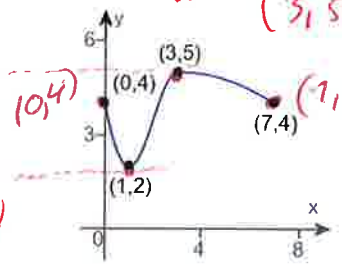
A. The graph is decreasing on **[−1,1]**.
(Type your answer in interval notation. Use a comma to separate answers as needed.)

A. The graph is constant on **[−3,−1],[1,2]**.
(Type your answer in interval notation. Use a comma to separate answers as needed.)

(1) neither odd nor even.

ID: 1.3.31

15. For the graph of a function y = f(x) shown to the right, find the absolute maximum and the absolute minimum, if they exist. Identify any local maxima or local minima.



abs max (3,5)
(0,4) (7,4)
abs min (1,2)

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

A. The absolute maximum of y = f(x) is f(3) = 5 . or (3, 5) Point
(Type integers or simplified fractions.)

B. There is no absolute maximum for y = f(x).

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

A. The absolute minimum of y = f(x) is f(1) = 2 . or (1, 2) Point
(Type integers or simplified fractions.)

B. There is no absolute minimum for y = f(x).

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

A. The local maximum of y = f(x) is f(3) = 5 . or (3, 5) Point
(Type integers or simplified fractions.)

B. The local maxima of y = f(x) are f( ) = and
f( ) = .
(Use ascending order with respect to x. Type integers or simplified fractions.)

C. There is no local maximum for y = f(x).

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

A. The local minimum of y = f(x) is f(1) = 2 . or (1, 2) Point
(Type integers or simplified fractions.)

B. The local minima of y = f(x) are f( ) = and
f( ) = .
(Use ascending order with respect to x. Type integers or simplified fractions.)

C. There is no local minimum for y = f(x).

Answers A. The absolute maximum of y = f(x) is f(3) = 5 .(Type integers or simplified fractions.)

A. The absolute minimum of y = f(x) is f(1) = 2 .(Type integers or simplified fractions.)

A. The local maximum of y = f(x) is f(3) = 5 .(Type integers or simplified fractions.)

A. The local minimum of y = f(x) is f(1) = 2 .(Type integers or simplified fractions.)

ID: 1.3.51

16. The function f is defined as follows.

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

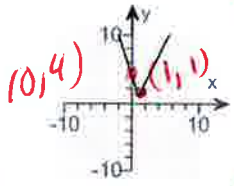
(a) Find the domain of the function.
(b) Locate any intercepts.
(c) Graph the function.
(d) Based on the graph, find the range.

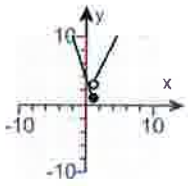
(a) The domain of the function f is $(-\infty, \infty)$ ← (left, right)
(Type your answer in interval notation.)

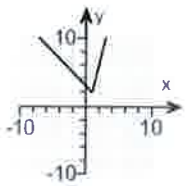
(b) Locate any intercepts. Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

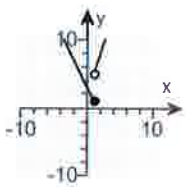
- A. The intercept(s) is/are $(0,4)$.
  (Type an ordered pair. Use a comma to separate answers as needed.)
- B. There are no intercepts.

(c) Choose the correct graph below.

A. 

B. 

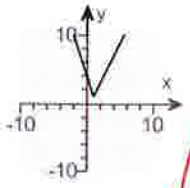
C. 

D. 

(d) The range of the function f is $[1, \infty)$ ← (bottom, top)
(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,∞)

window
x-min = -12
x-max = 12
y-min = -10
y-max = 10

use graphing calculator

2nd math

ID: 1.4.33

$y_1 = -3x+4$ ÷ $(x<1)$ open circle
left
2nd math
$y_2 = 2x-1$ ÷ $(x \geq 1)$ close circle
BIG

17. The function f is defined as follows.

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

(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 $(-\infty, \infty)$ ← (left, right)
(Type your answer in interval notation.)

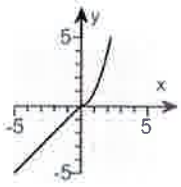
(b) Locate any intercepts. Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

○ **A.** The intercept(s) is/are $(-2, 0)$ x-intercept $(0, 0)$ x-intercept, y-intercept (also)
(Type an ordered pair. Use a comma to separate answers as needed.)

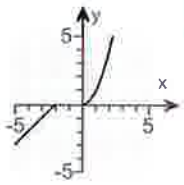
○ **B.** There are no intercepts.

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

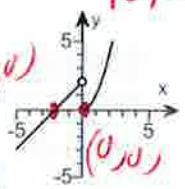
○ **A.**



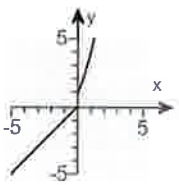
○ **B.**



✓ **C.** open circle (0,2) (-2,0) (0,0)



○ **D.**

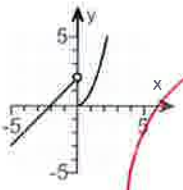


(d) The range of the function f is $(-\infty, \infty)$ ← (bottom, top)
(Type your answer in interval notation.)

Answers $(-\infty, \infty)$

A. The intercept(s) is/are **(−2,0),(0,0)**.
(Type an ordered pair. Use a comma to separate answers as needed.)

C.



Window
x-min = −12
x-max = 12
y-min = −10
y-max = 10
2nd Math

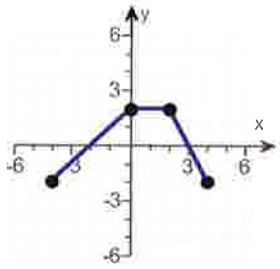
Use graphs Calculate

$(-\infty, \infty)$

ID: 1.4.37

$Y_1 = 2+X$ ÷ $(X < 0)$ open circle
$Y_2 = X^2$ ÷ $(X \geq 0)$ close circle
2nd Math

18. 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.

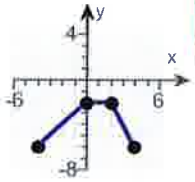


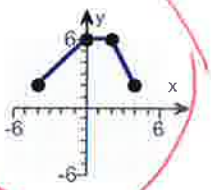
(a) $F(x) = f(x) + 4$ (b) $G(x) = f(x + 2)$ (c) $P(x) = -f(x)$

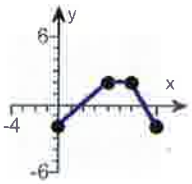
(d) $H(x) = f(x + 2) - 1$ (e) $Q(x) = \frac{1}{2}f(x)$ (f) $g(x) = f(-x)$

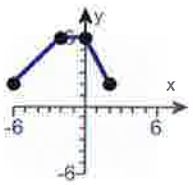
(g) $h(x) = f(2x)$

(a) Choose the correct graph of $F(x) = f(x) + 4$ below.

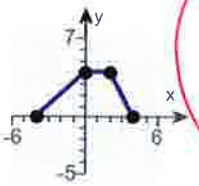
A. 

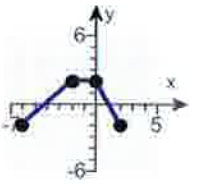
B. 

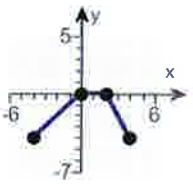
C. 

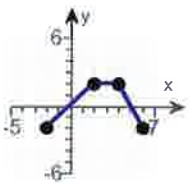
D. 

(b) Choose the correct graph of $G(x) = f(x + 2)$ below.

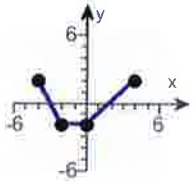
A. 

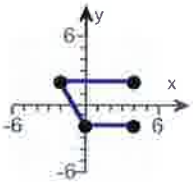
B. 

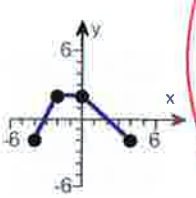
C. 

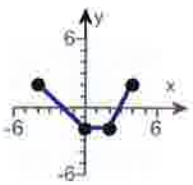
D. 

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

A. 

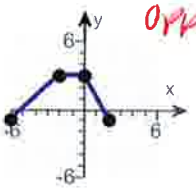
B. 

C. 

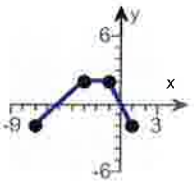
D. 

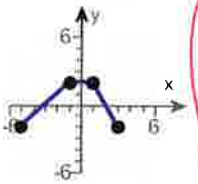
(d) Choose the correct graph of $H(x) = f(x + 2) - 1$ below.

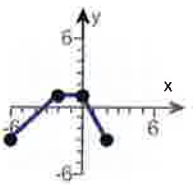
shift left −2 shift down −1

A. 

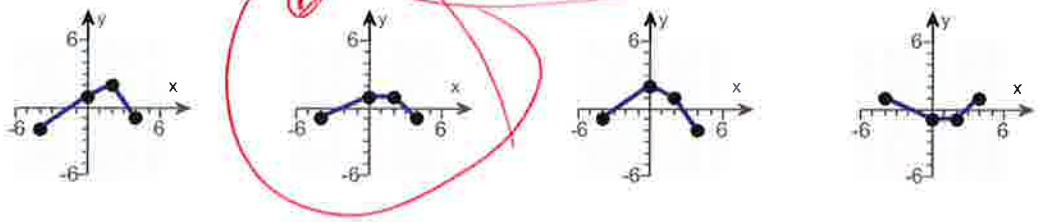
Opposite

B. 

C. 

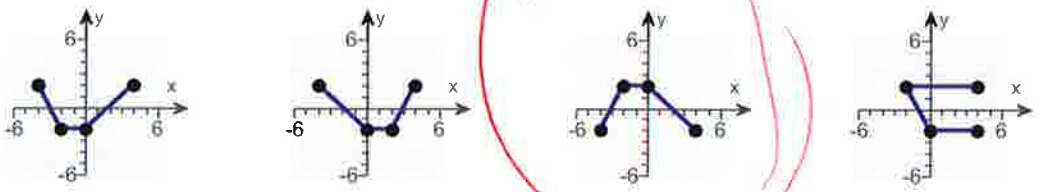
D. 

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



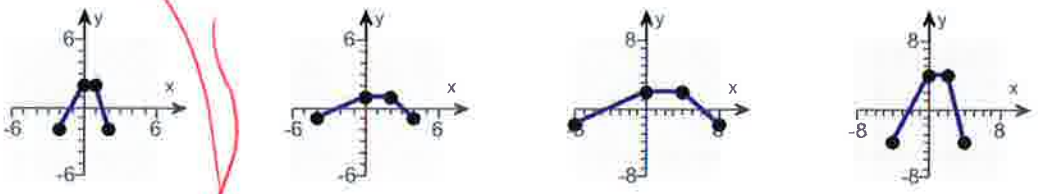
(f) Choose the correct graph of g(x) = f(− x) below.

A. B. C. D.

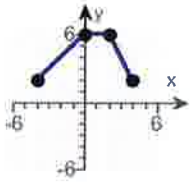


(g) Choose the correct graph of h(x) = f(2x) below.

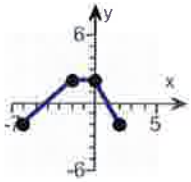
A. B. C. D.



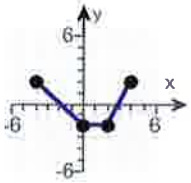
Answers



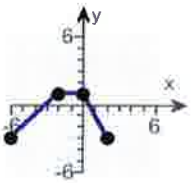
B.



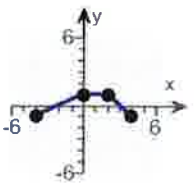
B.



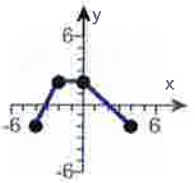
D.



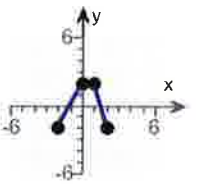
D.



B.



C.



A.

ID: 1.5.63

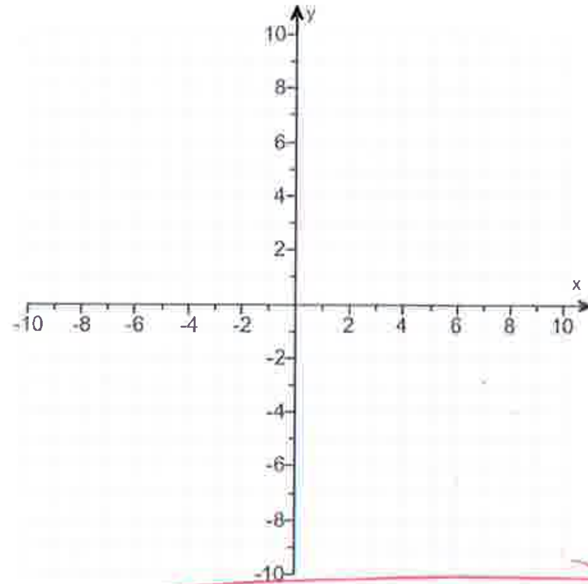
19.

(a) Graph f(x) = |x + 5| − 2 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.)

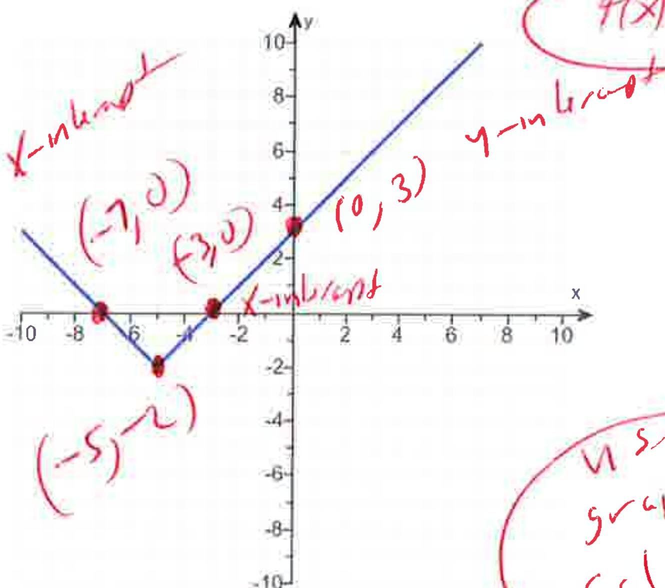
(b) The area of the region bounded by f and the x-axis that lies below the x-axis is ______ square units.
(Simplify your answer.)



$f(x) = |x+5| - 2$

X	f(x)
−7	0
−5	−2
−3	0
0	3

Answers



use graphing calculator

4

window
X-min = −12
X-max = 12
y-min = −10
y-max = 10

ID: 1.5.81

y_1 = math, num, abs

y_1 = abs(x+5) — 2

20. Solve the following equation using the quadratic formula.

$3x^2 + x - 4 = 0$

The solution set is { }.

(Type an exact answer, using radicals and i as needed. Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)

Answer: $1, -\frac{4}{3}$

ID: Quick Check P2.2.2

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?

$f(x) = 2x^2 + 1 + 6x$

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 $\frac{-3+\sqrt{7}}{2}, \frac{-3-\sqrt{7}}{2}$.

ID: 2.3.47

22. Find the real zeros of the function. What are the x-intercepts of the graph of the function?

$g(x) = x - 3\sqrt{x} - 54$

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

- 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 _____.

(Simplify your answer, including any radicals. Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)

Answer: A. The zeros and the x-intercepts are the same. They are 81.

ID: 2.3.75

22 part 2 $(x-54)^2 = (3\sqrt{x})^2$ square both sides

$(x-54)(x-54) = (3)^2(\sqrt{x})^2$

$x^2 - 54x - 54x + 2916 = (3)(3)(\sqrt{x})^2$

$x^2 - 108x + 2916 = 9(x)$

$x^2 - 108x + 2916 - 9x = 0$

$x^2 - 117x + 2916 = 0$

$(x - 36)(x - 81) = 0$

$x - 36 = 0$ OR $x - 81 = 0$

$x - 36 + 36 = 0 + 36$ OR $x - 81 + 81 = 0 + 81$

$x = 36$ OR $x = 81$ Check

Try $x = 36$

$x - 3\sqrt{x} - 54 = 0$

$(36) - 3\sqrt{36} - 54 = 0$

$36 - 3(6) - 54 = 0$

$36 - 18 - 54 = 0$

$18 - 54 = 0$

$-36 \neq 0$ BAD

Try $x = 81$

$x - 3\sqrt{x} - 54 = 0$

$(81) - 3\sqrt{81} - 54 = 0$

$81 - 3(9) - 54 = 0$

$81 - 27 - 54 = 0$

$54 - 54 = 0$

$0 = 0$ Good

Answer

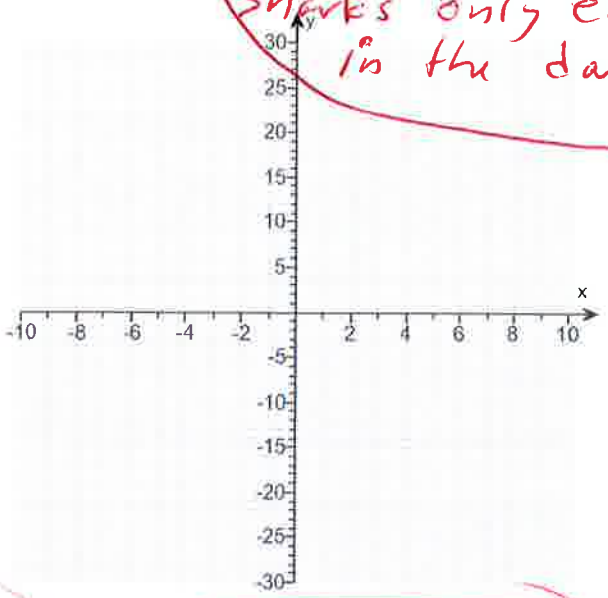
$x = 81$ only

23.

Graph the function $f(x) = -x^2 + 8x$ by starting with the graph of $y = x^2$ and using transformations (shifting, stretching/compressing, and/or reflecting).

Use the graphing tool to graph the function.

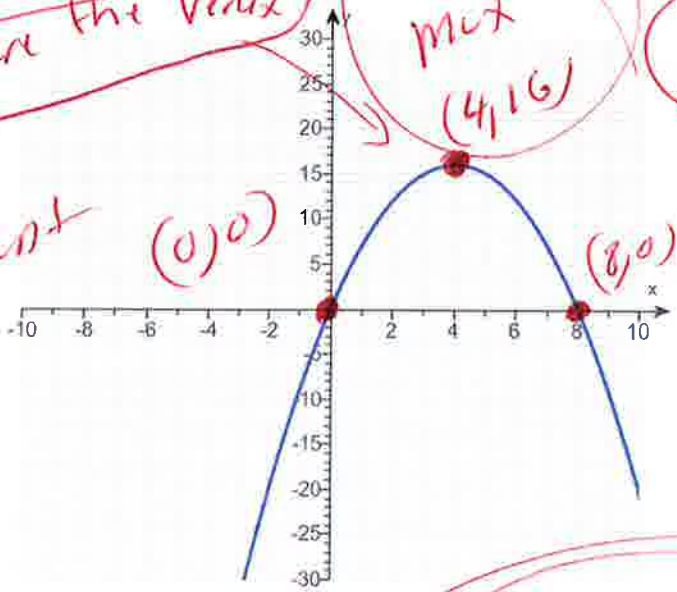
Lucky you Sharks only eat in the day.



Example Like swimming in the Ocean on Saturday night at 234 am by yourself after eating a double meat, double cheese, double bacon hamburger with a diet Soda

Answer:

You are the Vertex



Vertex (4,16)

x-intercept (0,0)

x-intercept (8,0)

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

x	f(x)
0	0
4	16
8	0

vertex

ID: 2.4.29

Use graphing calculator.

window

x-min = -12

x-max = 12

y-min = -10

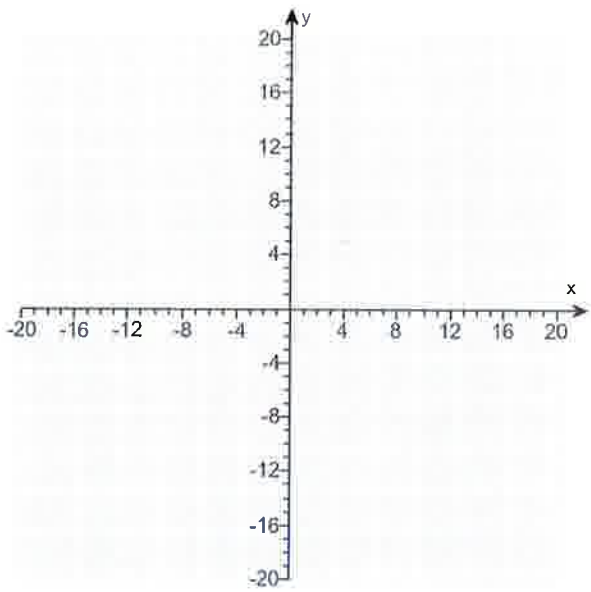
y-max = 10

$y_1 = -x^2 + 8x$


24

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.)

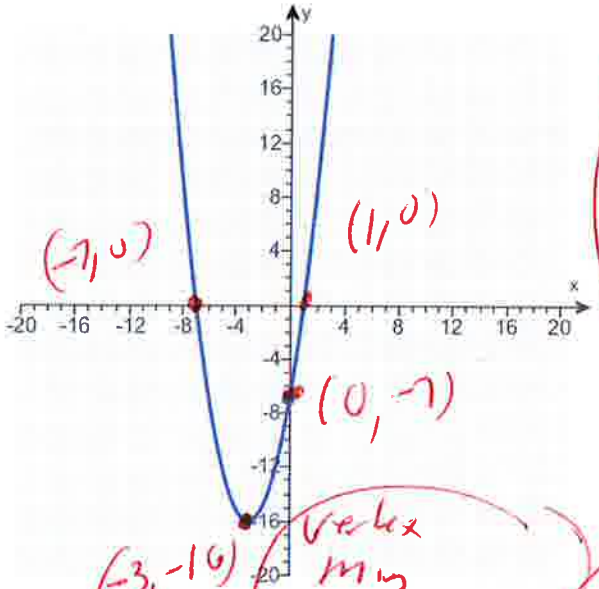
Answers up

(−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.)



(−7, 0)

(1, 0)

(0, −7)

(−3, −16) Vertex Min

Window
x-min = −12
x-max = 12
y-min = −18
y-max = 18

Use graphing calculator Vertex

x	f(x)
−7	0
−3	−16
0	−7
1	0

(−∞,∞)

[−16,∞)

[−3,∞)

(−∞, −3]

ID: 2.4.37

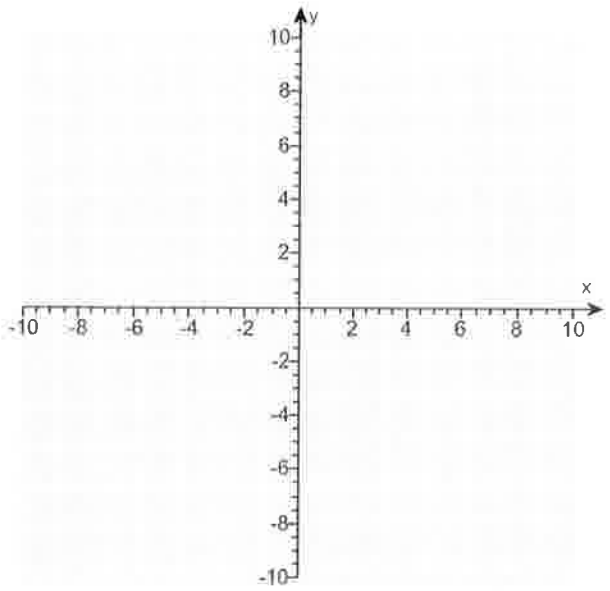
Example Like Swimming in the Ocean At 333 am on Saturday night by yourself. Swim only for 2 hours or you might get Leg and Arm cramps.

$y_1 = x^2 + 6x - 7$

BIG

25.

For the quadratic function $f(x) = -2x^2 + 2x - 5$, answer parts **(a)** through **(c)**. Verify the results using a graphing utility.



(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.

The graph of f opens (1) _____

The vertex of f is _____.
(Type an ordered pair.)

The axis of symmetry is _____.
(Type an equation. Simplify your answer.)

Determine 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.

Determine 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 rounded to two decimal places as needed. Use a comma to separate answers as needed.)
- ○ **B.** There is no x-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.)

The function is decreasing on the interval _____.
(Type your answer in interval notation.)

(1) ○ up.
○ down.

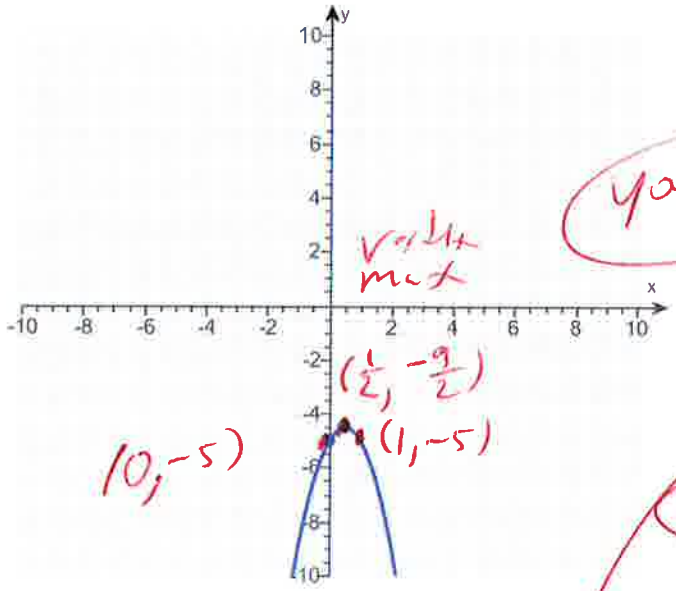
Answers (1) down.

$\left(\frac{1}{2}, -\frac{9}{2}\right)$

$x = \frac{1}{2}$

A. The y-intercept is **−5** .(Type an integer or a decimal.)

B. There is no x-intercept.



$(-\infty, \infty)$

$\left(-\infty, -\frac{9}{2}\right]$

$\left(-\infty, \frac{1}{2}\right]$

$\left[\frac{1}{2}, \infty\right)$

ID: 2.4.43

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

$f(x) = -3x^2 + 24x - 1$

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

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

What is this minimum or maximum value?

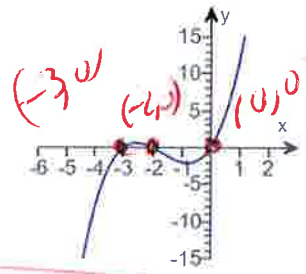
(Simplify your answer.)

Answers The function f has a maximum value.

47

ID: 2.4.59

27. Construct a polynomial function that might have the given graph.



Choose the correct answer below.

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

Answer: B. $f(x) = x(x+2)(x+3)$

ID: 3.1.73

28. Solve the equation in the complex number system.

$x^2 - 8x + 32 = 0$

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

Answer: $4-4i, 4+4i$

ID: 3.3.2

29. Find the complex zeros of the following polynomial function. Write f in factored form.

$f(x) = x^3 - 11x^2 + 43x - 65$

The complex zeros of f are _____.

(Simplify your answer. Type an exact answer, using radicals and i as needed. Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)

Use the complex zeros to factor f.

$f(x) =$ _____

(Type your answer in factored form. Type an exact answer, using radicals and i as needed. Use integers or fractions for any numbers in the expression.)

Answers $5, 3-2i, 3+2i$

$(x-5)(x-3+2i)(x-3-2i)$

ID: 3.3.33

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

$R(x) = \dfrac{10x}{x+10}$

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 = **−10** (Use a comma to separate answers as needed.)

A. The horizontal asymptote(s) is/are y = **10** (Use a comma to separate answers as needed.)

B. There is no oblique asymptote.

ID: 3.4.45

31. For $f(x) = 3x + 5$ and $g(x) = 3x$, 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 $9x + 5$

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

$9x + 15$

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

$9x + 20$

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

$9x$

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

ID: 4.1.23

31. a $f(x) = 3x + 5$ and $g(x) = 3x$ (insert here)

$(f \circ g)(x) =$

$f(g(x)) =$

$f(3x) =$

$3(3x) + 5 =$

$9x + 5 =$

domain $(-\infty, \infty)$

31. b $f(x) = 3x + 5$ and $g(x) = 3x$ (insert here)

$(g \circ f)(x) =$

$g(f(x)) =$

$g(3x + 5) =$

$3(3x + 5) =$

$9x + 15 =$

domain $(-\infty, \infty)$

82

$f(x) = 3x+5$ ← inside itself

$g(x) = 3x$

31 $(f \circ f)(x) =$

$f(f(x)) =$

$f(3x+5) =$

$3(3x+5)+5 =$

$9x + 15 + 5 =$

$9x + 20 =$

domain $(-\infty, \infty)$

31 $f(x) = 3x+5$ and $g(x) = 3x$ ← inside itself

$(g \circ g)(x) =$

$g(g(x)) =$

$g(3x) =$

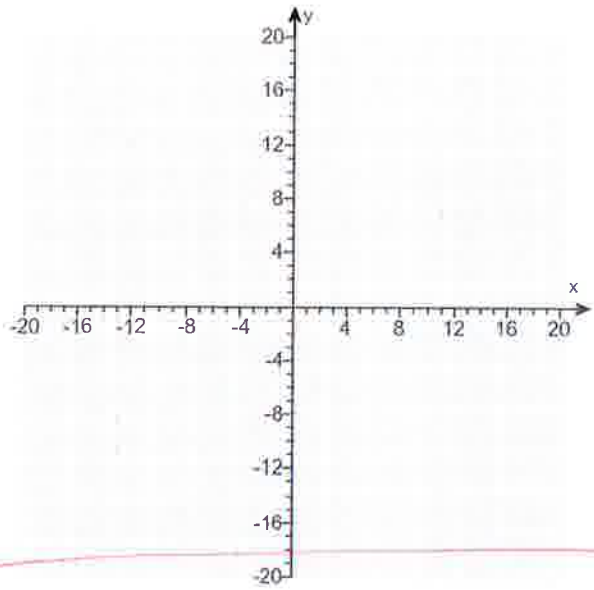
$3(3x) =$

$9x =$

domain $(-\infty, \infty)$

32.

The function $f(x) = 5x - 1$ 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 $\{x|x \geq$ _____ $\}$.
- C. The domain is $\{x|x \leq$ _____ $\}$.
- 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 $\{x|x \geq$ _____ $\}$.
- B. The domain is $\{x|x \neq$ _____ $\}$.
- C. The domain is $\{x|x \leq$ _____ $\}$.
- 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 $\{y|y \geq$ _____ $\}$.
- B. The range is $\{y|y \neq$ _____ $\}$.
- C. The range is $\{y|y \leq$ _____ $\}$.
- 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.

$f(x) = 5x - 1$
$y = 5x - 1$ Let $y =$ inv var
$x = 5y - 1$
$x + 1 = 5y - 1 + 1$ Solve for y
$x + 1 = 5y$
$\frac{x+1}{5} = \frac{5y}{5}$
$\frac{x+1}{5} = y$
$y = \frac{x+1}{5}$
inverse
$f^{-1}(x) = \frac{x+1}{5}$

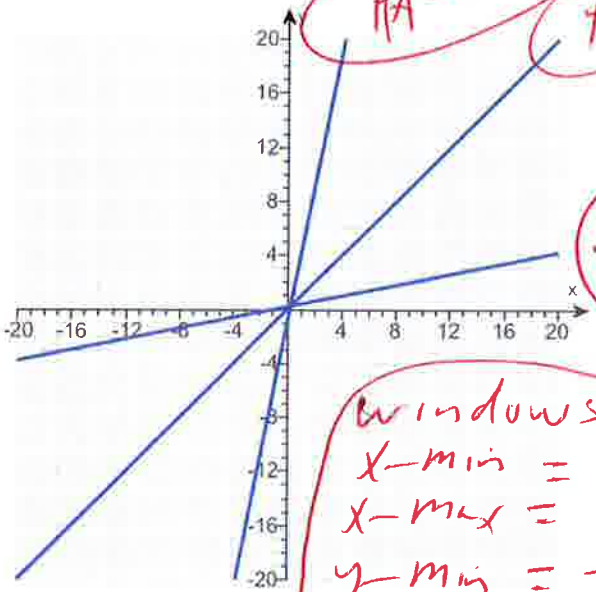
Answers $\frac{x+1}{5}$

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.



$y_1 = 5x - 1$

$y_2 = x$

$f(x) = 5x - 1$

$f(x) = x$

$y_3 = (x+1) \div 5$

$f^{-1}(x) = \frac{x+1}{5}$

windows
X-min = -12
X-max = 12
y-min = -10
y-max = 10

use graphing Calculator

ID: 4.2.53

33. Solve the equation.

$4^{-x+10} = 8^{x}$

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

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

Answer: 4

$-2x + 20 \quad 3x$

$2 = 2$

$-2x + 20 = 3x$

$-2x + 20 - 20 = 3x - 20$

$-2x = 3x - 20$

$-2x - 3x = 3x - 20 - 3x$

$-5x = -20$

$\frac{-5x}{-5} = \frac{-20}{-5}$ → $x = 4$

Primes
2, 3, 5, 7, 11, 13, ...

2 | 4
2 | 2
1

2 | 8
2 | 4
2 | 2
1

$4 = 2 \cdot 2 = 2^2$

$8 = 2 \cdot 2 \cdot 2 = 2^3$

ID: 4.3.73

34. The percentage of patients P who have survived t years after initial diagnosis of a certain disease is modeled by the function $P(t) = 100(0.8)^t$.

$P(t) = 100(0.8)^t$

(a) According to the model, what percent of patients survive 1 year after initial diagnosis?
(b) What percent of patients survive 4 years after initial diagnosis?
(c) Explain the meaning of the base 0.8 in the context of this problem.

$P(1) = 100(0.8)^1$

(a) According to the model, _____ % of patients survive 1 year after initial diagnosis.
(Type an integer or a decimal.)

$P(1) = 100(0.8)^1(1)$

(b) According to the model, _____ % of patients survive 4 years after initial diagnosis.
(Type an integer or a decimal.)

$P(1) = 80$

(c) Explain the meaning of the base 0.8 in the context of this problem. Select the correct choice below and fill in the answer box to complete your choice.

$P(t) = 100(0.8)^t$

- A. As each year passes, _____ % of the previous survivors take the diagnosis.
- B. As each year passes, _____ % of the previous year's survivors have survived.
- C. As each year passes, _____ % of the total patients have survived.

$P(4) = 100(0.8)^4$

$P(4) = 100(0.8)^1(4)$

$P(4) = 40.96$

Answers 80

40.96

B. As each year passes, 80 % of the previous year's survivors have survived.

ID: 4.3.109

35. The function

$D(h) = 5e^{-0.18h}$

$D(h) = 5e^{-0.18h}$

can be used to find the number of milligrams D of a certain drug that is in a patient's bloodstream h hours after the drug has been administered. How many milligrams will be present after 1 hour? After 4 hours?

After 1 hour, there will be _____ milligrams. (Round to two decimal places as needed.)

After 4 hours, there will be _____ milligrams. (Round to two decimal places as needed.)

$(-0.18(4))$

$D(1) = 5e^{(-0.18(1))}$

$D(4) = 5e^{(-0.18(4))}$

Answers 4.18

2.43

2nd LN

$D(1) = 5e^1(-0.18(1))$

2nd LN

$D(4) = 5e^1(-0.18(4))$

ID: 4.3.111

$D(1) = 4.176351057$

$D(4) = 2.433761128$

OR

$D(1) = 4.18$ Round

OR

$D(4) = 2.43$

36. Find the domain of the function.

$g(x) = \ln(x+2)$

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

Answer: $(-2, \infty)$

ID: 4.4.39

37. Solve the equation.

$\log_2(4x+1) = 4$

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 $4x+1 = 2^4$

$\frac{15}{4}$

ID: 4.4.91-Setup & Solve

38. Solve the equation. Write the answer in terms of the natural logarithm.

$5e^{0.2x} = 13$

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

Answer: $\frac{\ln 2.6}{0.2}$

ID: 4.4.109

39. The formula

$D = 25e^{-0.6h}$

can be used to find the number of milligrams D of a certain drug that is in a patient's bloodstream h hours after the drug was administered. When the number of milligrams reaches 2, the drug is to be administered again. What is the time between injections?

The time between injections is _____ hour(s).
(Type an integer or a decimal rounded to two decimal places as needed.)

Answer: 4.21

ID: 4.4.125

40. Write the expression as a sum and/or difference of logarithms. Express powers as factors.

$\log\left[\frac{x(x+7)}{(x+5)^4}\right]$, $x > 0$

$\log\left[\frac{x(x+7)}{(x+5)^4}\right]$ = _____ (Simplify your answer.)

Answer: $\log x + \log(x+7) - 4\log(x+5)$

ID: 4.5.51

41. Solve the logarithmic equation.

$\log_5(x+7) = \log_5 15$

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 $x + 7 = 15$

A. The solution set is {8}.
(Simplify your answer. Type an exact answer. Use a comma to separate answers as needed.)

ID: 4.6.9-Setup & Solve

42. Solve the logarithmic equation.

$\log x + \log(x-48) = 2$

$\log_{10}(x)(x-48) = 2$ rewrite

$10^2 = x(x-48)$

$100 = x^2 - 48x$

$0 = x^2 - 48x - 100$

Determine the equation to be solved after removing the logarithm.

(Type an equation. Do not simplify.)

$0 = (x+2)(x-50)$

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.)

$x+2=0$ OR $x-50=0$

$x+2-2=0-2$ OR $x-50+50=0+50$

$x=-2$ or $x=50$ Check

B. There is no solution.

Answers $x(x-48) = 10^2$

$\log(-2) + \log(-2-48) = 2$ BAD

$\log(-2) + \log(-50) = 2$ BAD

A. The solution set is { 50 }.

(Simplify your answer. Type an exact answer. Use a comma to separate answers as needed.)

$\log(50) + \log(50-48) = 2$

$\log(50) + \log(2) = 2$ Good

Answer $x = 50$ only

ID: 4.6.17-Setup & Solve

---

43. Solve the following logarithmic equation.

$\log(4x+1) = 1 + \log(x-9)$

$\log(4x+1) - \log(x-9) = 1$ rewrite

$\log_{10}\left(\frac{4x+1}{x-9}\right) = 1$

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.)

$10 = \frac{4x+1}{x-9}$

B. There is no solution.

$\frac{10}{1} = \frac{4x+1}{x-9}$

Answer: A. The solution set is $\left\{\frac{91}{6}\right\}$.

$10(x-9) = 1(4x+1)$ cross multiply

(Simplify your answer. Type an exact answer. Use a comma to separate answers as needed.)

$10x - 90 = 4x + 1$

$10x - 90 + 90 = 4x + 1 + 90$

$10x = 4x + 91$

$10x - 4x = 4x + 91 - 4x$

$6x = 91$

$\frac{6x}{6} = \frac{91}{6}$

$x = \frac{91}{6}$

$\log(4(\frac{91}{6})+1) = 1 + \log(\frac{91}{6} - 9)$

$\log(61.66666) = 1 + \log(6.16666)$ Good

Good

Answer $x = \frac{91}{6}$ only

ID: 4.6.19

44. Solve the following exponential equation. Express irrational solutions in exact form and as a decimal rounded to three decimal places.

$8^{x-6} = 64$

What is the exact answer? 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.)
- B. There is no solution.

What is the answer rounded to three decimal places? 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 integer or decimal rounded to three decimal places as needed.)
- B. There is no solution.

Answers A. The solution set is {8}. (Simplify your answer. Type an exact answer.)

A. The solution set is {8.000}. (Simplify your answer. Type an integer or decimal rounded to three decimal places as needed.)

ID: 4.6.41

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

$300 invested at 7% compounded quarterly after a period of 4 years

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

Answer: 395.98

ID: 4.7.7

46. How long does it take for an investment to double in value if it is invested at 14% compounded monthly? Compounded continuously?

At 14% compounded monthly, the investment doubles in about _____ years.
(Round to two decimal places as needed.)

At 14% compounded continuously, the investment doubles in about _____ years.
(Round to two decimal places as needed.)

Answers 4.98
4.95

ID: 4.7.35

47. How many years will it take for an initial investment of $10,000 to grow to $15,000? Assume a rate of interest of 11% compounded continuously.

It will take about _____ years for the investment to grow to $15,000.
(Round to two decimal places as needed.)

Answer: 3.69

ID: 4.7.41

48. The population of a colony of mosquitoes obeys the law of uninhibited growth. Use this information to answer parts (a) through (c).

(a) If N is the population of the colony and t is the time in days, express N as a function of t. Consider N_0 is the original amount at t = 0 and k ≠ 0 is a constant that represents the growth rate.

N(t) = _____ (Type an expression using t as the variable and in terms of e.)

(b) The population of a colony of mosquitoes obeys the law of uninhibited growth. If there are 1000 mosquitoes initially and there are 1900 after 1 day, what is the size of the colony after 3 days?

Approximately _____ mosquitoes.
(Do not round until the final answer. Then round to the nearest whole number as needed.)

(c) How long is it until there are 50,000 mosquitoes?

About _____ days.
(Do not round until the final answer. Then round to the nearest tenth as needed.)

Answers $N_0 e^{kt}$
6859
6.1

ID: 4.8.5

$$\frac{1900}{1000} = \frac{1000e^{k}}{1000}$$

$$1.9 = e^{k}$$

$$\ln(1.9) = \ln(e^{k})$$

$$\ln(1.9) = k\ln(e)$$

$$\ln(1.9) = k(1)$$

$$\ln(1.9) = k$$

$$.641853886 2 = k$$

$$.641854 = k \quad \text{Round}$$

$$N(t) = 1000e^{.641854t}$$

$$N(3) = 1000e^{(.641854(3))}$$

$$N(3) = 1000e^{\text{2ND LN}(.641854(3))}$$

$$N(3) = 6859.002342$$

$$N(3) = 6859.00 \quad \text{Round}$$

(c) (48) $N(t) = 1000e^{.641854t}$

$$50000 = 1000e^{.641854t}$$

$$\frac{50000}{1000} = \frac{1000e^{.641854t}}{1000}$$

$$50 = e^{.641854t}$$

$$\ln(50) = \ln(e^{.641854t})$$

$$\ln(50) = .641854t\ln(e)$$

$$\ln(50) = .641854t(1)$$

$$\ln(50) = .641854t$$

$$\frac{\ln(50)}{.641854} = \frac{.641854t}{.641854}$$

$$6.094879841 = t$$

$$6.1 = t \quad \text{Round}$$

$A = P\left(\frac{1}{2}\right)^{\frac{t}{h}}$ half-life

49. The half-life of carbon-14 is 5600 years. If a piece of charcoal made from the wood of a tree shows only 64% 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: 3606

ID: 4.8.11

$64 = 100\left(\frac{1}{2}\right)^{\frac{t}{5600}}$ $\ln(.64) = \frac{t}{5600}\ln\left(\frac{1}{2}\right)$ $\frac{\ln(.64)}{\ln(1/2)} = \frac{t}{5600}$ $3605.594663 = t$ $3606 = t$ Round

$\frac{64}{100} = \frac{100\left(\frac{1}{2}\right)^{\frac{t}{5600}}}{100}$ $.64 = \left(\frac{1}{2}\right)^{\frac{t}{5600}}$ $\ln(.64) = \ln\left(\frac{1}{2}\right)^{\frac{t}{5600}}$ $5600\frac{\ln(.64)}{\ln(1/2)} = 5600\frac{t}{5600}$

50. After the release of radioactive material into the atmosphere from a nuclear power plant in a country in 1985, the hay in that country was contaminated by a radioactive isotope (half-life 5 days). If it is safe to feed the hay to cows when 11% of the radioactive isotope remains, how long did the farmers need to wait to use this hay?

$A = P\left(\frac{1}{2}\right)^{\frac{t}{h}}$

The farmers needed to wait approximately _____ days for it to be safe to feed the hay to the cows.

(Round to one decimal place as needed.)

Answer: 15.9

ID: 4.8.21

$11 = 100\left(\frac{1}{2}\right)^{\frac{t}{5}}$ $\frac{11}{100} = \frac{100\left(\frac{1}{2}\right)^{\frac{t}{5}}}{100}$ $.11 = \left(\frac{1}{2}\right)^{\frac{t}{5}}$ $\ln(.11) = \frac{t}{5}\ln\left(\frac{1}{2}\right)$ $\frac{\ln(.11)}{\ln(1/2)} = \frac{t}{5}$ $\frac{5\ln(.11)}{\ln(1/2)} = 5\left(\frac{t}{5}\right)$ $15.922122196 = t$ $15.9 = t$ Round

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

$$\begin{cases} 4x - 2y = 4 \\ 10x + y = 22 \end{cases}$$

(1) $4x - 2y = 4$

(2) $20x + 2y = 44$ mult

$24x + 0 = 48$ $24x = 48$ $\frac{24x}{24} = \frac{48}{24}$ $x = 2$

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 = 2 and y = 2.
(Type an integers or simplified fractions.)

ID: 6.1.33

subst $4x - 2y = 4$ $4(2) - 2y = 4$ $8 - 2y = 4$ $8 - 2y - 8 = 4 - 8$ $-2y = -4$ $\frac{-2y}{-2} = \frac{-4}{-2}$ $y = 2$

$(x, y) = (2, 2)$ Answer

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

$$\begin{cases} x - 2y + 3z = 11 \\ 2x + y + z = -3 \\ -3x + 2y - 2z = -7 \end{cases}$$

2ND, Matrix, edit [A], 3x4, enter

$$[A] = \begin{bmatrix} 1 & -2 & 3 & 11 \\ 2 & 1 & 1 & -3 \\ -3 & 2 & -2 & -7 \end{bmatrix}$$

Use graphing calculator

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.

2ND, Matrix, Math, rref( ), enter

Answer: A.

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

$$rref([A]) = \begin{bmatrix} 1 & 0 & 0 & -1 \\ 0 & 1 & 0 & -3 \\ 0 & 0 & 1 & 2 \end{bmatrix} \quad (x, y, z) \quad (-1, -3, 2)$$

ANSWER

ID: 6.1.45

53. Find the sum of the sequence.

$$\sum_{k=1}^{6} (3k - 5)$$

$$\sum_{k=1}^{6} (3k - 5) =$$ _____

$(3(1)-5) + (3(2)-5) + (3(3)-5) + (3(4)-5) + (3(5)-5) + (3(6)-5)$

$(3-5) + (6-5) + (9-5) + (12-5) + (15-5) + (18-5) =$

$(-2) + (1) + (4) + (7) + (10) + (13) =$

33

OR Use graphing calculator, MATH, ↓, Summation Σ, enter

Answer: 33

ID: 7.1.73

54. Expand the expression using the binomial theorem.

$$(x + 3)^5$$

$(x + 3)^5 =$ _____

Answer: $x^5 + 15x^4 + 90x^3 + 270x^2 + 405x + 243$

ID: 7.5.17

54. $(x+3)^5$

$${}_5C_0(x)^5(3)^0 + {}_5C_1(x)^4(3)^1 + {}_5C_2(x)^3(3)^2 + {}_5C_3(x)^2(3)^3 + {}_5C_4(x)^1(3)^4 + {}_5C_5(x)^0(3)^5 =$$

$$(1)(x^5)(1) + (5)(x^4)(3) + (10)(x^3)(9) + (10)(x^2)(27) + (5)(x)(81) + (1)(1)(243) =$$

$$x^5 + 15x^4 + 90x^3 + 270x^2 + 405x + 243 =$$

5, Math, Prb, nCr, enter, 0, = 1
5, Math, Prb, nCr, enter, 1, = 5
5, Math, Prb, nCr, enter, 2, = 10
5, Math, Prb, nCr, enter, 3, = 10
5, Math, Prb, nCr, enter, 4, = 5
5, Math, Prb, nCr, enter, 5, = 1

Use graphing calculator

55. Find the real solutions of the equation.

$2 + \sqrt{3x-2} = x$ → $\sqrt{3x-2} = x-2$

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

SQ both sides

$(\sqrt{3x-2})^2 = (x-2)^2$

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

○ **B.** The solution is the empty set.

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

$3x-2 = x^2-2x-2x+4$

Answer: A. The solution set is { 6 }.
(Simplify your answer. Use a comma to separate answers as needed.)

$3x-2 = x^2-4x+4$

ID: A.8.55

$0 = x^2-4x+4-3x+2$

$0 = x^2-7x+6$

$0 = (x-1)(x-6)$

$x-1=0$ OR $x-6=0$

$x-1+1=0+1$ OR $x-6+6=0+6$

~~$x=1$~~ OR $x=6$ Check

try $x=1$

$2+\sqrt{3x-2} = x$

$2+\sqrt{3(1)-2} = (1)$

$2+\sqrt{3-2} = 1$

$2+\sqrt{1} = 1$

$2+1 = 1$

$3 \neq 1$

BAD

try $x=6$

$2+\sqrt{3x-2} = x$

$2+\sqrt{3(6)-2} = (6)$

$2+\sqrt{18-2} = 6$

$2+\sqrt{16} = 6$

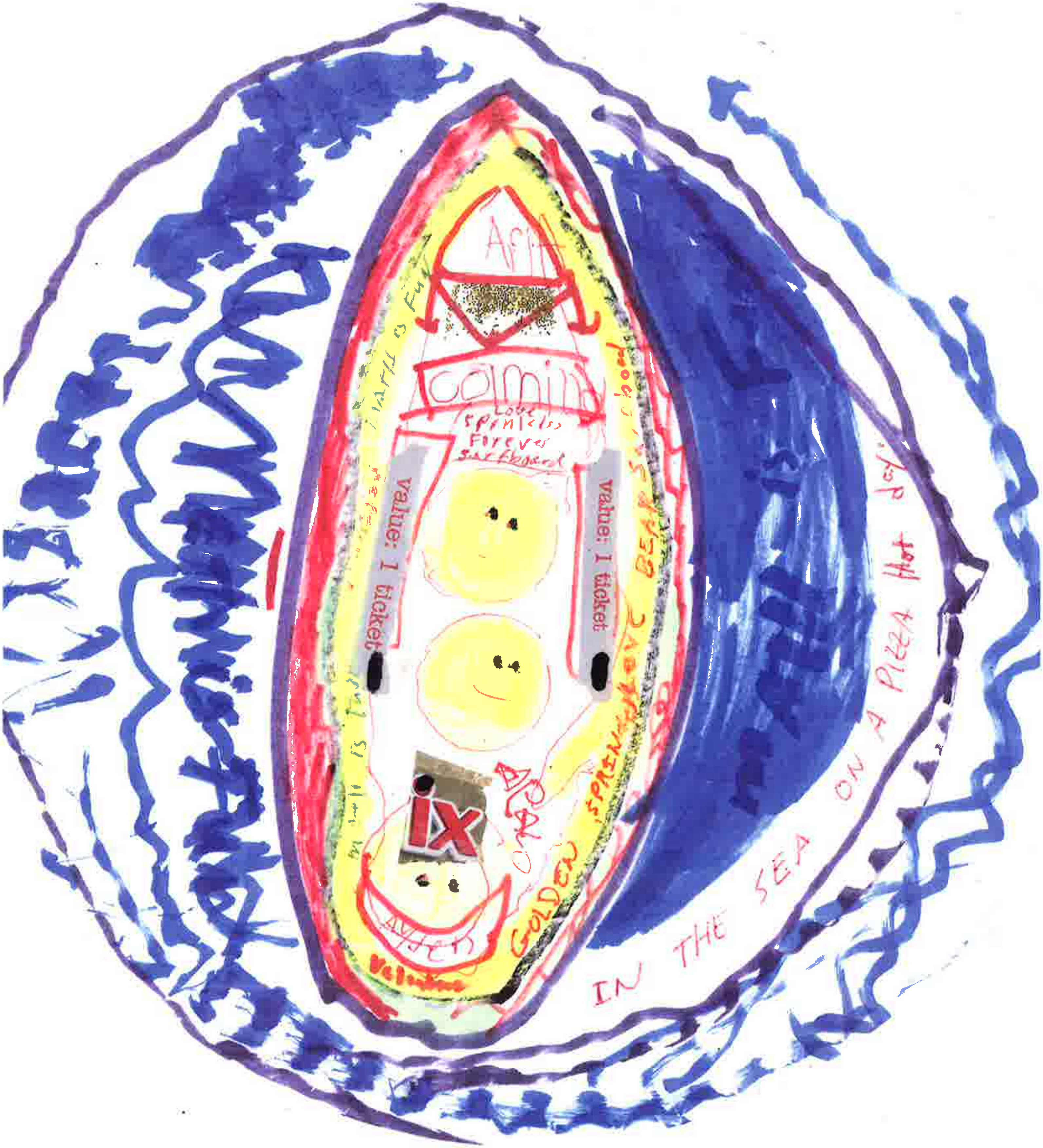
$2+4 = 6$

$6 = 6$

GOOD

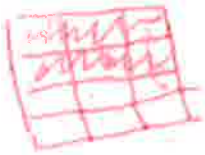
answer

$x = 6$


value: 1 ticket
value: 1 ticket
IN THE SEA ON A PIZZA Hot Dog

SMART Bird 5-10-17

$\frac{1}{3} \times \frac{4}{4} = \frac{4}{12}$, $\frac{2}{4} \times \frac{3}{3} = \frac{6}{12}$



MATH IS FUN

$\frac{4}{12} + \frac{6}{12} = \frac{10}{12} = \frac{5}{6}$

$\frac{12}{12} - \frac{10}{12} = \frac{2}{12}$ or $\frac{1}{6}$


BROKEN SURFBOARD
121119.AVG


MATH IS
FUN


MATH
MATH
MATH is Fun

(Exponential growth)

090316w