Student: _____ **Instructor:** Alfredo Alvarez **Assignment:** finalm1314COC029sullIljjRZZ29Z
Date: _____ **Course:** Math 1314 Sullivan Coreq

1. Solve the equation.

$8x^3 + x^2 - 72x - 9 = 0$

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

Answer: $-\frac{1}{8}, -3, 3$

ID: PF.4.39

2. Find the domain of the function.

$f(x) = \sqrt{2x - 6}$

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

Answer: $[3, \infty)$

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

$f(x) = 4x + 1;\ g(x) = 6x - 5$

(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 • 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)(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 • g)(3).

(f • 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 10x − 4

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

−2x + 6

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

$24x^2 - 14x - 5$

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

$\frac{4x+1}{6x-5}$

A. The domain is $\left\{x \middle| x \neq \frac{5}{6}\right\}$.

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

16

−2

169

5

ID: 1.1.67

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

$(f-g)(4) = -2(4)+6$

$(f-g)(4) = -8+6$

$(f-g)(4) = -2$ ✓

$(f \circ g)(x) = 24x^2 - 14x - 5$

$(f \circ g)(3) = 24(3)^2 - 14(3) - 5$

$(f \circ g)(3) = 24(3)(3) - 14(3) - 5$

$(f \circ g)(3) = 24(9) - 14(3) - 5$

$(f \circ g)(3) = 216 - 42 - 5$

$(f \circ g)(3) = 169$ ✓

$\left(\frac{f}{g}\right)(x) = \frac{4x+1}{6x-5}$

$\left(\frac{f}{g}\right)(1) = \frac{4(1)+1}{6(1)-5}$

$\left(\frac{f}{g}\right)(1) = \frac{4+1}{6-5}$

$\left(\frac{f}{g}\right)(1) = \frac{5}{1}$

$\left(\frac{f}{g}\right)(1) = 5$ ✓

4. 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.

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

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

Answer: $2x + h - 9$

ID: 1.1.83

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

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

$\frac{((x+h)^2 - 9(x+h) + 4) - (x^2 - 9x + 4)}{h} =$

$\frac{(x+h)(x+h) - 9x - 9h + 4 - x^2 + 9x - 4}{h} =$

$\frac{x^2 + 1xh + 1xh + h^2 - 9x - 9h + 4 - x^2 + 9x - 4}{h} =$

$\frac{x^2 + 2xh + h^2 - 9x - 9h + 4 - x^2 + 9x - 4}{h} =$

$\frac{x^2 + 2xh + h^2 - 9x - 9h + 4 - x^2 + 9x - 4}{h} =$

$\frac{2xh + h^2 - 9h}{h} =$

$\frac{2xh}{h} + \frac{h^2}{h} - \frac{9h}{h} =$

$2x + h - 9 =$

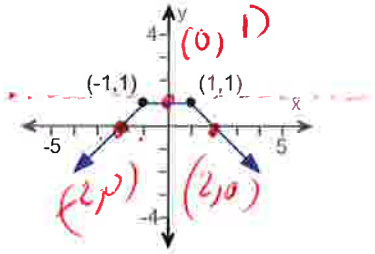
5.

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 $(-\infty, 1]$.
  (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.

x-intercepts x-intercepts y-intercept

- **A.** $(-2, 0)$ $(2, 0)$ $(0, 1)$
  (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 $(-\infty,1]$. (Type your answers in interval notation.)

A. $(2,0),(-2,0),(0,1)$ (Type an ordered pair. Use a comma to separate answers as needed.)

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

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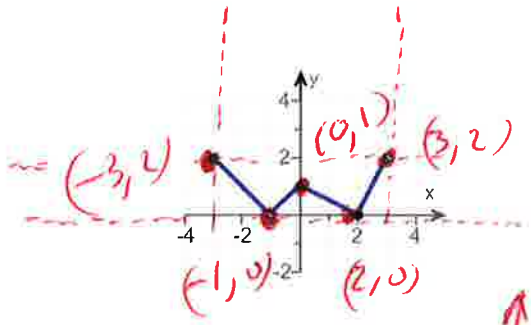
6. Using the given graph of the function f, find the following.

(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



x-intercept x-intercept y-intercept

(a) What are the intercepts? (-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, 2] ← [bottom, TOP]
(Type your answer in interval notation.)

example your favorite hamburger place at 3:34 am on saturday night for a double meat, double cheese double bacon, giant onion rings with diet Tea

(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.

LATER Exercise when you get home.

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.
- even.
- odd.

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

$[-3,3]$

$[0,2]$

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

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7. The function f is defined as follows.

$$f(x) = \begin{cases} 1+x & \text{if } x < 0 \\ x^2 & \text{if } x \geq 0 \end{cases}$$

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

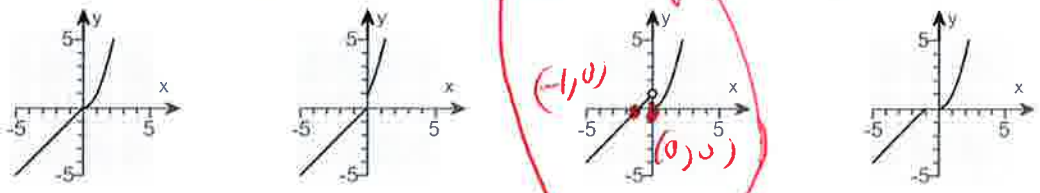
(a) The domain of the function f is $(-\infty, \infty)$ ← (left, right)
(Type your answer in interval notation.)

(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 $(-1,0)$ $(0,0)$ x-intercept / y-intercept / both
(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. (0,1) open circle; (-1,0); (0,0)
- D.

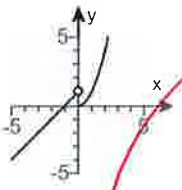


(d) The range of the function f is $(-\infty, \infty)$ ← (bottom, top)
(Type your answer in interval notation.)

Answers $(-\infty,\infty)$

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

C.



$(-\infty,\infty)$

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

use graphing calculator

2nd Math
$y_1 = 1+x$ ÷ $(x<0)$ open circle
2nd math
$y_2 = x^2$ ÷ $(x \geq 0)$ closed circle

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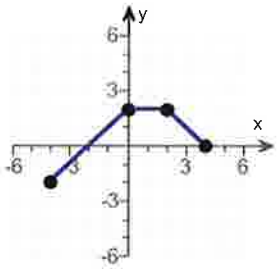
8. The graph of a function f is illustrated to the right. Use the graph of f as the first step toward graphing each of the following functions.



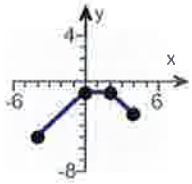
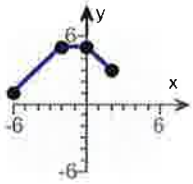
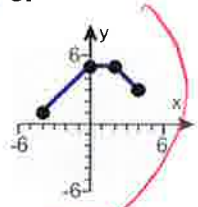
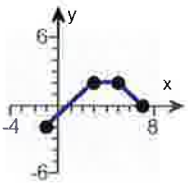
(a) $F(x) = f(x) + 3$ (b) $G(x) = f(x + 5)$ (c) $P(x) = -f(x)$

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

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

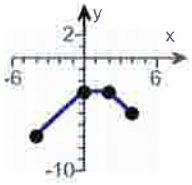
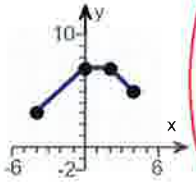
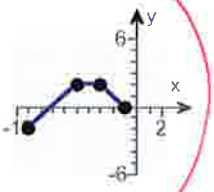
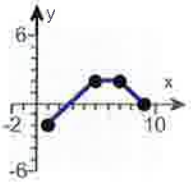
(a) Choose the correct graph of $F(x) = f(x) + 3$ below.

○ A. ○ B. ● C. ○ D.

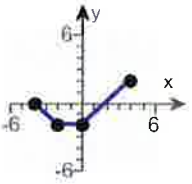
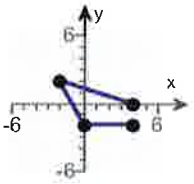
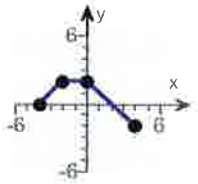
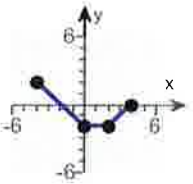
(b) Choose the correct graph of $G(x) = f(x + 5)$ below.

○ A. ○ B. ● C. ○ D.

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

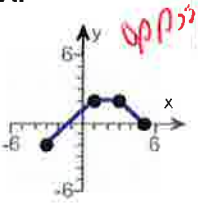
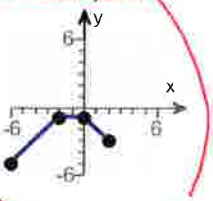
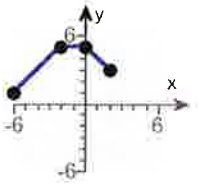
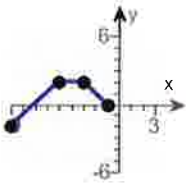
○ A. ○ B. ○ C. ● D.

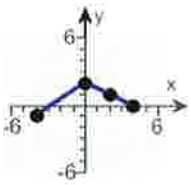
(d) Choose the correct graph of $H(x) = f(x + 2) - 3$ below.

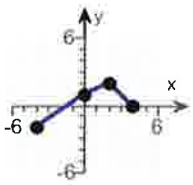
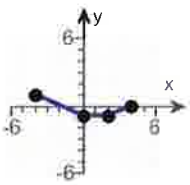
shift left −2 shift down −3

○ A. ● B. ○ C. ○ D.

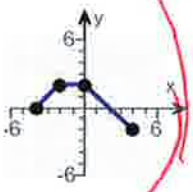
(e) Choose the correct graph of $Q(x) = \frac{1}{2}f(x)$ below.



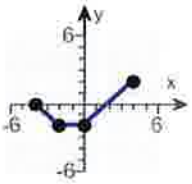



(f) Choose the correct graph of $g(x) = f(-x)$ below.

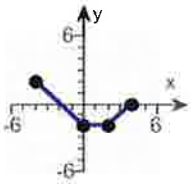
○ A.



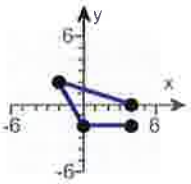
○ B.



○ C.

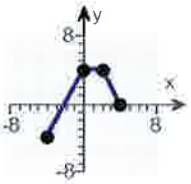


○ D.

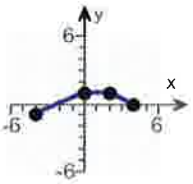


(g) Choose the correct graph of $h(x) = f(2x)$ below.

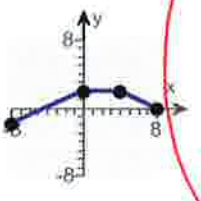
○ A.



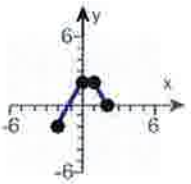
○ B.



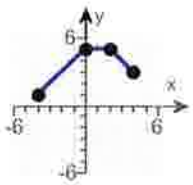
○ C.



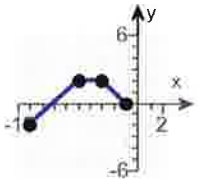
○ D.



Answers



C.



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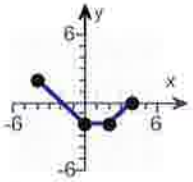

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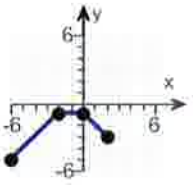
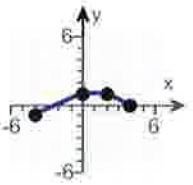
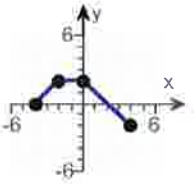


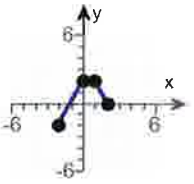
B.



B.



A.

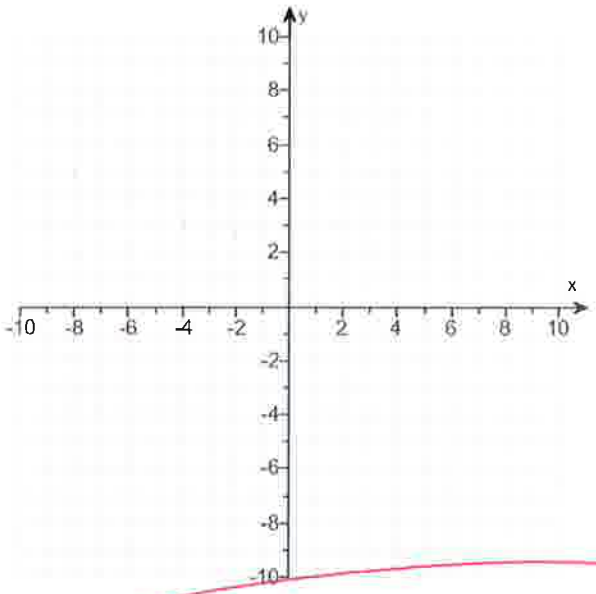


D.

ID: 1.5.63

9.

(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.

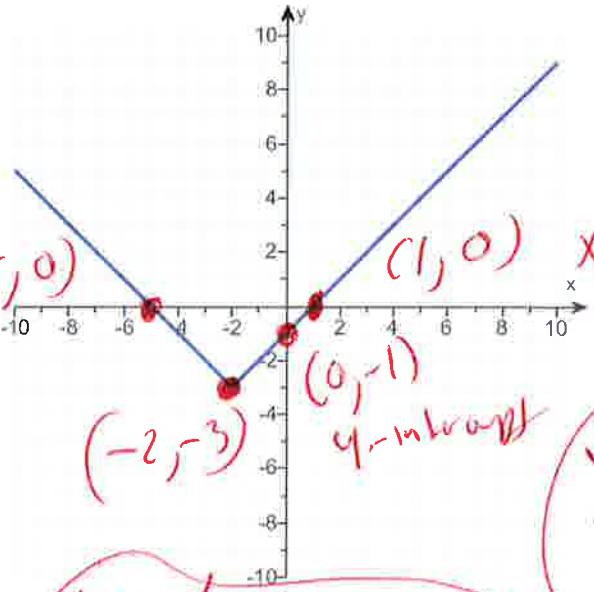


(a) Graph f(x).

(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

f(x) = |x+2| — 3

x-intercept (-5, 0)

x-intercept (1, 0)

(0, -1) y-intercept

(-2, -3)

x	f(x)
-5	0
-2	-3
0	-1
1	0

use graphing calculator

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

y1 = Math, Num, Abs

y1 = abs(x + 2) — 3

shift left -2 (opposite)

shift down -3

10. 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?

$f(x) = 2x^2 + 9 + 10x$

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 $\frac{-5+\sqrt{7}}{2}, \frac{-5-\sqrt{7}}{2}$.

ID: 2.3.47

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

$g(x) = x - 7\sqrt{x} - 18$

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

12. $(x-4)(x-81)=0$

$x-4=0$ or $x-81=0$

$x-4+4=0+4$ or $x-81+81=0+81$

$x=4$ or $x=81$ Check

Try $x=4$

$x-7\sqrt{x}-18=0$

$(4)-7\sqrt{4}-18=0$

$4-7(2)-18=0$

$4-14-18=0$

$-10-18=0$

$-28\neq 0$ BAD

Try $x=81$

$x-7\sqrt{x}-18=0$

$(81)-7\sqrt{81}-18=0$

$81-7(9)-18=0$

$81-63-18=0$

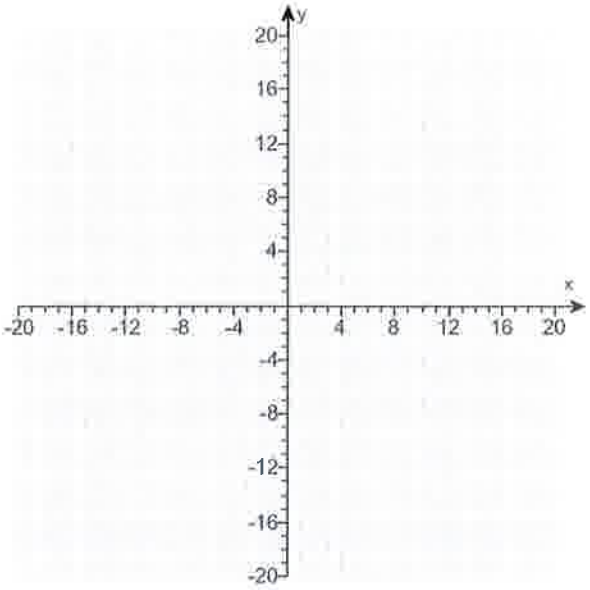
$18-18=0$

$0=0$ Good

answer

$x=81$ only

For the quadratic function $f(x) = x^2 + 2x - 8$, 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?

- ○ up
- ○ down

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.)

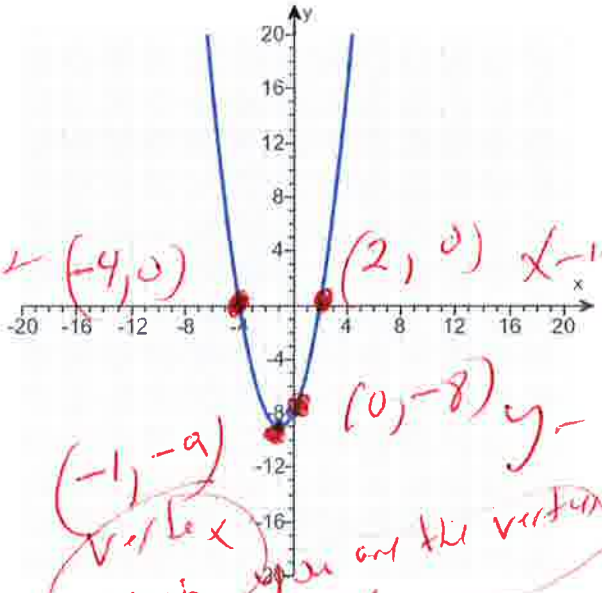
Answers up

(−1, −9)

x = −1

A. The x-intercept(s) is/are **−4,2**.
(Type an integer or a decimal. Use a comma to separate answers as needed.)

A. The y-intercept is **−8**.(Type an integer or a decimal.)



(−∞,∞)

[−9,∞)

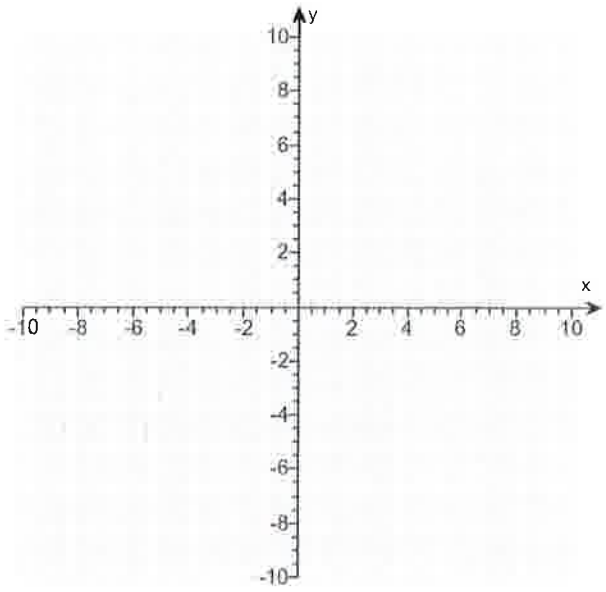
[−1,∞)

(−∞, −1]

ID: 2.4.37

13.

For the quadratic function $f(x) = -2x^2 + 2x - 4$, 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.

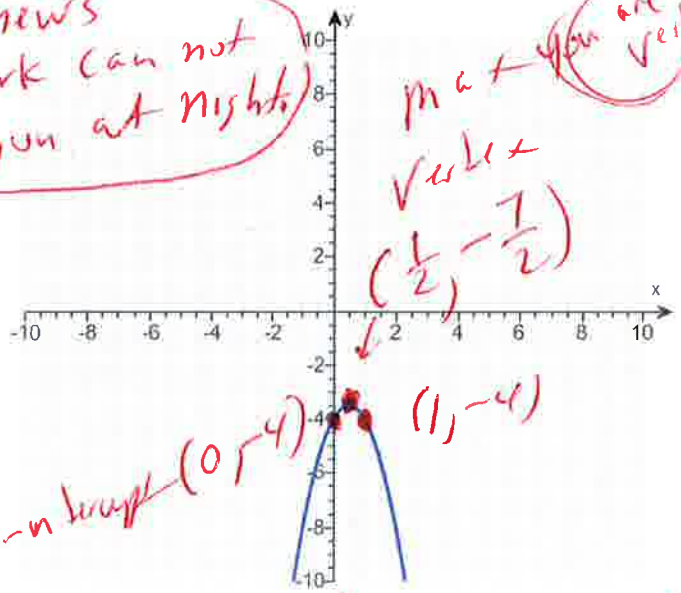
Answers (1) down.

$\left(\frac{1}{2}, -\frac{7}{2}\right)$

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

A. The y-intercept is −4 .(Type an integer or a decimal.)

B. There is no x-intercept.



$(-\infty, \infty)$

$\left(-\infty, -\frac{7}{2}\right]$

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

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

ID: 2.4.43

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

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

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.

−1

ID: 2.4.59

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

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

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 = −13. (Use a comma to separate answers as needed.)

A. The horizontal asymptote(s) is/are y = 20. (Use a comma to separate answers as needed.)

B. There is no oblique asymptote.

ID: 3.4.45

16. For $f(x) = 7x + 9$ and $g(x) = 2x$, 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 $14x + 9$

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

$14x + 18$

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

$49x + 72$

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

$4x$

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

ID: 4.1.23

Inside here

(16) a $f(x) = 7x + 9$ and $g(x) = 2x$

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

$f(g(x)) =$

$f(2x) =$

$7(2x) + 9 =$

$14x + 9 =$

Domain $(-\infty, \infty)$

(16) b $f(x) = 7x + 9$ and ~~Inside here~~ $g(x) = 2x$

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

$g(f(x)) =$

$g(7x + 9) =$

$2(7x + 9) =$

$14x + 18 =$

Domain $(-\infty, \infty)$

17.

(16) C $f(x) = 7x + 9$ and $g(x) = 2x$

inside itself

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

$f(f(x)) =$

$f(7x+9) =$

$7(7x+9) + 9 =$

$49x + 63 + 9 =$

$49x + 72$

domain $(-\infty, \infty)$

(16) d $f(x) = 7x + 9$ and $g(x) = 2x$

inside itself

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

$g(g(x)) =$

$g(2x) =$

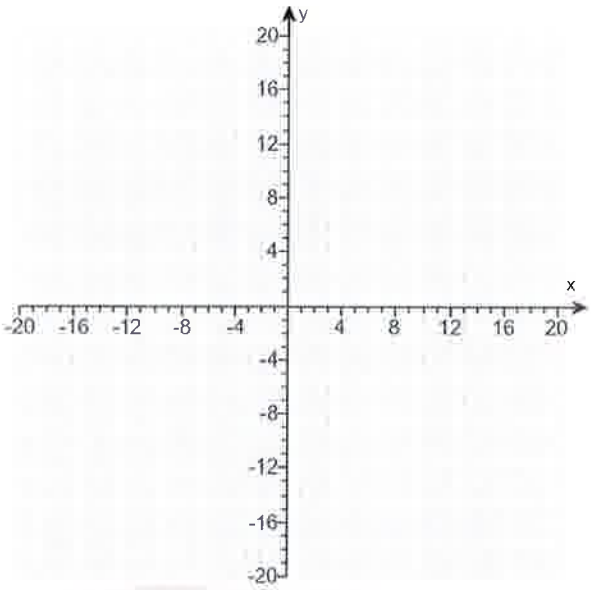
$2(2x) =$

$4x$

domain $(-\infty, \infty)$

17.

The function $f(x) = 6x + 2$ 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 $\{x|x \geq$ _____ $\}$.
- 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. 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.

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 $\{y|y \geq$ _____ $\}$.
- 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.

$f(x) = 6x + 2$ ✓

$y = 6x + 2$ Let $y =$ ✓

$x = 6y + 2$ Inv var x, y ✓

$x - 2 = 6y + 2 - 2$ solve for y

$x - 2 = 6y$

$\frac{x-2}{6} = \frac{6y}{6}$

$\frac{x-2}{6} = y$

$y = \frac{x-2}{6}$ rewrite

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

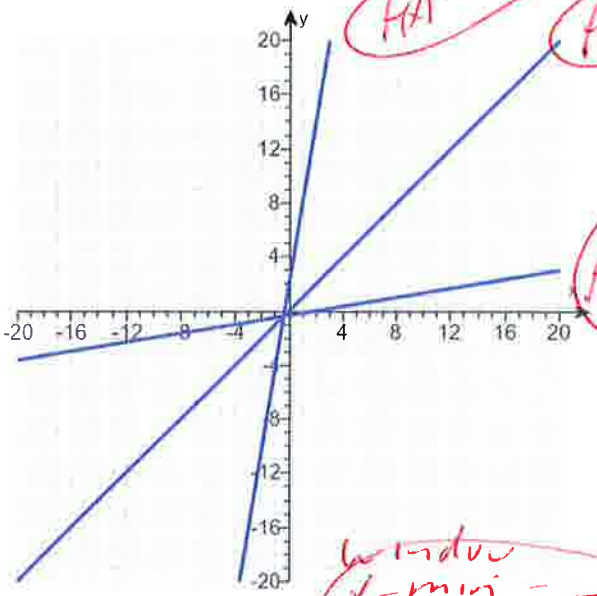
Answers $\frac{x-2}{6}$

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.



$y_1 = 6x+2$

$f(x) = 6x+2$

$f(x) = x$

$y_2 = x$

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

$y_3 = (x-2) \div (6)$

use a graphing calculator

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

ID: 4.2.53

18. Solve the equation.

$32^{-x+48} = 128^{x}$

$(2^5)^{-x+48} = (2^7)^{x}$

rewrite

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

2|32	2|128
2|16	2|64
2|8	2|32
2|4	2|16
2|2	2|8
1	2|4
	2|2
	1

$32 = 2^5$

$128 = 2^7$

The solution set is { }.

(Type an integer or a simplified fraction. Use a comma to separate answers as needed.)

Answer: 20

$2^{-5x+240} = 2^{7x}$

ID: 4.3.73

$-5x+240 = 7x$

$-5x+240-240 = 7x-240$

$-5x = 7x-240$

$-5x-7x = 7x-240-7x$

$-12x = -240$

$\frac{-12x}{-12} = \frac{-240}{-12}$

$x = 20$

19. Solve the equation.

$\log_2(4x+3) = 5$

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 $4x+3=2^5$

$\frac{29}{4}$

ID: 4.4.91-Setup & Solve

what formula $\log_2(4x+3)=5$ → rewrite

$2^5 = 4x+3$

$2\cdot2\cdot2\cdot2\cdot2 = 4x+3$

$32 = 4x+3$

$32-3 = 4x+3-3$

$29 = 4x$

$\frac{29}{4} = \frac{4x}{4}$

$\frac{29}{4} = x$

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

$\log\left[\frac{x(x+4)}{(x+6)^{15}}\right]$, $x>0$

$\log\left[\frac{x(x+4)}{(x+6)^{15}}\right]$ = [ ] (Simplify your answer.)

Answer: $\log x + \log(x+4) - 15\log(x+6)$

ID: 4.5.51

$\log\left(\frac{x(x+4)}{(x+6)^{15}}\right) =$

$\log(x(x+4)) - \log(x+6)^{15} =$

$\log(x) + \log(x+4) - \log(x+6)^{15} =$

$\log(x) + \log(x+4) - 15\log(x+6) =$

formulas

$\log\left(\frac{A}{B}\right) = \log(A) - \log(B)$ ← formula

$\log(AB) = \log(A) + \log(B)$

$\log(A^N) = N\log(A)$ ← formula

21. Solve the logarithmic equation.

log x + log (x + 48) = 2

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

A. The solution set is { 2 }.
(Simplify your answer. Type an exact answer. Use a comma to separate answers as needed.)

ID: 4.6.17-Setup & Solve

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

$300 invested at 7% compounded quarterly after a period of 3 years

After 3 years, the investment results in $
(Round to the nearest cent as needed.)

Answer: 369.43

ID: 4.7.7

23. How long does it take for an investment to double in value if it is invested at 9% compounded monthly? Compounded continuously?

At 9% compounded monthly, the investment doubles in about years.
(Round to two decimal places as needed.)

At 9% compounded continuously, the investment doubles in about years.
(Round to two decimal places as needed.)

Answers 7.73
7.70

ID: 4.7.35

(23.) $\ln(2) = \ln\left(1 + \frac{.09}{12}\right)^{12t}$

part 2 $\ln(2) = 12t \ln\left(1 + \frac{.09}{12}\right)$

$$\frac{\ln(2)}{\left(12 \ln\left(1 + \frac{.09}{12}\right)\right)} = \frac{12t \ln\left(1 + \frac{.09}{12}\right)}{\left(12 \ln\left(1 + \frac{.09}{12}\right)\right)}$$

$7.730480505 = t$ OR Round

$7.73 = t$ ✓

$A = Pe^{rt}$

$200 = 100e^{.09t}$

$\frac{200}{100} = \frac{100e^{.09t}}{100}$

$2 = e^{.09t}$

$\ln(2) = \ln(e^{.09t})$

$\ln(2) = .09t \ln(e)$

$\ln(2) = .09t(1)$

$\ln(2) = .09t$

$\frac{\ln(2)}{.09} = \frac{.09t}{.09}$

$7.701635344 = t$ OR Round

$7.70 = t$ ✓

$A = 200$ ↑ double

$P = 100$ ←

$r = .09$

$t = ?$

24. How many years will it take for an initial investment of $10,000 to grow to $25,000? Assume a rate of interest of 11% compounded continuously.

It will take about [ ] years for the investment to grow to $25,000.
(Round to two decimal places as needed.)

Answer: 8.33

ID: 4.7.41

25. 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 1700 after 1 day, what is the size of the colony after 4 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 10,000 mosquitoes?

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

Answers $N_0 e^{kt}$

8352

4.3

ID: 4.8.5

$.530628251 = k$

$N(t) = 1000e^{.53063t}$

$N(4) = 1000e^{.53063(4)}$

$N(4) = 1000e^{(.53063(4))}$

$N(4) = 8352.158429$ or Round

$N(4) = 8352$ ✓

25 c. $N(t) = 1000e^{.53063t}$

$10{,}000 = 1000e^{.53063t}$

$\frac{10000}{1000} = \frac{1000e^{.53063t}}{1000}$

$10 = e^{.53063t}$

$\ln(10) = \ln(e^{.53063t})$

$\ln(10) = .53063t \ln(e)$

$\ln(10) = .53063t(1)$

$\ln(10) = .53063t$

$\frac{\ln(10)}{.53063} = \frac{.53063t}{.53063}$

$4.339342057 = t$ ✓ or

$4.3 \text{ I } t$ ✓ Round

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

$$\begin{cases} 2x - 5y = -4 \\ 5x + y = 17 \end{cases}$$

Mult $\begin{pmatrix} 1 \\ 5 \end{pmatrix}$ $\begin{matrix} 2x - 5y = -4 \\ 25x + 5y = 85 \end{matrix}$

$27x + 0 = 81$

$\frac{27x}{27} = \frac{81}{27}$

$x = 3$

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.

Subst $2x - 5y = -4$

$2(3) - 5y = -4$

$6 - 5y = -4$

$6 - 5y - 6 = -4 - 6$

$-5y = -10$

$\frac{-5y}{-5} = \frac{-10}{-5}$

$y = 2$

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

$(x, y) = (3, 2)$ ✓

ID: 6.1.33

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

$$\begin{cases} x - 2y + 3z = 18 \\ 2x + y + z = 6 \\ -3x + 2y - 2z = -21 \end{cases}$$

2ND, matrix, Edit, [A], 3x4, Enter

$$[A] = \begin{bmatrix} 1 & -2 & 3 & 18 \\ 2 & 1 & 1 & 6 \\ -3 & 2 & -2 & -21 \end{bmatrix}$$

MSP 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.

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

2ND, matrix, math, ↓, rref( )

ID: 6.1.45

2ND matrix

rref([A]) =

$$\begin{bmatrix} 1 & 0 & 0 & 3 \\ 0 & 1 & 0 & -3 \\ 0 & 0 & 1 & 3 \end{bmatrix} \begin{matrix} x \\ y \\ z \end{matrix}$$

$(x, y, z) = (3, -3, 3)$ ✓

28. Solve the equation.

$$\frac{8}{3x-4}=\frac{3}{x+2}$$

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

- A. The solution set is { } . (Simplify your answer.)
- B. There is no solution.

Answer: A. The solution set is { 28 } . (Simplify your answer.)

ID: A.8.35

$8(x+2)=3(3x-4)$ Cross Multiply

$8x+16=9x-12$

$8x+16-16=9x-12-16$

$8x=9x-28$

$8x-9x=9x-28-9x$

$-1x=-28$

$\frac{-1x}{-1}=\frac{-28}{-1}$

$x=28$

29. Find the real solutions of the equation.

$$6+\sqrt{2x+3}=x$$

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

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

Answer: A. The solution set is { 11 } .
(Simplify your answer. Use a comma to separate answers as needed.)

ID: A.8.55

$\sqrt{2x+3}=x-6$ rewrite

Square both sides

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

$2x+3=(x-6)(x-6)$

$2x+3=x^2-6x-6x+36$

$2x+3=x^2-12x+36$

$0=x^2-12x+36-2x-3$

$0=x^2-14x+33$

$0=(x-3)(x-11)$

$x-3=0$ or $x-11=0$

$x-3+3=0+3$ or $x-11+11=0+11$

$x=3$ or $x=11$

Check

Try $x=3$

$6+\sqrt{2x+3}=x$

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

$6+\sqrt{6+3}=3$

$6+\sqrt{9}=3$

$6+3=3$

$9\neq 3$

BAD

Check

Try $x=11$

$6+\sqrt{2x+3}=x$

$6+\sqrt{2(11)+3}=(11)$

$6+\sqrt{22+3}=11$

$6+\sqrt{25}=11$

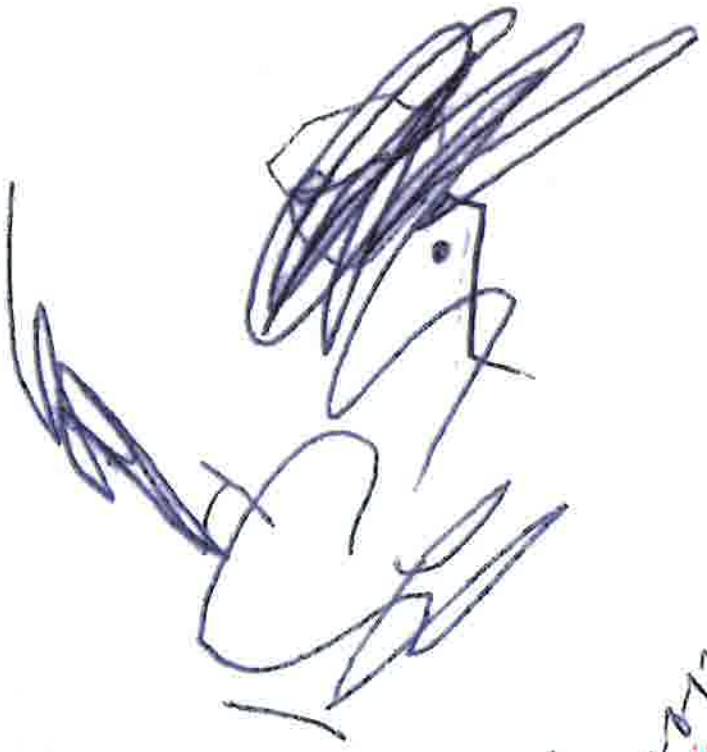
$6+5=11$

$11=11$ ✓

Good answer

$x=11$ only

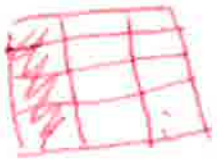
value: 1 ticket
value: 1 ticket
IN THE SEA ON A PIZZA Hot day!



SMART Bird

MATH IS FUN

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



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

$\frac{12}{12} - \frac{10}{12} = \frac{2}{12}$ or $\frac{1}{6}$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MATH is
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(exponential growth)

-090315