

07-23-19
07-25-19

07-25-19
08-13-19
08-15-19
08-17-19

Student: _____
Date: _____

Instructor: Alfredo Alvarez
Course: math1314newcoreq2019

Assignment:
finalm1314COC049sullljjRZ

1. Evaluate the following expression, if possible.

$$\sqrt[3]{(6p-5)^3}$$

$$\sqrt[3]{(6p-5)^3} = \boxed{} \text{ (Simplify your answer.)}$$

Answer: $6p - 5$

$$\sqrt[3]{(6p-5)^3} =$$

$$6p-5 =$$

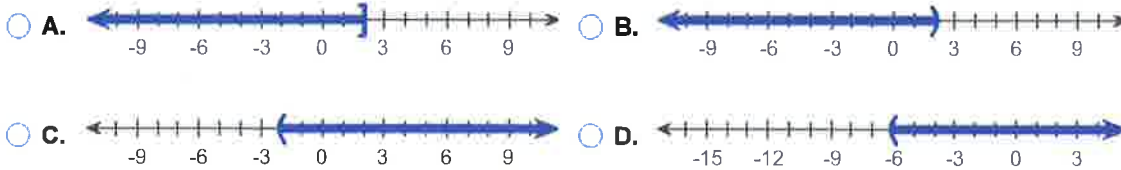
Formula
 $(Ax+B)^n =$
 $Ax+B =$

ID: P1.2.43

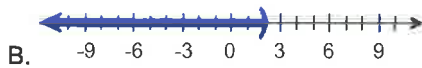
2. Solve the inequality $16 - 3x > 10$. Graph the solution set.

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

Graph the solution set. Choose the correct graph below.



Answers $x < 2$



ID: 1.1.4

$$16 - 3x > 10$$

$$16 - 3x - 16 > 10 - 16$$

$$-3x > -6$$

$$\frac{-3x}{-3} < \frac{-6}{-3}$$

$$x < 2$$

$$(-\infty, 2)$$

3. Find the following for the function $f(x) = 3x^2 + 4x - 2$.

- (a) $f(0)$
- (b) $f(4)$
- (c) $f(-4)$
- (e) $-f(x)$
- (f) $f(x+1)$
- (g) $f(4x)$

(a) $f(0) = \boxed{}$ (Simplify your answer.)

(b) $f(4) = \boxed{}$ (Simplify your answer.)

(c) $f(-4) = \boxed{}$ (Simplify your answer.)

(d) $f(-x) = \boxed{}$ (Simplify your answer.)

(e) $-f(x) = \boxed{}$ (Simplify your answer.)

(f) $f(x+1) = \boxed{}$ (Simplify your answer.)

(g) $f(4x) = \boxed{}$ (Simplify your answer.)

(h) $f(x+h) = \boxed{}$ (Simplify your answer.)

$f(0) = 3(0)^2 + 4(0) - 2 = 3(0)(0) + 4(0) - 2 = 0 + 0 - 2 = -2$
 $f(4) = 3(4)^2 + 4(4) - 2 = 3(16) + 16 - 2 = 48 + 16 - 2 = 62$
 $f(-4) = 3(-4)^2 + 4(-4) - 2 = 3(16) - 16 - 2 = 48 - 16 - 2 = 30$
 $f(-x) = 3(-x)^2 + 4(-x) - 2 = 3(x^2) - 4x - 2 = 3x^2 - 4x - 2$
 $-f(x) = -(3x^2 + 4x - 2) = -3x^2 - 4x + 2$
 $f(x+1) = 3(x+1)^2 + 4(x+1) - 2 = 3(x^2 + 2x + 1) + 4x + 4 - 2 = 3x^2 + 6x + 3 + 4x + 4 - 2 = 3x^2 + 10x + 5$
 $f(4x) = 3(4x)^2 + 4(4x) - 2 = 3(16x^2) + 16x - 2 = 48x^2 + 16x - 2$

Answers - 2

62

30

$3x^2 - 4x - 2$

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

$3x^2 + 10x + 5$

$48x^2 + 16x - 2$

$3x^2 + 6hx + 3h^2 + 4x + 4h - 2$

ID: 1.1.43

4. Find the domain of the function.

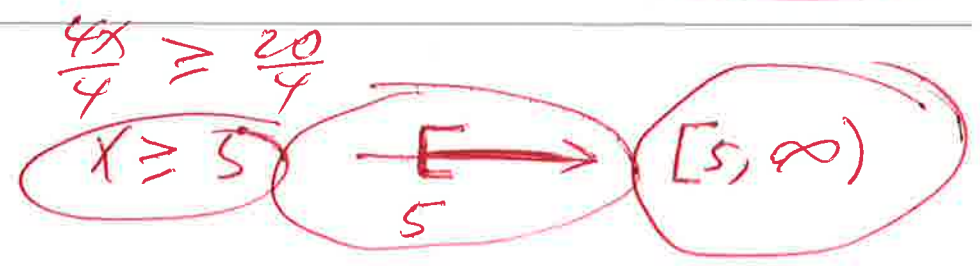
$f(x) = \sqrt{4x - 20}$

The domain is $\boxed{}$. (Type your answer in interval notation.)

Answer: $[5, \infty)$

ID: 1.1.59

$4x - 20 \geq 0$
 $4x - 20 + 20 \geq 0 + 20$
 $4x \geq 20$



formula
 domain
 $f(x) = \sqrt{Ax+B}$
 set $Ax+B \geq 0$

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

$f(x) = 4x + 7; g(x) = 8x - 1$

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

$(f + g)(x) = \text{[]}$ (Simplify your answer.)

$4x + 7 + 8x - 1 =$
 $(4x + 7) + (8x - 1) =$
 $4x + 7 + 8x - 1 =$
 $12x + 6 =$

Domain $(-\infty, \infty)$

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 $\{x | \text{[]}\}$.
(Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)

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

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

$(f - g)(x) = \text{[]}$ (Simplify your answer.)

$4x + 7 - 8x - 1 =$
 $(4x + 7) - (8x - 1) =$
 $4x + 7 - 8x + 1 =$
 $-4x + 8 =$

Domain $(-\infty, \infty)$

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 $\{x | \text{[]}\}$.
(Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)

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

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

$(f \cdot g)(x) = \text{[]}$ (Simplify your answer.)

$(4x + 7)(8x - 1) =$
 $32x^2 - 4x + 56x - 7 =$
 $32x^2 + 52x - 7 =$

Domain $(-\infty, \infty)$

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 $\{x | \text{[]}\}$.
(Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)

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

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

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

$\frac{f(x)}{g(x)} =$
 $\frac{4x + 7}{8x - 1} =$

$8x - 1 = 0$
 $8x - 1 + 1 = 0 + 1$
 $8x = 1$
 $\frac{8x}{8} = \frac{1}{8}$
 $x = \frac{1}{8}$

Domain $x \neq \frac{1}{8}$

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 $\{x | \text{[]}\}$.
(Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)

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

(e) Find $(f + g)(4)$.

$(f + g)(x) = 12x + 6$
 $(f + g)(4) = 12(4) + 6$
 $(f + g)(4) = 48 + 6$
 $(f + g)(4) = 54$

$(f + g)(4) = \text{[]}$ (Type an integer or a simplified fraction.)

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

$(f - g)(3) = \text{[]}$ (Type an integer or a simplified fraction.)

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

$(f \cdot g)(2) = \text{[]}$ (Type an integer or a simplified fraction.)

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

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

Answers $12x + 6$

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

$-4x + 8$

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

$32x^2 + 52x - 7$

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

$\frac{4x + 7}{8x - 1}$

A. The domain is $\left\{x \mid \text{[]} \right\}$.

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

54

-4

225

$\frac{11}{7}$

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

$(f - g)(3) = -4(3) + 8$

$(f - g)(3) = -12 + 8$

$(f - g)(3) = -4$

$(f \cdot g)(x) = 32x^2 + 52x - 7$

~~$(f \cdot g)(2) = 32(2) + 52(2) - 7$~~

$(f \cdot g)(2) = 32(2)(2) + 52(2) - 7$

$(f \cdot g)(2) = 128 + 104 - 7$

$(f \cdot g)(2) = 225$

$\left(\frac{f}{g}\right)(x) = \frac{4x + 7}{8x - 1}$

$\left(\frac{f}{g}\right)(1) = \frac{4(1) + 7}{8(1) - 1}$

$\left(\frac{f}{g}\right)(1) = \frac{4 + 7}{8 - 1}$

$\left(\frac{f}{g}\right)(1) = \frac{11}{7}$

ID: 1.1.67

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

$f(x) = x - 1; g(x) = 3x^2$

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

$(f + g)(x) = \text{[]}$ (Simplify your answer.) $3x^2 + x - 1$

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

domain $(-\infty, \infty)$

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 $\{x | \text{[]}\}$.
 (Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)

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

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

$(f - g)(x) = \text{[]}$ (Simplify your answer.) $-3x^2 + x - 1$

$f(x) - g(x) =$
 $(x-1) - (3x^2) =$
 $x - 1 - 3x^2 =$

domain $(-\infty, \infty)$

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 $\{x | \text{[]}\}$.
 (Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)

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

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

$(f \cdot g)(x) = \text{[]}$ (Simplify your answer.) $3x^3 - 3x^2$

$f(x) \cdot g(x) =$
 $(x-1)(3x^2) =$
 $3x^3 - 3x^2 =$

domain $(-\infty, \infty)$

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 $\{x | \text{[]}\}$.
 (Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)

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

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

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

$\frac{f(x)}{g(x)} =$
 $\frac{x-1}{3x^2} =$

domain $x \neq 0$
 $3x^2 = 0 \Rightarrow x = 0$
 $x^2 = 0 \Rightarrow x = 0$

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 $\{x | \text{[]}\}$.
 (Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)

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

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

$(f + g)(x) = 3x^2 + x - 1$
 $(f + g)(3) = 3(3)^2 + (3) - 1$
 $(f + g)(3) = 3(9) + 3 - 1$
 $(f + g)(3) = 27 + 3 - 1$
 $(f + g)(3) = 29$

$(f + g)(3) = \text{[]}$ (Type an integer or a simplified fraction.)

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

$(f - g)(2) = \text{[]}$ (Type an integer or a simplified fraction.)

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

$(f \cdot g)(4) = \text{[]}$ (Type an integer or a simplified fraction.)

(h) Find $\left(\frac{f}{g}\right)(3)$.

$\left(\frac{f}{g}\right)(3) = \text{[]}$ (Type an integer or a simplified fraction.)

$(f-g)(x) = -3x^2 + x - 1$
 $(f-g)(2) = -3(2)^2 + (2) - 1$
 $(f-g)(2) = -3(2)(2) + (2) - 1$
 $(f-g)(2) = -12 + 2 - 1$
 $(f-g)(2) = -11$

$(f \cdot g)(x) = 3x^3 - 3x^2$
 $(f \cdot g)(4) = 3(4)^3 - 3(4)^2$
 $(f \cdot g)(4) = 3(4)(4)(4) - 3(4)(4)$
 $(f \cdot g)(4) = 192 - 48$
 $(f \cdot g)(4) = 144$

$\left(\frac{f}{g}\right)(x) = \frac{x-1}{3x^2}$
 $\left(\frac{f}{g}\right)(3) = \frac{(3)-1}{3(3)^2}$
 $\left(\frac{f}{g}\right)(3) = \frac{3-1}{3(3)(3)}$
 $\left(\frac{f}{g}\right)(3) = \frac{2}{27}$

Answers $3x^2 + x - 1$

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

$-3x^2 + x - 1$

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

$3x^3 - 3x^2$

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

$\frac{x-1}{3x^2}$

A. The domain is $\{x \mid \text{[] } x \neq 0 \}$.

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

29

-11

144

$\frac{2}{27}$

ID: 1.1.69

7. 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.

$f(x) = x^2 - 8x + 3$

$(x+h)^2 - 8(x+h) + 3 - (x^2 - 8x + 3) =$
 $\frac{(x+h)^2 - 8(x+h) + 3 - (x^2 - 8x + 3)}{h} =$

$\frac{(x+h)(x+h) - 8x - 8h + 3 - x^2 + 8x - 3}{h} =$
 $\frac{x^2 + xh + xh + h^2 - 8x - 8h + 3 - x^2 + 8x - 3}{h} =$

Answer: $2x + h - 8$

ID: 1.1.83

$\frac{2xh + h^2 - 8h}{h} =$
 $\frac{2xh}{h} + \frac{h^2}{h} - \frac{8h}{h} = 2x + h - 8 =$

8. Given $f(x) = x^2 - 2x + 2$, find the value(s) for x such that $f(x) = 17$.

The solution set is .

Answer: -3,5

ID: 1.1.91



$$\text{Let } x^2 - 2x + 2 = 17$$

$$x^2 - 2x + 2 - 17 = 17 - 17$$

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

$$(x + 3)(x - 5) = 0$$

$$\text{Let } x + 3 = 0 \quad \text{OR} \quad x - 5 = 0$$

$$x + 3 - 3 = 0 - 3 \quad \text{OR} \quad x - 5 + 5 = 0 + 5$$

$$x = -3$$

$$\text{OR } x = 5$$

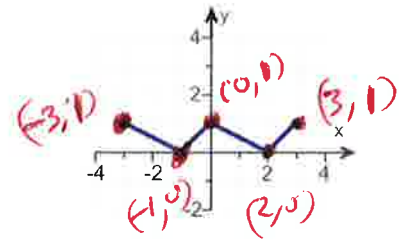
Possible

15, 1

3, 5

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

- the intercepts, if any
- its domain and range
- the intervals on which it is increasing, decreasing, or constant
- whether it is even, odd, or neither



(a) What are the intercepts?

x -int $(-1, 0)$ $(2, 0)$ $(0, 1)$

(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

$[0, 1]$ ← [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 $[-1, 0]$ $[2, 3]$
(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.

neither odd nor even.

even.

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

$[-3,3]$

$[0,1]$

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

10. The function f is defined as follows.

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

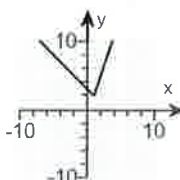
- (a) Find the domain of the function.
- (b) Locate any intercepts.
- (c) Graph the function.
- (d) Based on the graph, find the range.

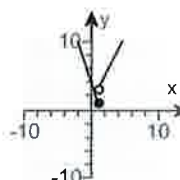
(a) The domain of the function f is $(-\infty, \infty) \leftarrow [\text{left, Right}]$
 (Type your answer in interval notation.)

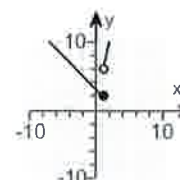
(b) Locate any intercepts. Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

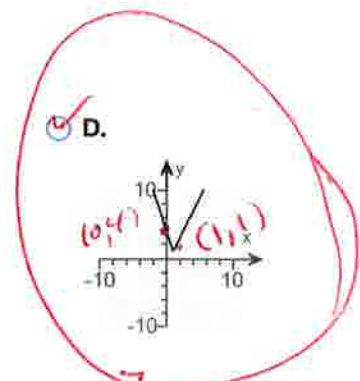
- A. The intercept(s) is/are $(0, 4)$.
 (Type an ordered pair. Use a comma to separate answers as needed.)
- B. There are no intercepts.

(c) Choose the correct graph below.

A. 

B. 

C. 

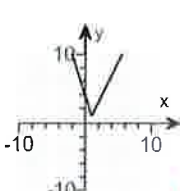
D. 

(d) The range of the function f is $[1, \infty) \leftarrow [\text{bottom, TOP}]$
 (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.)

D.
 $[1, \infty)$



windows
 use graphs calculator

windows
 $x - \text{min} = -12$
 $x - \text{max} = 12$
 $y - \text{min} = -10$
 $y - \text{max} = 10$

ID: 1.4.33

2ND math
 $y_1 = -3x + 4 \div (x < 1)$ OPEN Circle

2ND math
 $y_2 = 2x - 1 \div (x \geq 1)$ Close Circle

11. The function f is defined as follows.

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

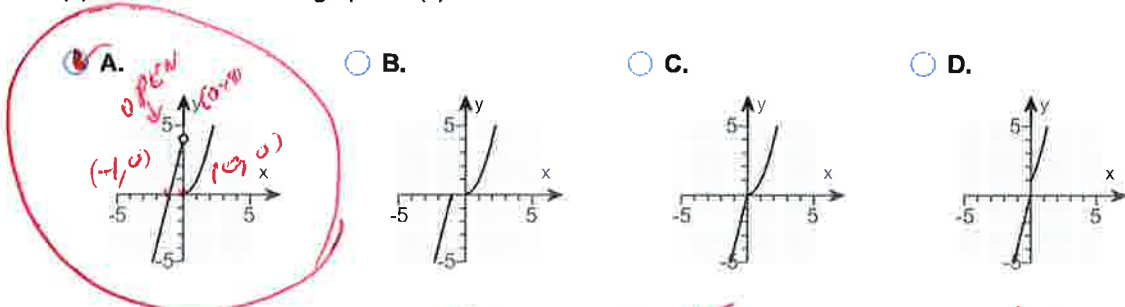
- (a) Find the domain of the function.
- (b) Locate any intercepts.
- (c) Graph the function.
- (d) Based on the graph, find the range.

(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_{int}, y_{int}
 (Type an ordered pair. Use a comma to separate answers as needed.)
- B. There are no intercepts.

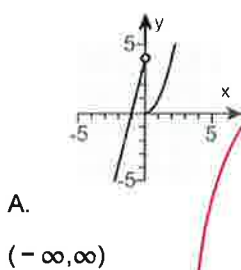
(c) Choose the correct graph of $f(x)$ below.



(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.)



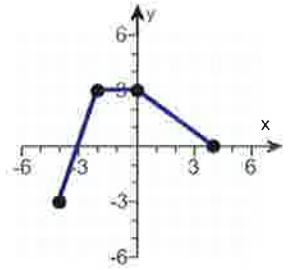
Window
 $x_{min} = -12$
 $x_{max} = 12$
 $y_{min} = -10$
 $y_{max} = 10$

use graphing calculator

ID: 1.4.37

$y_1 = 4 + 4x$ ← 2ND MATH (x < 0) OPEN Circle
 $y_2 = x^2$ ← 2ND MATH (x ≥ 0) CLOSE Circle

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



- (a) $F(x) = f(x) + 2$
- (b) $G(x) = f(x + 3)$
- (c) $P(x) = -f(x)$
- (d) $H(x) = f(x + 2) - 3$
- (e) $Q(x) = \frac{1}{3}f(x)$
- (f) $g(x) = f(-x)$
- (g) $h(x) = f(2x)$

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

- A.
- B.
- C.
- D.

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

- A.
- B.
- C.
- D.

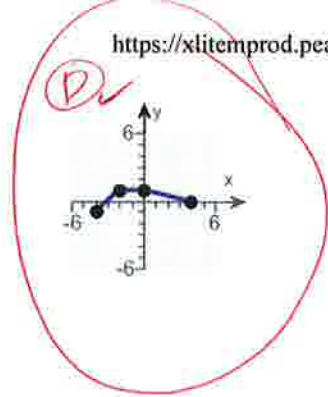
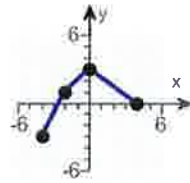
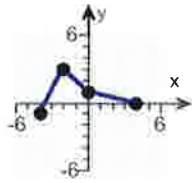
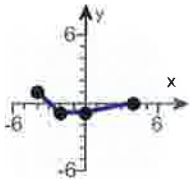
(c) Choose the correct graph of $P(x) = -f(x)$ below.

- A.
- B.
- C.
- D.

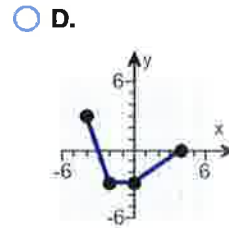
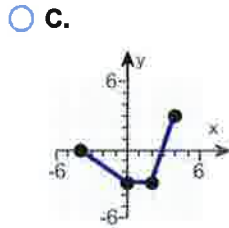
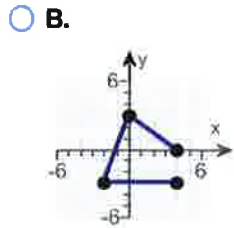
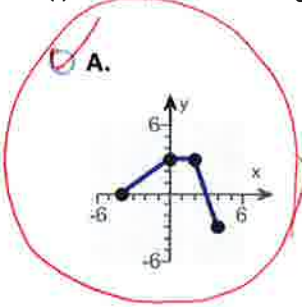
(d) Choose the correct graph of $H(x) = f(x + 2) - 3$ below.

- A.
- B.
- C.
- D.

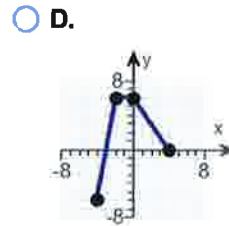
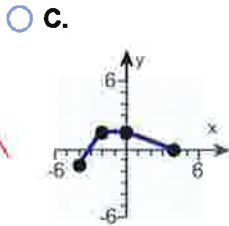
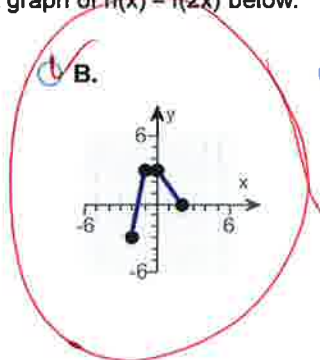
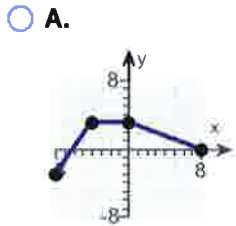
(e) Choose the correct graph of $Q(x) = \frac{1}{3}f(x)$ below.



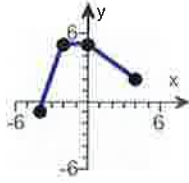
(f) Choose the correct graph of $g(x) = f(-x)$ below.



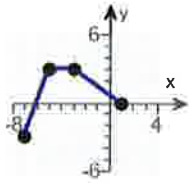
(g) Choose the correct graph of $h(x) = f(2x)$ below.



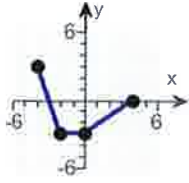
Answers



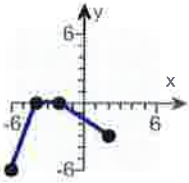
C.



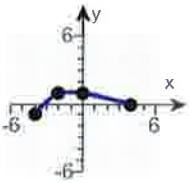
A.



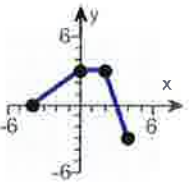
D.



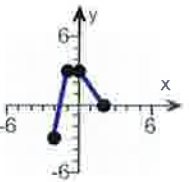
D.



D.



A.



B.

ID: 1.5.63

13.

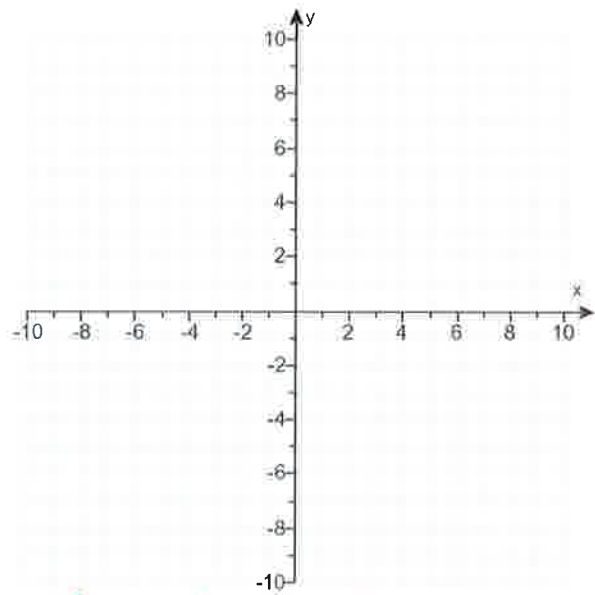
- (a) Graph $f(x) = |x - 7| - 2$ using transformations.
- (b) Find the area of the region bounded by f and the x -axis that lies below the x -axis.

(a) Graph $f(x)$.

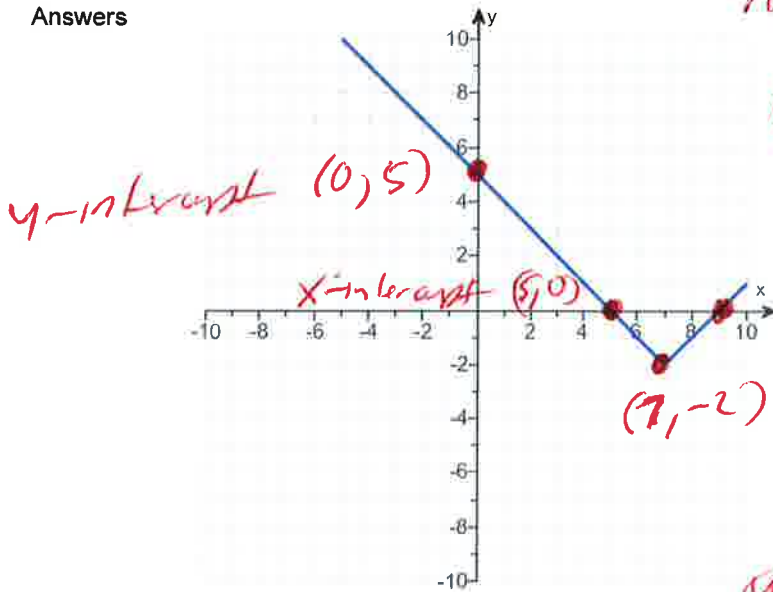
(Use the graphing tool provided to graph the function.)

(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.)



Answers



$f(x) = |x - 7| - 2$

Shift right 7
Shift down -2

(5, 0) x-intercept

(7, -2)

use graphing calculator

$y_1 = \text{Math, num, abs}$

$y_1 = \text{abs}(x - 7) - 2$

B5 ✓ B5 ✓

4

ID: 1.5.81

Window

X-min = -12
X-max = 12
Y-min = -10
Y-max = 6

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

$x^2 + 18x + 77$

=

$(x + 7)(x + 11)$

Possible
77: 1
11: 7

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

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

$(x+7)(x+11) =$
 $x^2 + 11x + 7x + 77 =$
 $x^2 + 18x + 77 =$
 Good =

ID: 2.3.1

15. Solve the equation.

$(x - 8)(3x + 5) = 0$

Let $x - 8 = 0$ OR $3x + 5 = 0$
 $x - 8 + 8 = 0 + 8$ OR $3x + 5 - 5 = 0 - 5$
 $3x = -5$
 $\frac{3x}{3} = \frac{-5}{3}$
 $x = -\frac{5}{3}$

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

Answer: $8, -\frac{5}{3}$

ID: 2.3.3

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

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

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

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

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

ID: 2.3.17

$x^2 + x - 2 = 0$
 $(x - 1)(x + 2) = 0$
 Let $x - 1 = 0$ OR $x + 2 = 0$
 $x - 1 + 1 = 0 + 1$ OR $x + 2 - 2 = 0 - 2$
 $x = 1$ OR $x = -2$

Possible
2, 1

3.1 possible
8.1
2.4

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

$g(x) = 3x^2 - 10x - 8$

$3x^2 - 10x - 8 = 0$
 $(3x + 2)(x - 4) = 0$

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

- A. The zeros and the x-intercepts are the same. They are $3x + 2 = 0$ OR $x - 4 = 0$
- B. The zeros and the x-intercepts are different. The zeros are _____, the x-intercepts are _____
 $3x + 2 - 2 = 0 - 2$ OR $x - 4 + 4 = 0 + 4$
 $3x = -2$ OR $x = 4$

Answer: A. The zeros and the x-intercepts are the same. They are $-\frac{2}{3}, 4$

$\frac{3x = -2}{3} = -\frac{2}{3}$
 $x = -\frac{2}{3}$

ID: 2.3.19

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

$g(x) = x(x + 14) + 45$

$x(x + 14) + 45 = 0$
 $x^2 + 14x + 45 = 0$

possible
45.1
15.3
9.5

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

- A. The zeros and the x-intercepts are the same. They are $x + 5 = 0$ OR $x + 9 = 0$
- B. The zeros and the x-intercepts are different. The zeros are _____, the x-intercepts are _____
 $x + 5 - 5 = 0 - 5$ OR $x + 9 - 9 = 0 - 9$
 $x = -5$ OR $x = -9$

Answer: A. The zeros and the x-intercepts are the same. They are $-5, -9$

ID: 2.3.23

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

$g(x) = (x - 1)^2 - 9$

$(x - 1)^2 - 9 = 0$
 $(x - 1)^2 = 9$
 $\sqrt{(x - 1)^2} = \pm \sqrt{9}$
 $(x - 1) = \pm 3$
 $x - 1 = +3$

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

- A. The zeros and the x-intercepts are the same. They are _____.
- B. The zeros and the x-intercepts are different. The zeros are _____, the x-intercepts are _____
 $x - 1 + 1 = -3 + 1$ OR $x - 1 + 1 = 3 + 1$
 $x = -2$ OR $x = 4$

Answer: A. The zeros and the x-intercepts are the same. They are $4, -2$

ID: 2.3.29

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

$f(x) = x^2 + 6x + 4$

$f(x) = x^2 + 6x + 4$
 $a=1, b=6, c=4$
 $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-6 \pm \sqrt{36 - 16}}{2(1)} = \frac{-6 \pm \sqrt{20}}{2}$

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 $-3 + \sqrt{5}, -3 - \sqrt{5}$.

ID: 2.3.41

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

$f(x) = 8x^2 + 11 + 20x$

$f(x) = 8x^2 + 20x + 11$
 $a=8, b=20, c=11$
 $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

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 $\frac{-5 + \sqrt{3}}{4}, \frac{-5 - \sqrt{3}}{4}$.

ID: 2.3.47

$x = \frac{-20 \pm \sqrt{400 - 352}}{16}$
 $x = \frac{-20 \pm 4\sqrt{3}}{16}$
 $x = \frac{-5 \pm \sqrt{3}}{4}$
 $x = \frac{-5 + \sqrt{3}}{4}$ OR $x = \frac{-5 - \sqrt{3}}{4}$

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

$G(x) = 2x(x + 2) - 5$

$G(x) = 2x^2 + 4x - 5$ rewrite
 $a=2, b=4, c=-5$

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-(4) \pm \sqrt{(4)^2 - 4(2)(-5)}}{2(2)}$

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.

$= \frac{-4 \pm \sqrt{16 + 40}}{4}$
 $x = \frac{-4 \pm \sqrt{56}}{4}$
 $x = \frac{-4 \pm \sqrt{4 \cdot 14}}{4}$
 $x = \frac{-4 \pm 2\sqrt{14}}{4}$
 $x = \frac{-2 \pm \sqrt{14}}{2}$

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

$\frac{-2 + \sqrt{14}}{2}$	$\frac{-2 - \sqrt{14}}{2}$
----------------------------	----------------------------

$x = \frac{-2 + \sqrt{14}}{2}$ or $x = \frac{-2 - \sqrt{14}}{2}$ $x = \frac{2(-2 \pm \sqrt{14})}{2(2)}$

ID: 2.3.49

23. Match the graph with the following function.

$f(x) = x^2 + 10x + 25$

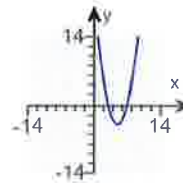
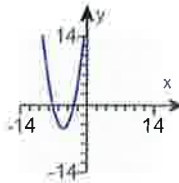
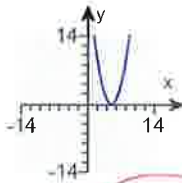
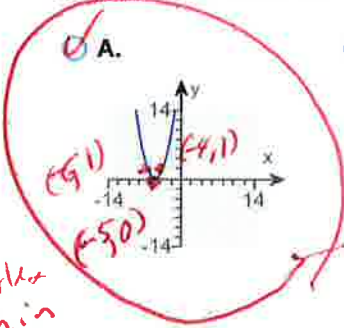
Choose the correct graph below.

A.

B.

C.

D.

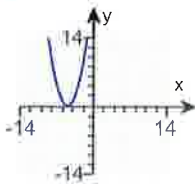


x	f(x)
-6	1
-5	0
-4	1
0	25

vertex = (-5, 0)

x-intercept = (-5, 0)
 y-intercept = (0, 25)
 vertex = (-5, 0)

Answer:



A.

Window
 $x_{min} = -12$
 $x_{max} = 12$
 $y_{min} = -10$
 $y_{max} = 10$

use graphing calculator

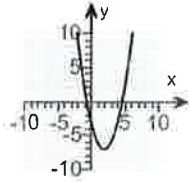
$y_1 = x^2 + 10x + 25$

ID: 2.4.15

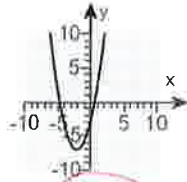
24. Match the function $f(x) = x^2 - 4x + 3$ to one of the given graphs.

Choose the correct graph below.

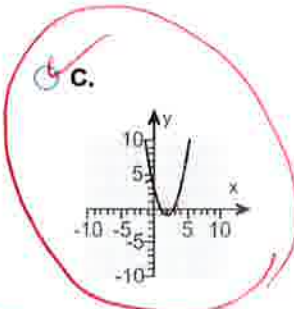
A.



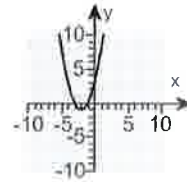
B.



C.



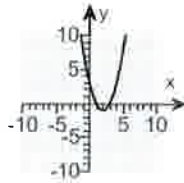
D.



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

Vertex = (2, -1)

Answer:



C.

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

Use graphing calculator

$$y_1 = x^2 - 4x + 3$$

x -intercepts (1, 0) (3, 0)

y -intercept (0, 3)

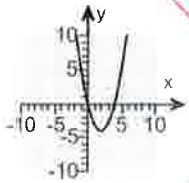
Vertex = (2, -1) (Min)

ID: 2.4.17

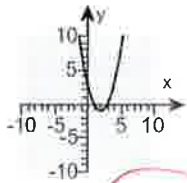
25. Match the function $f(x) = x^2 - 4x$ to one of the given graphs.

Choose the correct graph below.

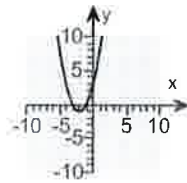
A.



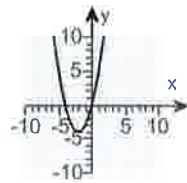
B.



C.



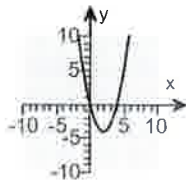
D.



X	f(x)
0	0
2	-4
4	0

Vertex = (2, -4)

Answer:



A.

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

Use graphing calculator

$$y_1 = x^2 - 4x$$

BIG

x -intercept (0, 0), (4, 0)

y -intercept (0, 0)

Vertex = (2, -4) Min

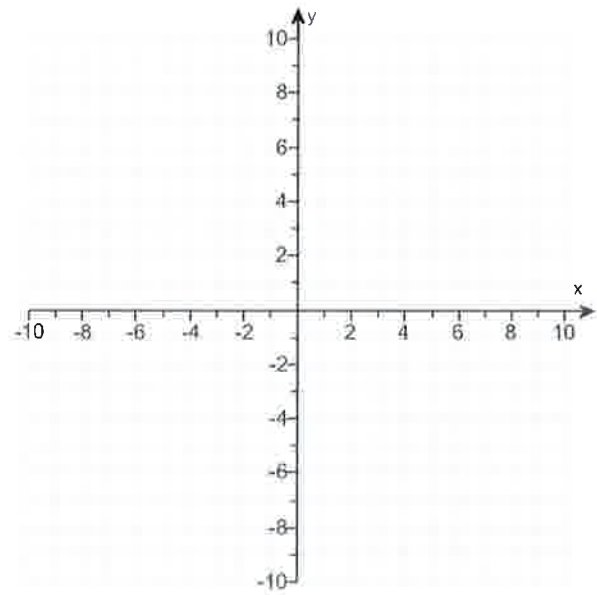
ID: 2.4.19

26.

Graph the function $f(x) = (x + 3)^2 - 4$ by starting with the graph of $y = x^2$ and using transformations (shifting, stretching/compressing, and/or reflecting).

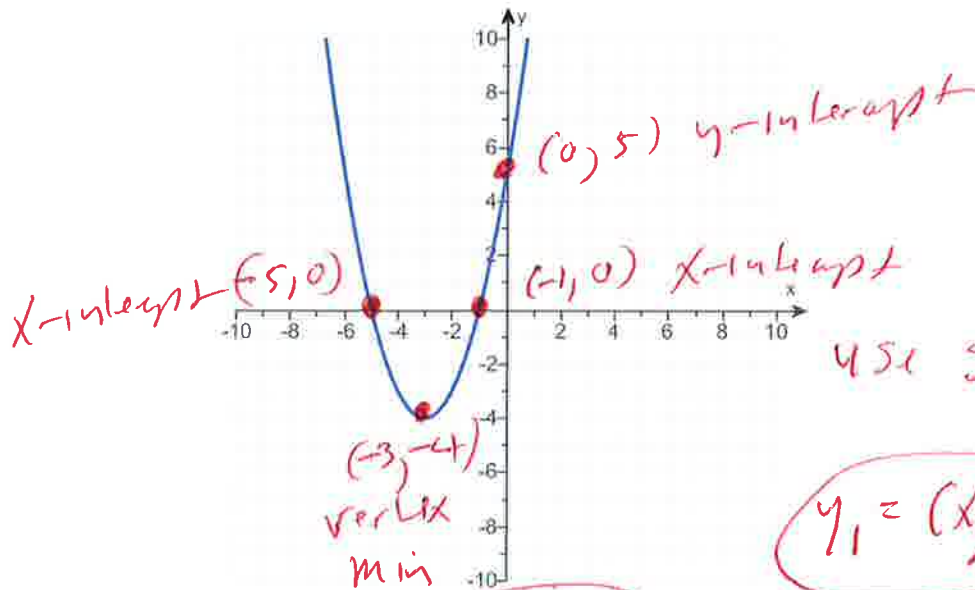
Select all the transformations needed to graph the given function using $y = x^2$.

- A. Shift the graph to the left 3 units.
- B. Reflect the graph about the y-axis.
- C. Shift the graph to the right 3 units.
- D. Reflect the graph about the x-axis.
- E. Compress the graph vertically by a factor of 4.
- F. Shift the graph down 4 units.
- G. Stretch the graph vertically by a factor of 3.
- H. Shift the graph up 4 units.



Use the graphing tool to graph the function.

Answers A. Shift the graph to the left 3 units., F. Shift the graph down 4 units.



x	f(x)
-5	0
-3	-4
-1	0
0	5

vertex

use graphing calculator

$$y_1 = (x + 3)^2 - 4$$

Shift left
-3

Shift down
-4

ID: 2.4.23-Setup & Solve

Window
 $x - \min = -12$
 $x - \max = 12$
 $y - \min = -10$
 $y - \max = 10$

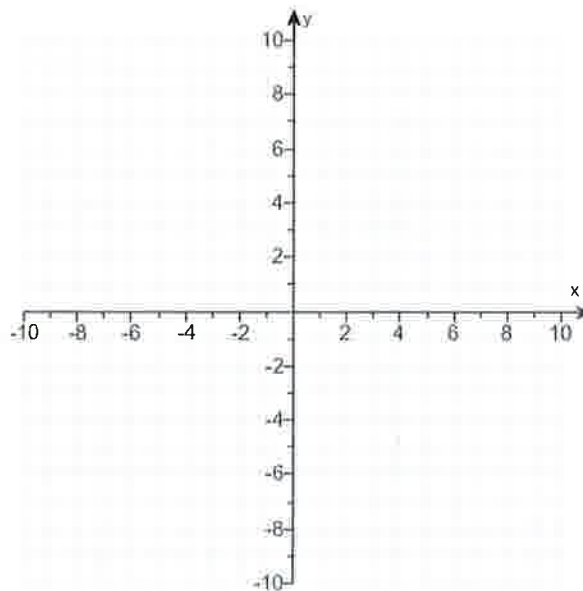
27.

Graph the function $f(x) = x^2 + 10x + 24$ by starting with the graph of $y = x^2$ and using transformations (shifting, stretching/compressing, and/or reflecting).

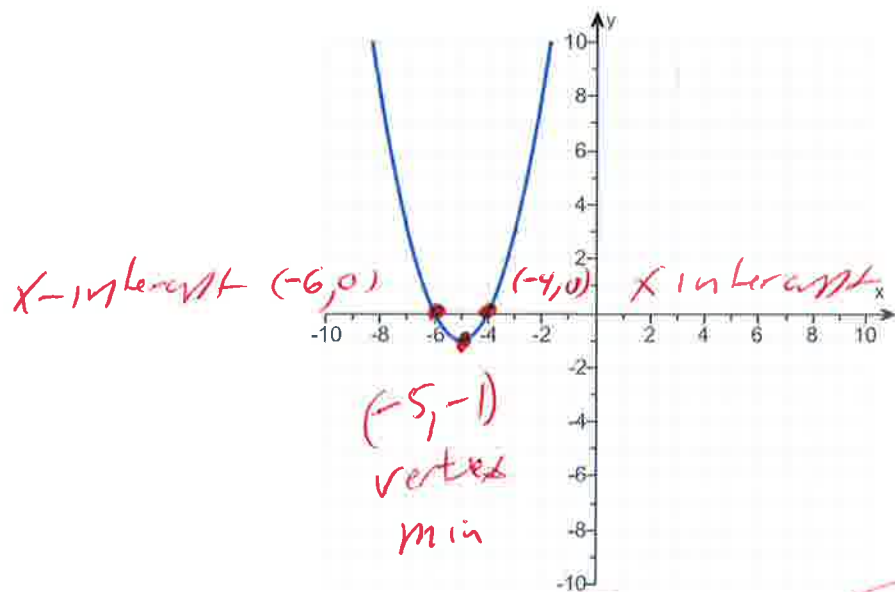
Select all the transformations needed to graph the given function using $y = x^2$.

- A. Stretch the graph vertically by a factor of 10.
- B. Shift the graph up 1 unit.
- C. Shift the graph to the right 5 units.
- D. Shift the graph down 1 unit.
- E. Reflect the graph about the x-axis.
- F. Compress the graph vertically by a factor of 1.
- G. Reflect the graph about the y-axis.
- H. Shift the graph to the left 5 units.

Use the graphing tool to graph the function.



Answers D. Shift the graph down 1 unit., H. Shift the graph to the left 5 units.



X	f(x)
-6	0
-5	-1
-4	0

Vertex

use graphing calculator

$$y_1 = x^2 + 10x + 24$$

ID: 2.4.25-Setup & Solve

Window

X-min = -12
 X-max = 12
 Y-min = -10
 Y-max = 10

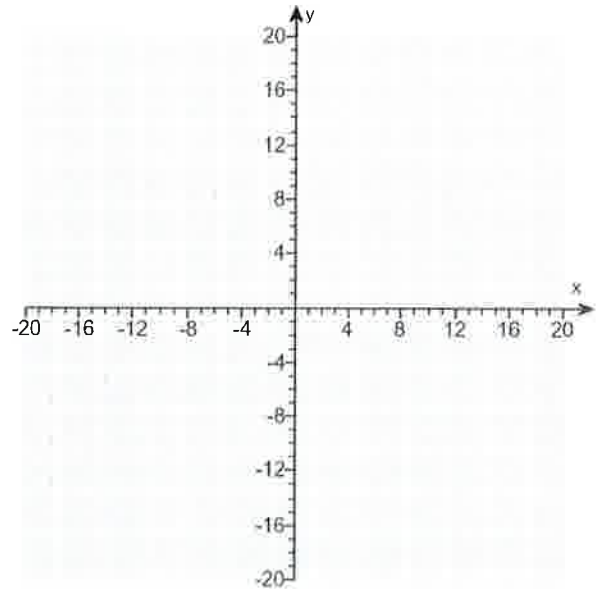
28.

Graph the function $f(x) = -x^2 - 4x$ by starting with the graph of $y = x^2$ and using transformations (shifting, stretching/compressing, and/or reflecting).

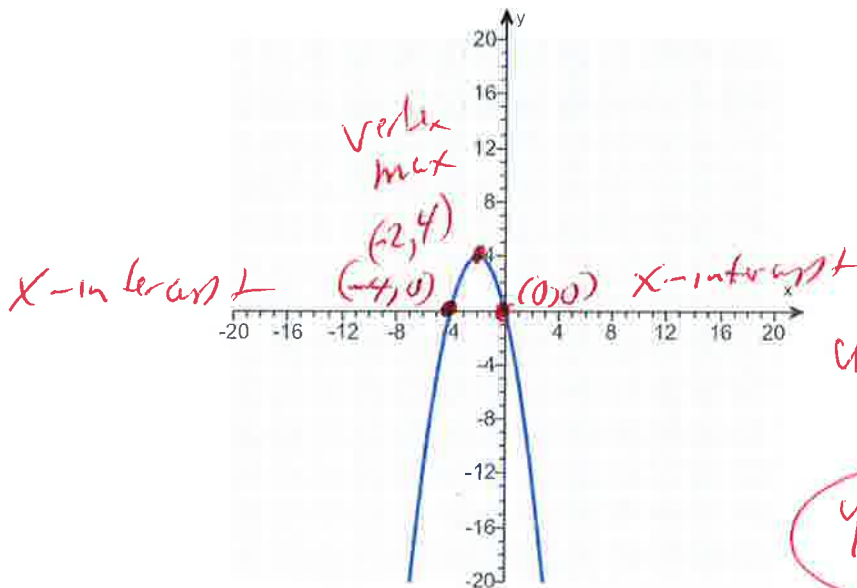
Select all the transformations needed to graph the given function using $y = x^2$.

- A. Compress the graph vertically by a factor of 4.
- B. Reflect the graph about the x-axis.
- C. Shift the graph up 4 units.
- D. Shift the graph down 4 units.
- E. Shift the graph to the right 2 units.
- F. Reflect the graph about the y-axis.
- G. Stretch the graph vertically by a factor of -2.
- H. Shift the graph to the left 2 units.

Use the graphing tool to graph the function.



Answers B. Reflect the graph about the x-axis., C. Shift the graph up 4 units., H. Shift the graph to the left 2 units.



x	$f(x)$
-4	0
-2	4
0	0

Vertex

use graph
calculator

$$y = -x^2 - 4x$$

446 BIG

ID: 2.4.29-Setup & Solve

Window

$$x - \min = -12$$

$$x - \max = 12$$

$$y - \min = -10$$

$$y - \max = 10$$

29.

next page

29

For the quadratic function $f(x) = x^2 - 2x - 3$, 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.

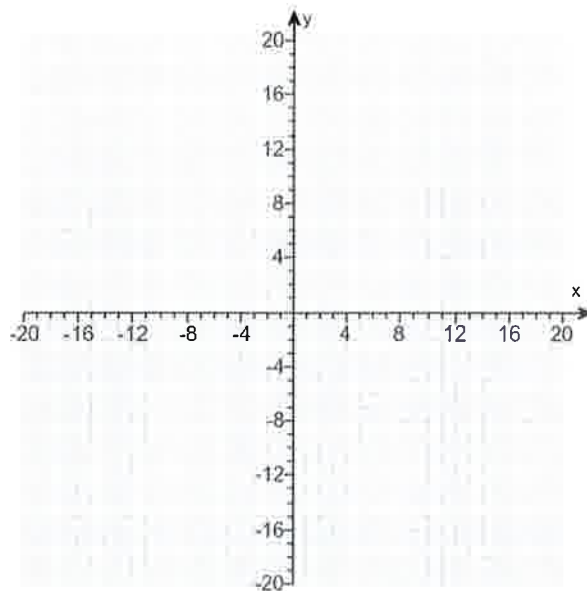
(b) Determine the domain and the range of the function.

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

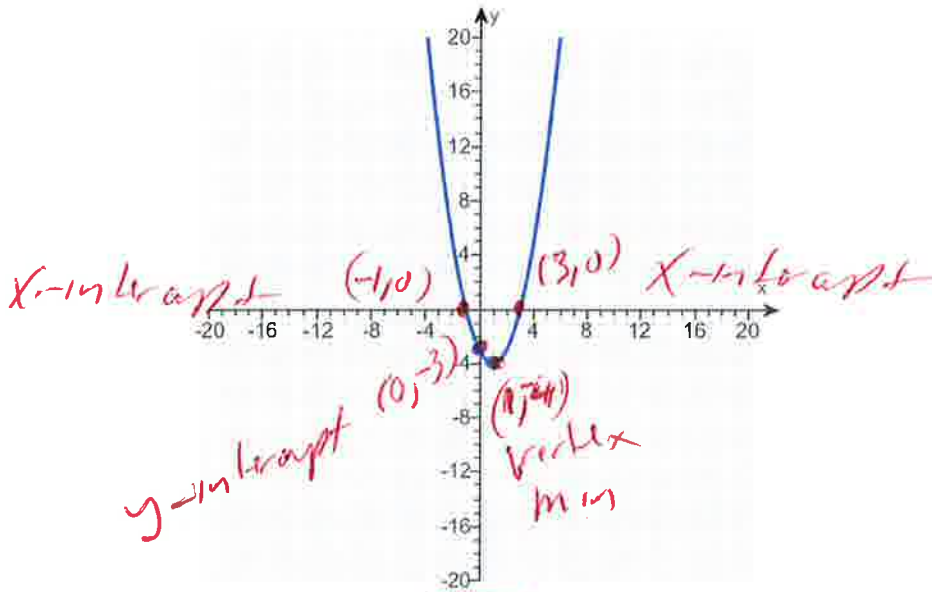
(1, -4)

x = 1

A. The x-intercept(s) is/are .

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

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



X	f(x)
-1	0
0	-3
1	-4
3	0

Vertex (circled)

- (-∞, ∞)
- [-4, ∞)
- [1, ∞)
- (-∞, 1]

Window

x-min = -12

x-max = 12

y-min = -10

y-max = 10

use graphing calculator

$y_1 = x^2 - 2x - 3$

ID: 2.4.37

30.

Next Page

30
For the quadratic function $f(x) = x^2 - 2x + 1$, 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 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.

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.

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.)

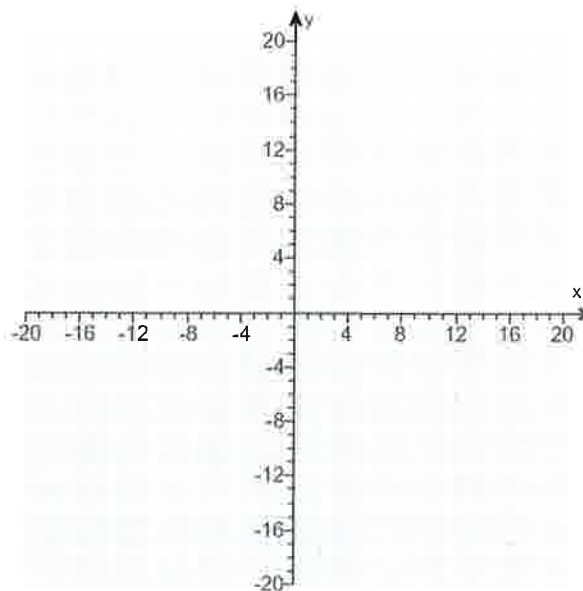
The range of f is .

(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.)

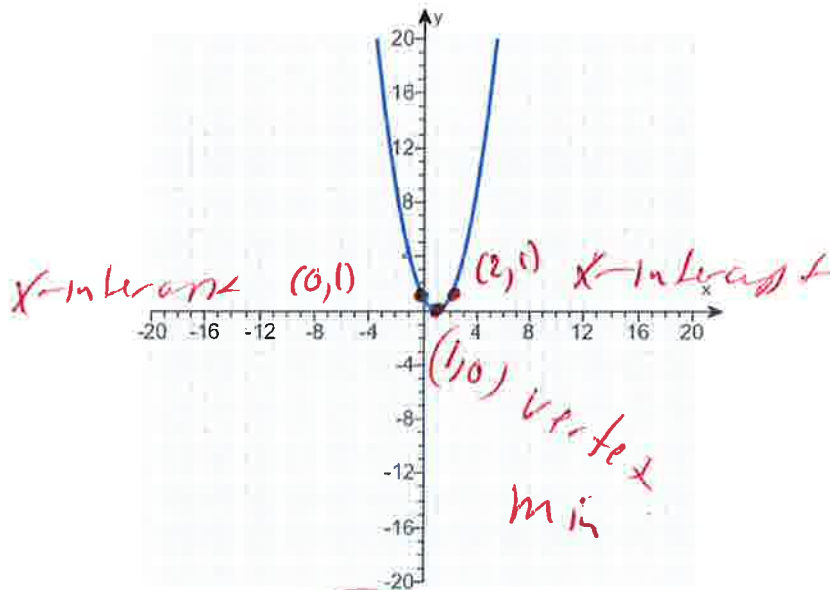


Answers up

(1,0)

 $x = 1$ A. The y-intercept is . (Type an integer or a decimal.)A. The x-intercept(s) is/are .

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



x	$f(x)$
0	1
1	0
2	1

vertex

 $(-\infty, \infty)$ $[0, \infty)$ $[1, \infty)$ $(-\infty, 1]$

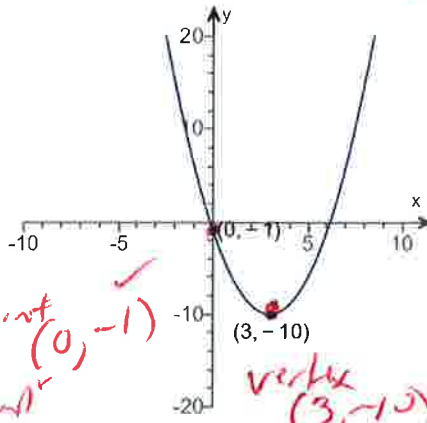
windows

 x -min = -12 x -max = 12 y -min = -10 y -max = 10use graphing
calculator

ID: 2.4.39

$$y_1 = x^2 - 2x + 1$$

31. Determine the quadratic function whose graph is given below. The quadratic function which describes the given graph is $f(x) = \text{_____}$.
(Type an expression.)



Point (0, -1)
x-intercept

vertex (3, -10)
min

Answer: $x^2 - 6x - 1$

formula $\rightarrow y = a(x+b)^2 + c$ vertex = (3, -10)

$y = a(x-3)^2 - 10$
f(x) = _____
(Type an expression.)

point (0, -1)
 $-1 = a(0-3)^2 - 10$
 $-1 = a(-3)^2 - 10$
 $-1 = a(9) - 10$
 $-1 = 9a - 10$
 $-1 + 10 = 9a - 10 + 10$
 $9 = 9a$
 $\frac{9}{9} = \frac{9a}{9}$
 $1 = a$

$y = a(x-3)^2 - 10$
 $y = 1(x-3)^2 - 10$
 $y = 1(x-3)(x-3) - 10$
 $y = 1(x^2 - 3x - 3x + 9) - 10$
 $y = 1(x^2 - 6x + 9) - 10$
 $y = x^2 - 6x + 9 - 10$
 $y = x^2 - 6x - 1$
ANSWER

ID: 2.4.49

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

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

graph opens down has a MAX

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?

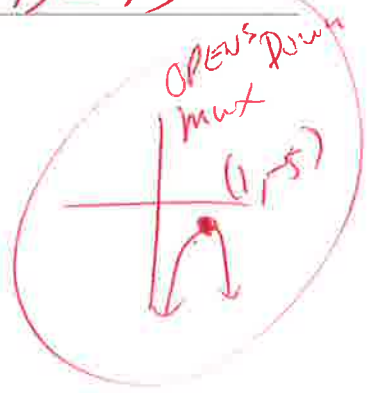
(Simplify your answer.)

Answers The function f has a maximum value.

-5

ID: 2.4.59

$f(x) = -2x^2 + 4x - 7$
 $a = -2, b = 4, c = -7$
vertex = $(-\frac{b}{2a}, f(-\frac{b}{2a}))$
vertex = $(-\frac{4}{2(-2)}, f(\frac{4}{2(-2)}))$
vertex = $(-\frac{4}{-4}, f(\frac{4}{-4}))$
vertex = $(1, f(1))$
vertex = $(1, -2(1)^2 + 4(1) - 7)$
vertex = $(1, -2(1)(1) + 4(1) - 7)$
vertex = $(1, -2 + 4 - 7)$
vertex = $(1, 2 - 7)$
vertex = $(1, -5)$
MAX



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

$f(x) = x^3 - 3x^2 - 25x - 21$

$f(x) = 1x^3 - 3x^2 - 25x - 21$

Possibly

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

- A. $x =$ _____
(Simplify your answer. Type an exact answer, using radicals as needed. Use integers or fractions for any rational numbers in the expression. Use a comma to separate answers as needed.)
- B. There are no real zeros.

Last =
First

$\frac{\pm 21}{\pm 1} =$

$\pm 21, \pm 7, \pm 3, \pm 1$

Use the real zeros to factor f.

$f(x) =$

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

$\frac{\pm 21}{1} \frac{\pm 7}{7} \frac{\pm 3}{7} \frac{\pm 1}{1}$

Answers A. $x =$

Use Synthetic division

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

$(x + 1)(x + 3)(x - 7)$

Try $x = -1$

$\pm 21, \pm 7, \pm 3, \pm 1$

ID: 3.2.45

-1	1	-3	-25	-21
		-1	4	21
	1	-4	-21	0 Rem

$x^2 - 4x - 21 = 0$
 $(x + 3)(x - 7) = 0$

Let $x + 3 = 0$ or $x - 7 = 0$
 $x + 3 - 3 = 0 - 3$ or $x - 7 + 7 = 0 + 7$
 $x = -3$ or $x = 7$

Answers

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

$f(x) = x^4 + 4x^3 - 9x^2 - 16x + 20$

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

A. $x =$

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

B. There are no real zeros.

Use the real zeros to factor f.

$f(x) =$

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

Answers A. $x =$

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

$(x + 5)(x - 1)(x + 2)(x - 2)$

ID: 3.2.53

35. Solve the equation in the real number system.

$3x^4 - 28x^3 + 81x^2 - 84x + 20 = 0$

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

A. $x =$

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

B. There are no real solutions.

Answer: A. $x =$

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

ID: 3.2.67

Handwritten notes and work:

$f(x) = x^4 + 4x^3 - 9x^2 - 16x + 20$

Use synthetic division

1	1	4	-9	-16	20
		4	17	8	-4
1	1	8	8	-8	16
		8	16	0	0
1	1	16	24	-8	16
		16	40	32	16
1	1	32	64	24	32
		32	96	120	160
1	1	64	160	144	192
		64	224	368	512
1	1	128	384	512	704
		128	512	896	1408
1	1	256	896	1408	1920
		256	1152	2304	3840
1	1	512	2048	3712	5760
		512	2760	6416	11520
1	1	1024	5808	12128	23040
		1024	7832	18544	34560
1	1	2048	15640	41072	76800
		2048	21168	59616	111360
1	1	4096	46808	131184	253440
		4096	64416	180800	364800
1	1	8192	141224	411584	768000
		8192	196416	562304	1132800
1	1	16384	382448	1224608	2465600
		16384	523840	1686912	3398400
1	1	32768	1047688	3813824	7796800
		32768	1415376	5230736	11195200
1	1	65536	2830764	11461472	24390400
		65536	3846140	15692208	35585600
1	1	131072	7672308	35184416	77171200
		131072	10583036	48176624	106356800
1	1	262144	21166072	110353248	233713600
		262144	29087108	150529872	340070400
1	1	524288	58174216	351058752	770144000
		524288	79401324	471588624	1060217600
1	1	1048576	158802648	1103177248	2420435200
		1048576	216604024	1474765872	3280652800
1	1	2097152	433208048	3517931744	7701104000
		2097152	592922072	4719702624	10602176000
1	1	4194304	1185844144	11031772448	24204352000
		4194304	1605266288	15052987392	32806528000
1	1	8388608	3210532576	35179317376	77011040000
		8388608	4348800000	47197026304	106021760000
1	1	16777216	8697600000	110317724416	242043520000
		16777216	11740400000	150529873920	328065280000
1	1	33554432	23480800000	351793173824	770110400000
		33554432	31961600000	471970264000	1060217600000
1	1	67108864	63923200000	110317724736	2420435200000
		67108864	86846400000	150529874240	3280652800000
1	1	134217728	173692800000	351793174528	7701104000000
		134217728	233913600000	471970265024	10602176000000
1	1	268435456	467827200000	110317725024	24204352000000
		268435456	630240000000	150529875520	32806528000000
1	1	536870912	1260480000000	351793176032	77011040000000
		536870912	1707360000000	471970266048	106021760000000
1	1	1073741824	3414720000000	110317727040	242043520000000
		1073741824	4618400000000	150529877056	328065280000000
1	1	2147483648	9236800000000	351793178080	770110400000000
		2147483648	12502400000000	471970268096	1060217600000000
1	1	4294967296	25004800000000	110317729120	2420435200000000
		4294967296	33347200000000	150529879168	3280652800000000
1	1	8589934592	66694400000000	351793180224	7701104000000000
		8589934592	89123200000000	471970270272	10602176000000000
1	1	17179869184	178246400000000	110317729280	24204352000000000
		17179869184	237760000000000	150529880320	32806528000000000
1	1	34359738368	475488000000000	351793181376	77011040000000000
		34359738368	634240000000000	471970281408	106021760000000000
1	1	68719476736	1268480000000000	110317729472	242043520000000000
		68719476736	1707360000000000	150529881504	328065280000000000
1	1	137438953472	3414720000000000	351793182528	770110400000000000
		137438953472	4618400000000000	471970281536	1060217600000000000
1	1	274877906944	9236800000000000	110317729568	2420435200000000000
		274877906944	12502400000000000	150529882576	3280652800000000000
1	1	549755813888	25004800000000000	351793183680	7701104000000000000
		549755813888	33347200000000000	471970281600	10602176000000000000
1	1	1099511627776	66694400000000000	110317729664	24204352000000000000
		1099511627776	89123200000000000	150529883616	32806528000000000000
1	1	2199023255552	178246400000000000	351793184768	77011040000000000000
		2199023255552	237760000000000000	471970281632	106021760000000000000
1	1	4398046511104	475488000000000000	110317729760	242043520000000000000
		4398046511104	634240000000000000	150529884672	328065280000000000000
1	1	8796093022208	1268480000000000000	351793185824	770110400000000000000
		8796093022208	1707360000000000000	471970281664	1060217600000000000000
1	1	17592186044416	3414720000000000000	110317729856	2420435200000000000000
		17592186044416	4618400000000000000	150529885680	3280652800000000000000
1	1	35184372088832	9236800000000000000	351793186912	7701104000000000000000
		35184372088832	12502400000000000000	471970281696	10602176000000000000000
1	1	70368744177664	25004800000000000000	110317729952	24204352000000000000000
		70368744177664	33347200000000000000	150529886720	32806528000000000000000
1	1	140737488355328	66694400000000000000	351793188032	77011040000000000000000
		140737488355328	89123200000000000000	471970281712	106021760000000000000000
1	1	281474976710656	178246400000000000000	110317730048	242043520000000000000000
		281474976710656	237760000000000000000	150529887776	328065280000000000000000
1	1	562949953421312	475488000000000000000	351793189184	770110400000000000000000
		562949953421312	634240000000000000000	471970281728	1060217600000000000000000
1	1	1125899906842624	1268480000000000000000	110317730144	2420435200000000000000000
		1125899906842624	1707360000000000000000	150529888832	3280652800000000000000000
1	1	2251799813685248	3414720000000000000000	351793190288	7701104000000000000000000
		2251799813685248	4618400000000000000000	471970281744	10602176000000000000000000
1	1	4503599627370496	9236800000000000000000	110317730240	24204352000000000000000000
		4503599627370496	12502400000000000000000	150529889888	32806528000000000000000000
1	1	9007199254740992	25004800000000000000000	351793191392	77011040000000000000000000
		9007199254740992	33347200000000000000000	471970281760	106021760000000000000000000
1	1	18014398509481984	66694400000000000000000	110317730336	242043520000000000000000000
		18014398509481984	89123200000000000000000	150529890944	328065280000000000000000000
1	1	36028797018963968	178246400000000000000000	351793192480	770110400000000000000000000
		36028797018963968	237760000000000000000000	471970281776	1060217600000000000000000000
1	1	72057594037927936	475488000000000000000000	110317730432	2420435200000000000000000000
		72057594037927936	634240000000000000000000	150529892000	3280652800000000000000000000
1	1	144115188075855872	1268480000000000000000000	351793193600	7701104000000000000000000000
		144115188075855872	1707360000000000000000000	471970281792	10602176000000000000000000000
1	1	288230376151711744	3414720000000000000000000	110317730528	24204352000000000000000000000
		288230376151711744	4618400000000000000000000	150529893056	32806528000000000000000000000
1	1	576460752303423488	9236800000000000000000000	351793194752	77011040000000000000000000000
		576460752303423488	12502400000000000000000000	471970281808	106021760000000000000000000000
1	1	1152921504606846976	25004800000000000000000000	110317730624	242043520000000000000000000000
		1152921504606846976	33347200000000000000000000	150529894112	328065280000000000000000000000
1	1	2305843009213693952	66694400000000000000000000	351793195872	770110400000000000000000000000
		2305843009213693952	89123200000000000000000000	471970281824	1060217600000000000000000000000
1	1	4611686018427387904	178246400000000000000000000	110317730720	2420435200000000000000000000000
		4611686018427387904	237760000000000000000000000	150529895168	3280652800000000000000000000000
1	1	9223372036854775808	475488000000000000000000000	351793196992	7701104000000000000000000000000
		9223372036854775808	634240000000000000000000000	471970281840	10602176000000000000000000000000
1	1	18446744073709551616	1268480000000000000000000000	110317730816	24204352000000000000000000000000
		18446744073709551616	1707360000000000000000000000	150529896224	3

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

$$R(x) = \frac{8x}{x+10}$$

set $x+10=0$
 $x+10-10=0-10$

vertical asymptote

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

$x = -10$

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

horizontal asymptote
 Highest Power top = 8
 Highest Power bottom = 1
 $\frac{8x}{x} = 8$ simplify

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.

$y = 8$ *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.

no oblique asymptote
 since powers are same up & down

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

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

B. There is no oblique asymptote.

ID: 3.4.45

37. For $f(x) = 4x + 9$ and $g(x) = 9x$, 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) $(f \circ g)(x) = \boxed{}$ (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) $(g \circ f)(x) = \boxed{}$ (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) $(f \circ f)(x) = \boxed{}$ (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) $(g \circ g)(x) = \boxed{}$ (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 $36x + 9$

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

$36x + 81$

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

$16x + 45$

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

$81x$

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

Handwritten work for (a):
 $(f \circ g)(x) = f(g(x)) = f(9x) = 4(9x) + 9 = 36x + 9$
 Domain: $(-\infty, \infty)$

Handwritten work for (b):
 $(g \circ f)(x) = g(f(x)) = g(4x + 9) = 9(4x + 9) = 36x + 81$
 Domain: $(-\infty, \infty)$

Handwritten work for (c):
 $(f \circ f)(x) = f(f(x)) = f(4x + 9) = 4(4x + 9) + 9 = 16x + 36 + 9 = 16x + 45$
 Domain: $(-\infty, \infty)$

Handwritten work for (d):
 $(g \circ g)(x) = g(g(x)) = g(9x) = 9(9x) = 81x$
 Domain: $(-\infty, \infty)$

ID: 4.1.23

next
page

38. For $f(x) = 3x + 3$ and $g(x) = x^2$, 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) $(f \circ g)(x) = \boxed{}$ (Simplify your answer.)

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

Handwritten work for (a):
 $(f \circ g)(x) =$
 $f(g(x)) =$
 ~~$f(x^2)$~~
 $f(x^2) =$
 $3(x^2) + 3 =$
 $3x^2 + 3 =$
 Domain: $(-\infty, \infty)$

(b) $(g \circ f)(x) = \boxed{}$ (Simplify your answer.)

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

Handwritten work for (b):
 $(g \circ f)(x) =$
 $g(f(x)) =$
 $g(3x + 3) =$
 $(3x + 3)^2 =$
 $(3x + 3)(3x + 3) =$
 $9x^2 + 9x + 9x + 9 =$
 Domain: $(-\infty, \infty)$

(c) $(f \circ f)(x) = \boxed{}$ (Simplify your answer.)

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

Handwritten work for (c):
 $(f \circ f)(x) =$
 $f(f(x)) =$
 $f(3x + 3) =$
 $9x^2 + 18x + 9 =$
 $(f \circ f)(x) =$
 $f(f(x)) =$
 $f(3x + 3) =$

(d) $(g \circ g)(x) = \boxed{}$ (Simplify your answer.)

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

Handwritten work for (d):
 $(g \circ g)(x) =$
 $g(g(x)) =$
 $g(x^2) =$
 $(x^2)^2 =$
 $9x^2 + 12 =$
 Domain: $(-\infty, \infty)$

Answers $3x^2 + 3$

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

$9x^2 + 18x + 9$

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

$9x + 12$

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

x^4

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

Handwritten work for (d) continued:
 $(g \circ g)(x) =$
 $g(g(x)) =$
 $g(x^2) =$
 $(x^2)^2 =$
 $x^4 =$
 Domain: $(-\infty, \infty)$

ID: 4.1.25

max page

39.

next page

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The function $f(x) = 6x - 3$ 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 $\{x|x \leq \underline{\hspace{2cm}}\}$.
- B. The domain is $\{x|x \geq \underline{\hspace{2cm}}\}$.
- C. The domain is $\{x|x \neq \underline{\hspace{2cm}}\}$.
- 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 $\{y|y \neq \underline{\hspace{2cm}}\}$.
- B. The range is $\{y|y \leq \underline{\hspace{2cm}}\}$.
- C. The range is $\{y|y \geq \underline{\hspace{2cm}}\}$.
- D. The range is the set of all real numbers.

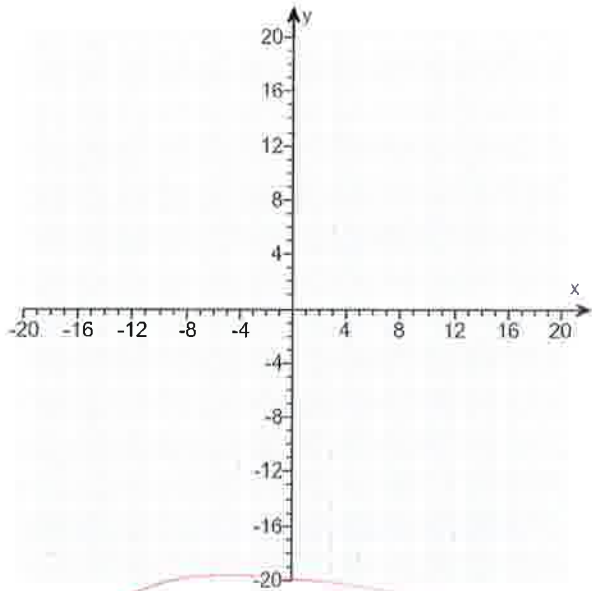
Find the domain of f^{-1} . Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The domain is $\{x|x \neq \underline{\hspace{2cm}}\}$.
- B. The domain is $\{x|x \geq \underline{\hspace{2cm}}\}$.
- C. The domain is $\{x|x \leq \underline{\hspace{2cm}}\}$.
- D. The domain is the set of all real numbers.

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

- A. The range is $\{y|y \leq \underline{\hspace{2cm}}\}$.
- B. The range is $\{y|y \neq \underline{\hspace{2cm}}\}$.
- C. The range is $\{y|y \geq \underline{\hspace{2cm}}\}$.
- 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.



Handwritten work for finding the inverse function $f^{-1}(x)$:

$$f(x) = 6x - 3$$

$$y = 6x - 3 \quad \text{Set } y =$$

$$x = 6y - 3 \quad \text{inv}$$

$$x + 3 = 6y \quad \text{var}$$

$$x + 3 = 6y$$

$$\frac{x + 3}{6} = \frac{6y}{6}$$

$$\frac{x + 3}{6} = y$$

$$y = \frac{x + 3}{6}$$

$$f^{-1}(x) = \frac{x + 3}{6}$$

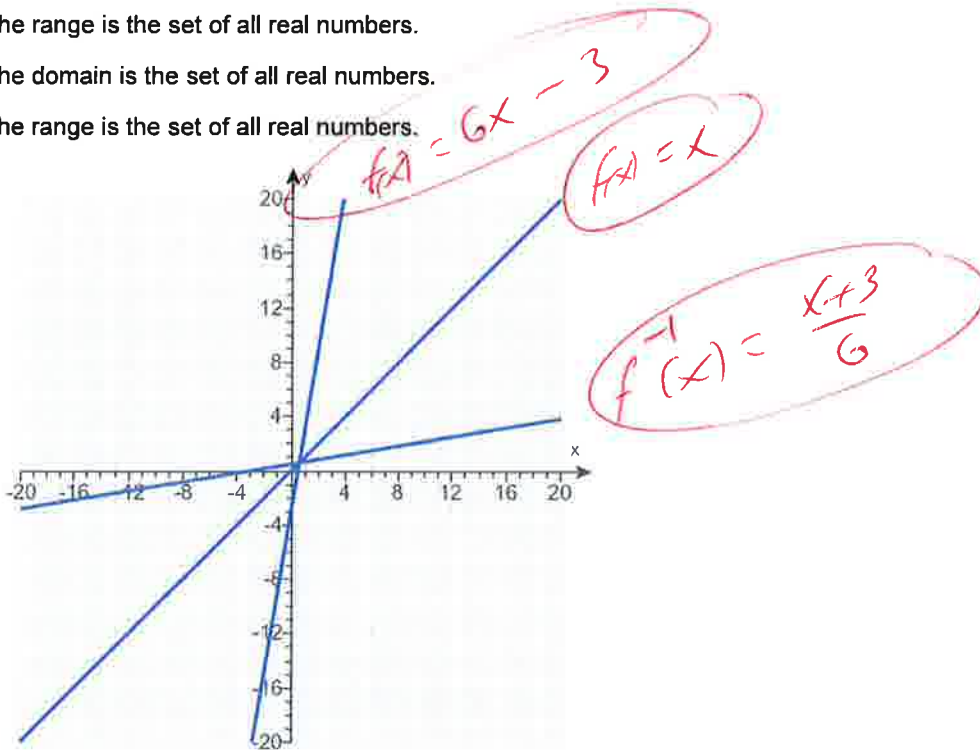
Answers $\frac{x+3}{6}$

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.



ID: 4.2.53

40. Solve the equation.

$$64^{-x+52} = 128^x$$

The solution set is .

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

Answer: 24

ID: 4.3.73

$$64^{-x+52} = 128^x$$

$$(2^6)^{-x+52} = (2^7)^x \quad \text{rewrite}$$

$$2^{-6x+312} = 2^{7x} \quad \text{Match powers}$$

$$-6x + 312 = 7x$$

$$-6x + 312 - 312 = 7x - 312$$

$$-6x = 7x - 312$$

$$-6x - 7x = 7x - 312 - 7x$$

$$-13x = -312$$

$$\frac{-13x}{-13} = \frac{-312}{-13}$$

$$x = 24$$

41. Solve the equation.

$$\log_2(2x + 1) = 3$$

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 $2x + 1 = 2^3$

$$\frac{7}{2}$$

$$\begin{aligned} \log_2(2x+1) &= 3 \\ 2^3 &= 2x+1 \text{ rewrite} \\ 2 \cdot 2 \cdot 2 &= 2x+1 \\ 8 &= 2x+1 \\ 8-1 &= 2x+1-1 \\ 7 &= 2x \\ \frac{7}{2} &= \frac{2x}{2} \\ \frac{7}{2} &= x \end{aligned}$$

ID: 4.4.91-Setup & Solve

42. Solve the following logarithmic equation.

$$\log_5 x = 3$$

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

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

Answer: A. The solution set is .

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

ID: 4.6.5

$$\begin{aligned} \log_5(x) &= 3 \\ 5^3 &= x \text{ rewrite} \\ 5 \cdot 5 \cdot 5 &= x \\ 125 &= x \end{aligned}$$

43. Solve the following logarithmic equation.

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

$\log_2(5x) = 4$
 $2^4 = 5x$ rewrite

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

$2 \cdot 2 \cdot 2 \cdot 2 = 5x$

- 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.

$16 = 5x$
 $\frac{16}{5} = \frac{5x}{5}$

Answer: A. The solution set is $\left\{ \frac{16}{5} \right\}$.

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

$\frac{16}{5} = x$

ID: 4.6.7

44. Solve the following logarithmic equation.

$$\log_6(x+6) = \log_6 7$$

$\log_6(x+6) = \log_6(7)$
 $x+6 = 7$ rewrite

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

$x+6-6 = 7-6$

- 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.

$x = 1$

Answer: A. The solution set is $\{ 1 \}$.

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

ID: 4.6.9

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

\$400 invested at 5% compounded quarterly after a period of 4 years

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

Formula
 $A = P \left(1 + \frac{r}{n} \right)^{nt}$

$P = 400$
 $r = 5\%$
 $= 0.05$
 $n = 4$
 $t = 4$

Answer: 487.96

$A = 400 \left(1 + \frac{0.05}{4} \right)^{(4)(4)}$

$A = 400 \left(1 + \frac{0.05}{4} \right)^{16}$

$A = 400 \left(1 + \frac{0.05}{4} \right)^{16}$

$A = 487.9558191$

Use graphing calculator

OR
 $A = 487.96$ Round

ID: 4.7.7

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

\$400 invested at 5% compounded daily after a period of 4 years

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

Answer: 488.55

ID: 4.7.11

Formula

$$A = P(1 + \frac{r}{n})^{nt}$$

$$360(4)$$

$$A = 400(1 + \frac{0.05}{360})^{1440}$$

$$A = 400(1 + 0.05/360)^{1440}$$

$$A = 488.5543184$$

$$A = 488.55$$

Round

$P = 400$
 $r = 5\% = 0.05$
 $n = 360$
 $t = 4$

47. How many years will it take for an initial investment of \$10,000 to grow to \$35,000? Assume a rate of interest of 19% compounded continuously.

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

Answer: 6.59

ID: 4.7.41

Formula

$$h(3.5) = h(e^{0.19t})$$

$$h(3.5) = 0.19t \ln(e)$$

$$h(3.5) = 0.19(6.11)$$

$$h(3.5) = 0.19t$$

$$6.593489308 = t$$

$$6.59 = t$$

$$35000 = 10000e^{0.19t}$$

$$\frac{35000}{10000} = \frac{10000e^{0.19t}}{10000}$$

$$3.5 = e^{0.19t}$$

$P = 10000$
 $A = 35000$
 $r = 19\% = 0.19$

Round

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

$$\begin{cases} 4x - 3y = -1 \\ 5x + y = 13 \end{cases} \begin{pmatrix} 1 \\ 3 \end{pmatrix}$$

$$\text{mult } 4x - 3y = -1$$

$$15x + 3y = 39$$

$$19x = 38$$

$$\frac{19x}{19} = \frac{38}{19}$$

$$x = 2$$

Subst

$$4x - 3y = -1$$

$$4(2) - 3y = -1$$

$$8 - 3y = -1$$

$$8 - 3y - 8 = -1 - 8$$

$$-3y = -9$$

$$\frac{-3y}{-3} = \frac{-9}{-3}$$

$$y = 3$$

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 $\{(x,y) | x =$, 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 $x =$ and $y =$. (Type an integers or simplified fractions.)

ID: 6.1.33

$$(x, y) = (2, 3)$$

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

$$\begin{cases} x - 3y + 4z = 24 \\ 2x + y + z = 6 \\ -2x + 3y - 3z = -22 \end{cases}$$

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

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

Answer: A.

The solution is $x =$, $y =$, and $z =$. (Type integers or simplified fractions.)

use graphing calculator

ID: 6.1.45

2nd, Matrix, Edit, [A], 3x4, enter

$$[A] = \begin{bmatrix} 1 & -3 & 4 & 24 \\ 2 & 1 & 1 & 6 \\ -2 & 3 & -3 & -22 \end{bmatrix}$$

2nd, Matrix, math, ↓, rref([A])

$$\text{rref}([A]) = \begin{bmatrix} 1 & 0 & 0 & 2 \\ 0 & 1 & 0 & -2 \\ 0 & 0 & 1 & 4 \end{bmatrix}$$

$$(x, y, z) = (2, -2, 4)$$

exponential
growth

