Student: _____ Instructor: Alfredo Alvarez
Date: _____ Course: math1314newcoreq2019 Assignment: finalm1314COC059sullllljj

1. Solve the quadratic equation by completing the square.

$x^2 + 2x = 48$

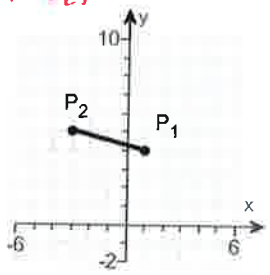
The solution set is { _____ }.
(Simplify your answer, including any radicals and i as needed. Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed.)

Answer: 6, − 8

ID: PF.5.15

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

$P_1 = (1,4)$
$P_2 = (-3,5)$



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

Answer: $\sqrt{17}$

ID: F.1.21

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

$P_1 = (5, -6)$; $P_2 = (7, 6)$

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

Answer: (6,0)

ID: F.1.39

4. Solve the equation by factoring.

$z^2 + 2z - 3 = 0$

What is the solution set?

{ } (Use a comma to separate answers as needed.)

Answer: −3, 1

ID: F.2.2

$z^2+2z-3=0$

$(z-1)(z+3)=0$

$z-1=0$ OR $z+3=0$

$z-1+1=0+1$ OR $z+3-3=0-3$

$z=1$ OR $z=-3$

Using Quadratic formula

$1z^2+2z-3=0$

$a=1,\ b=2,\ c=-3$

$z=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$

$z=\frac{-(2)\pm\sqrt{(2)^2-4(1)(-3)}}{2(1)}$

$z=\frac{-2\pm\sqrt{4+12}}{2}$

$z=\frac{-2\pm\sqrt{16}}{2}$

$z=\frac{-2\pm4}{2}$

$z=-1\pm2$

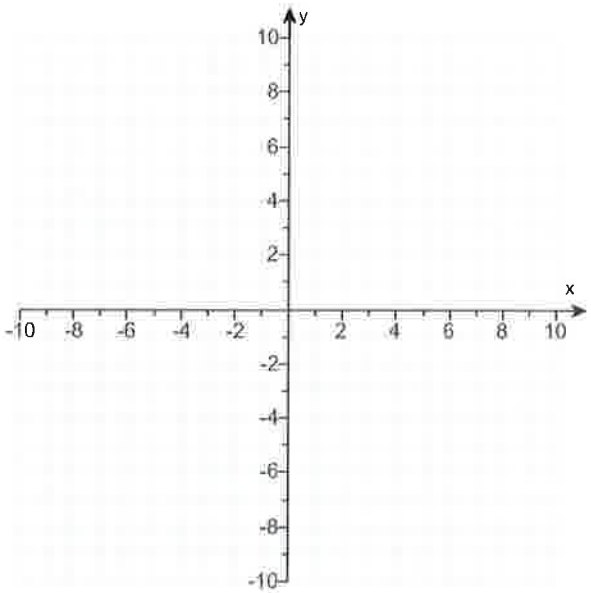
$z=-1+2$ OR $z=-1-2$

$z=1$ OR $z=-3$

5.

For the equation $x^2 + y^2 - 8x - 6y - 11 = 0$, do the following.

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



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

The radius is r = ____.

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

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

- ○ **A.** The intercept(s) is/are ____.
  (Type an ordered pair. Use a comma to separate answers as needed. Type exact answers for each coordinate, using radicals as needed.)
- ○ **B.** There is no intercept.

$x^2+y^2-8x-6y-11=0$

$x^2-8x+y^2-6y=11$ rewrite

$x^2-8x+\left(\frac{1}{2}(-8)\right)^2+y^2-6y+\left(\frac{1}{2}(-6)\right)^2=11+\left(\frac{1}{2}(-8)\right)^2+\left(\frac{1}{2}(-6)\right)^2$

$x^2-8x+(-4)^2+y^2-6y+(-3)^2=11+(-4)^2+(-3)^2$

$x^2-8x+16+y^2-6y+9=11+16+9$

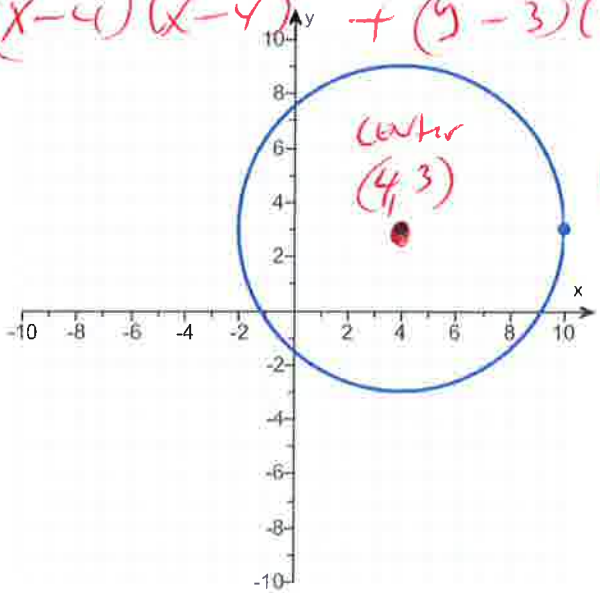
$(x-4)(x-4)+(y-3)(y-3)=36$

$(x-4)^2+(y-3)^2=36$

center $=(4,3)$

Radius $=\sqrt{36}=6$

Answers (4,3)
6



A. The intercept(s) is/are $(4-3\sqrt{3},0),(4+3\sqrt{3},0),(0,3-2\sqrt{5}),(0,3+2\sqrt{5})$.
(Type an ordered pair. Use a comma to separate answers as needed. Type exact answers for each coordinate, using radicals as needed.)

ID: F.4.27

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

(a) f(0) **(b)** f(2) **(c)** f(−2) **(d)** f(−x)
(e) −f(x) **(f)** f(x + 3) **(g)** f(3x) **(h)** f(x + h)

(a) f(0) = _____ (Simplify your answer.)

(b) f(2) = _____ (Simplify your answer.)

(c) f(−2) = _____ (Simplify your answer.)

(d) f(−x) = _____ (Simplify your answer.)

(e) −f(x) = _____ (Simplify your answer.)

(f) f(x + 3) = _____ (Simplify your answer.)

(g) f(3x) = _____ (Simplify your answer.)

(h) f(x + h) = _____ (Simplify your answer.)

Answers −2

14

6

$3x^2 - 2x - 2$

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

$3x^2 + 20x + 31$

$27x^2 + 6x - 2$

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

ID: 1.1.43

7. Find the domain of the function.

$f(x) = \sqrt{3x - 24}$

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

Answer: [8,∞)

ID: 1.1.59

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

$f(x) = 5x + 6;\ g(x) = 2x - 9$

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

(f) Find (f − g)(3).

(f − g)(3) = ____ (Type an integer or a simplified fraction.)

(g) Find (f • g)(4).

(f • g)(4) = ____ (Type an integer or a simplified fraction.)

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

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

Answers 7x − 3

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

3x + 15

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

$10x^2 - 33x - 54$

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

$\frac{5x+6}{2x-9}$

A. The domain is $\left\{x \middle| x \neq \frac{9}{2}\right\}$.

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

11

24

− 26

$-\frac{11}{7}$

ID: 1.1.67

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

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

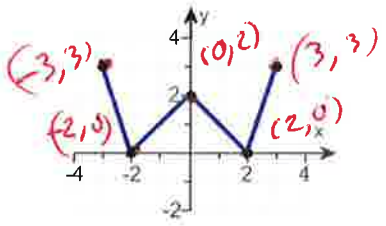
$\frac{f(x+h)-f(x)}{h}$ = ____

Answer: 2x + h − 6

ID: 1.1.83

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

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



(a) What are the intercepts?

(-2,0) (2,0) (0,2)

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

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

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

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

- A. The graph is increasing on [-2,0] [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 _____.
  (Type your answer in interval notation. Use a comma to separate answers as needed.)
- B. The graph is not decreasing on any interval.

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

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

(d) The function is (1) _____

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

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

$[-3,3]$

$[0,3]$

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

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

B. The graph is not constant on any interval.

(1) even.

ID: 1.3.25

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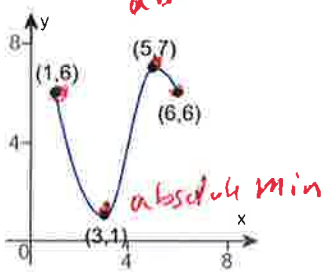
11. For the graph of a function y = f(x) shown to the right, find the absolute maximum and the absolute minimum, if they exist. Identify any local maxima or local minima.

absolute max



absolute min

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

- A. The absolute maximum of y = f(x) is f(5) = 7 . OR (5, 7)
  (Type integers or simplified fractions.)
- B. There is no absolute maximum for y = f(x).

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

- A. The absolute minimum of y = f(x) is f(3) = 1 . OR (3, 1)
  (Type integers or simplified fractions.)
- B. There is no absolute minimum for y = f(x).

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

- A. The local maximum of y = f(x) is f(5) = 7 . OR (5, 7)
  (Type integers or simplified fractions.)
- B. The local maxima of y = f(x) are f( ) = and
  f( ) = .
  (Use ascending order with respect to x. Type integers or simplified fractions.)
- C. There is no local maximum for y = f(x).

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

- A. The local minimum of y = f(x) is f(3) = 1 . OR (3, 1)
  (Type integers or simplified fractions.)
- B. The local minima of y = f(x) are f( ) = and
  f( ) = .
  (Use ascending order with respect to x. Type integers or simplified fractions.)
- C. There is no local minimum for y = f(x).

Answers A. The absolute maximum of y = f(x) is f(5) = 7 .
(Type integers or simplified fractions.)

A. The absolute minimum of y = f(x) is f(3) = 1 .
(Type integers or simplified fractions.)

A. The local maximum of y = f(x) is f(5) = 7 .
(Type integers or simplified fractions.)

A. The local minimum of y = f(x) is f(3) = 1 .
(Type integers or simplified fractions.)

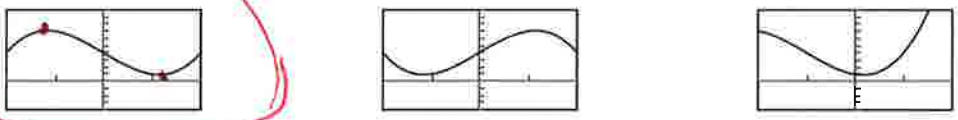
ID: 1.3.51

12. (a) Use a graphing utility to graph $f(x) = x^3 - 4x + 4$ on the interval $[-2,2]$ and approximate any local maxima and local minima.

(b) Determine where f is increasing and where it is decreasing.

(a) Using a graphing utility, graph the function for $-2 \le x \le 2$ and $-4 \le y \le 10$. Choose the correct graph, below.

◉ A. ○ B. ○ C.



The local maximum is y ≈ 7.08 and it occurs at x ≈ −1.15. OR (−1.15, 7.08)
(Round to two decimal places.)

The local minimum is y ≈ 0.92 and it occurs at x ≈ 1.15. OR (1.15, 0.92)
(Round to two decimal places.)

(b) Where is the graph of f increasing?

- ○ [0.92,7.08]
- ○ [−2, −1.15] and [0.92,7.08]
- ○ [−1.15,1.15]
- ◉ [−2, −1.15] and [1.15,2]

(Choose the answer that most completely answers the question.)

use graphing calculator

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

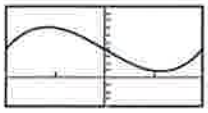
Window
x-min = −2
x-max = 2
y-min = −4
y-max = 10

Where is the graph of f decreasing?

- ○ [−2,0.92] and [2,7.08]
- ◉ [−1.15,1.15]
- ○ [−2, −1.15] and [1.15,2]
- ○ [0.92,7.08]

(Choose the answer that most completely answers the question.)

Answers

A. 

7.08

−1.15

0.92

1.15

[−2, −1.15] and [1.15,2]

[−1.15,1.15]

ID: 1.3.57-GC

13. The function f is defined as follows.

$$f(x) = \begin{cases} 3 + 3x & \text{if } x < 0 \\ x^2 & \text{if } x \geq 0 \end{cases}$$

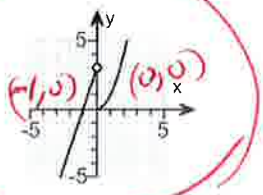
(a) Find the domain of the function.
(b) Locate any intercepts.
(c) Graph the function.
(d) Based on the graph, find the range.

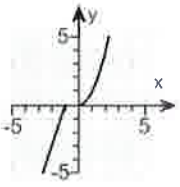
(a) The domain of the function f is $(-\infty, \infty)$
(Type your answer in interval notation.)

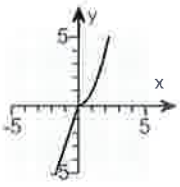
(b) Locate any intercepts. Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

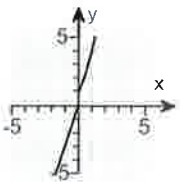
- A. The intercept(s) is/are $(-1, 0)$ $(0, 0)$
  (Type an ordered pair. Use a comma to separate answers as needed.)
- B. There are no intercepts.

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

A. 

B. 

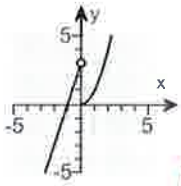
C. 

D. 

(d) The range of the function f is $(-\infty, \infty)$
(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.)



A.

$(-\infty, \infty)$

ID: 1.4.37

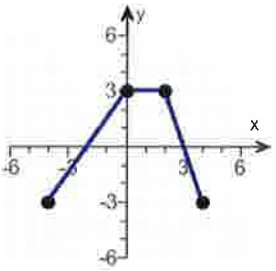
use graphing calculator

Windows
X-Min = -12
X-Max = 12
Y-Min = -10
Y-Max = 10

2ND Math OPEN Circle
$Y_1 = 3 + 3X \div 0 \ (X < 0)$

2ND Math OPEN Circle
$Y_2 = X^2 \div 0 \ (X \geq 0)$

14. 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.



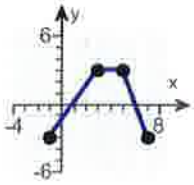
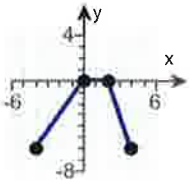
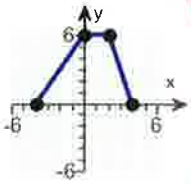
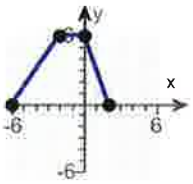
(a) $F(x) = f(x) + 3$ (b) $G(x) = f(x + 3)$ (c) $P(x) = -f(x)$

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

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

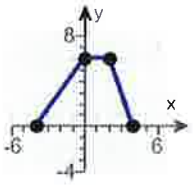
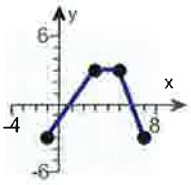
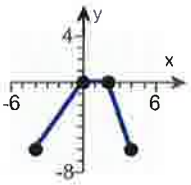
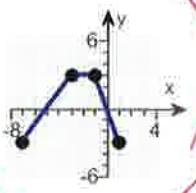
(a) Choose the correct graph of $F(x) = f(x) + 3$ below.

○ A. ○ B. ● C. ○ D.

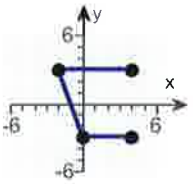
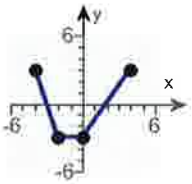
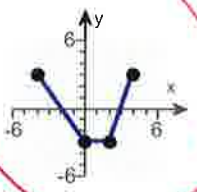
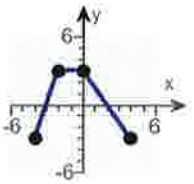
(b) Choose the correct graph of $G(x) = f(x + 3)$ below.

○ A. ○ B. ○ C. ● D.

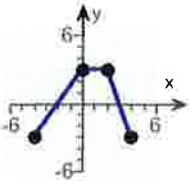
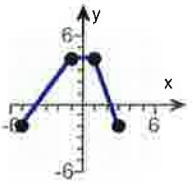
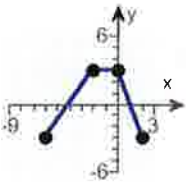
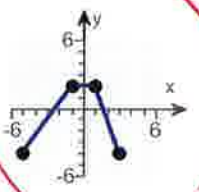
(c) Choose the correct graph of $P(x) = -f(x)$ below.

○ A. ○ B. ● C. ○ D.

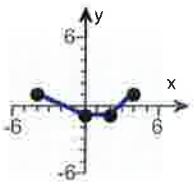
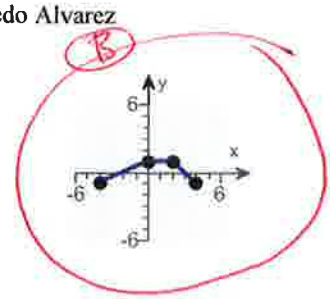
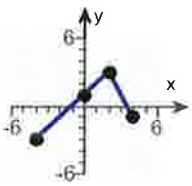
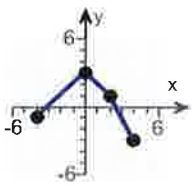
(d) Choose the correct graph of $H(x) = f(x + 1) - 1$ below.

○ A. ○ B. ○ C. ● D.

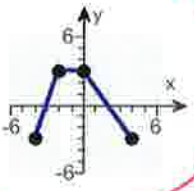
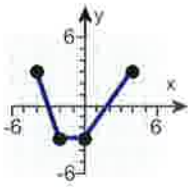
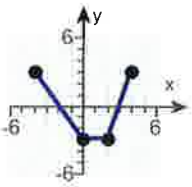
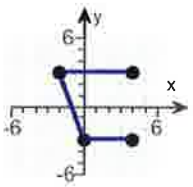





(e) Choose the correct graph of $Q(x) = \frac{1}{3}f(x)$ below.

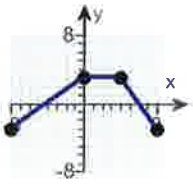
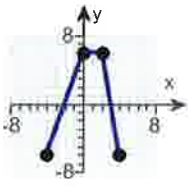
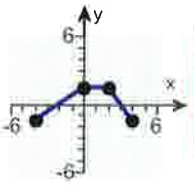
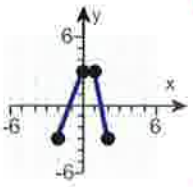
○ A. ● B. ○ C. ○ D.

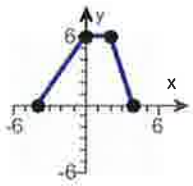
(f) Choose the correct graph of $g(x) = f(-x)$ below.

A.

B.

C.

D.


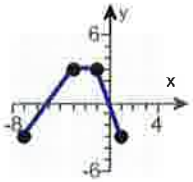
(g) Choose the correct graph of $h(x) = f(2x)$ below.

A.

B.

C.

D.


Answers



C.



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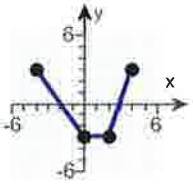
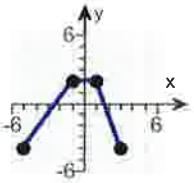


C.



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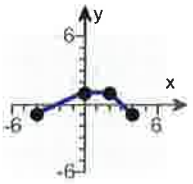
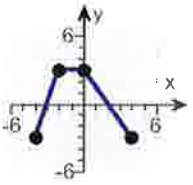
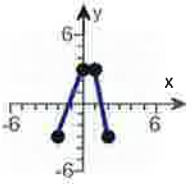


B.



A.

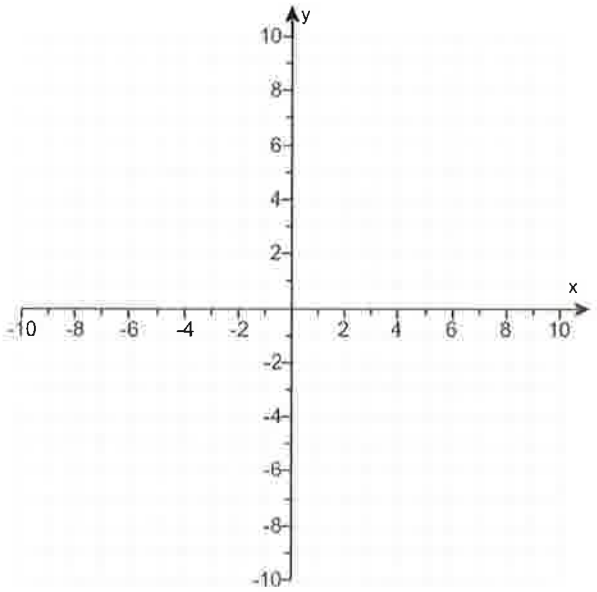


D.

ID: 1.5.63

15.

(a) Graph $f(x) = |x - 6| - 4$ using transformations.
(b) Find the area of the region bounded by f and the x-axis that lies below the x-axis.

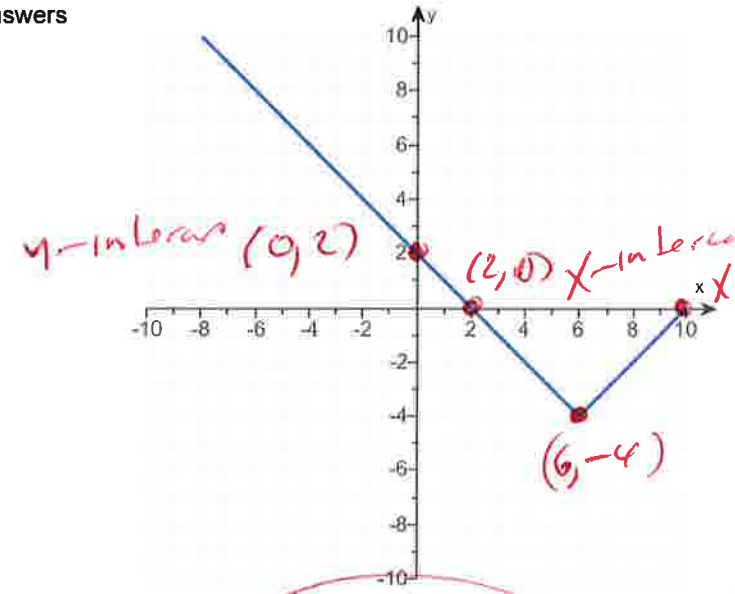


(a) Graph f(x).

(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



x	f(x)
0	2
2	0
6	-4
10	0

16

ID: 1.5.81

use graphing calculator

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

Y_1 = Math, Num, abs

$Y_1 = abs(X - 6) - 4$

BIG BIG

Shift Right 6

Shift down 4

$m = \frac{y_1 - y_2}{x_1 - x_2}$ $(4,5)$ and $(6,2)$ $x_1\ y_1$ $x_2\ y_2$

16. Find the slope of the line joining the points (4,5) and (6,2).

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

- ○ **A.** The slope is _____. (Simplify your answer.)
- ○ **B.** The slope is undefined.

$m = \frac{(5)-(2)}{(4)-(6)}$

$m = \frac{5-2}{4-6}$

Answer: A. The slope is $-\frac{3}{2}$. (Simplify your answer.)

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

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

ID: 2.1.2

17. Solve the following equation.

$60x - 900 = -25x + 4200$

The solution set is { }. (Simplify your answer.)

Answer: 60

ID: 2.1.4

$60x - 900 + 900 = -25x + 4200 + 900$

$60x = -25x + 5100$

$60x + 25x = -25x + 5100 + 25x$

$85x = 5100$

$\frac{85x}{85} = \frac{5100}{85}$

$x = 60$

18. If $f(x) = x^2 - 3$, find $f(-3)$.

$f(-3) =$ _____

Answer: 6

ID: 2.1.5

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

$f(-3) = (-3)^2 - 3$

$f(-3) = (-3)(-3) - 3$

$f(-3) = 9 - 3$

$f(-3) = 6$

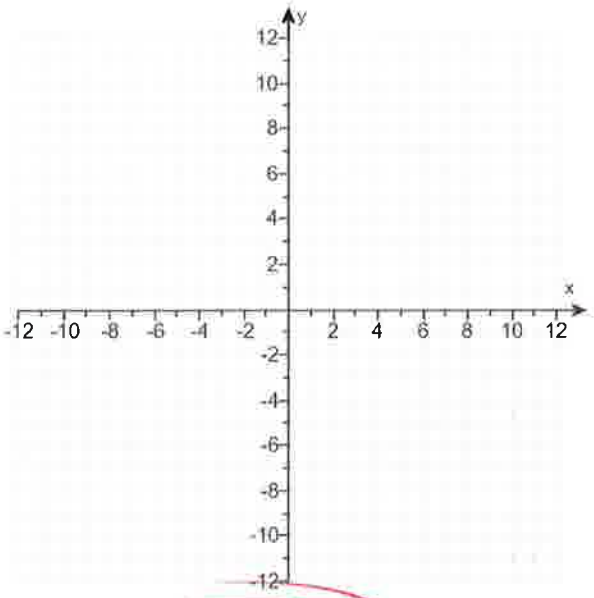
19.

(a) Find the zero of the linear function and (b) graph the function using the zero and y-intercept.

$g(x) = 2x - 6$

(a) The zero is ____.
(Type a whole number.)

(b) Use the graphing tool to graph the linear equation. Use the intercepts when drawing the line.



Answers 3

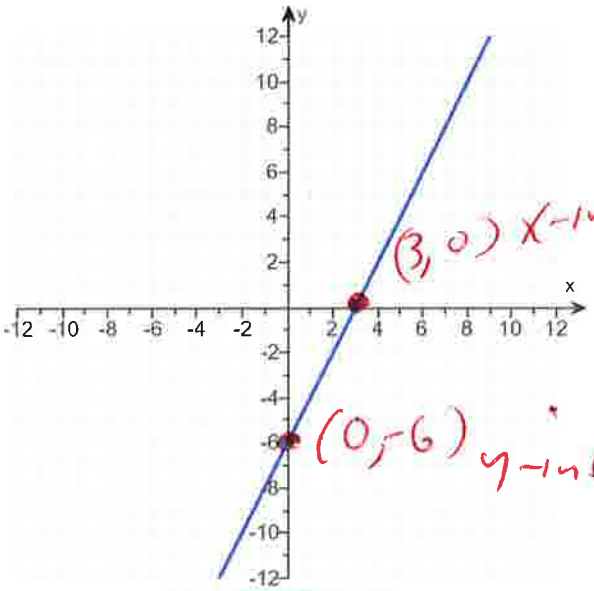
$g(x) = 2x - 6$

$g(0) = 2(0) - 6$

$g(0) = 0 - 6$

$g(0) = -6$

x	g(x)
0	-6
3	0



$g(3) = 2(3) - 6$

$g(3) = 6 - 6$

$g(3) = 0$

use graphing calculator

BIG

$y_1 = 2x - 6$

windows

$x\text{-min} = -12$

$x\text{-max} = 12$

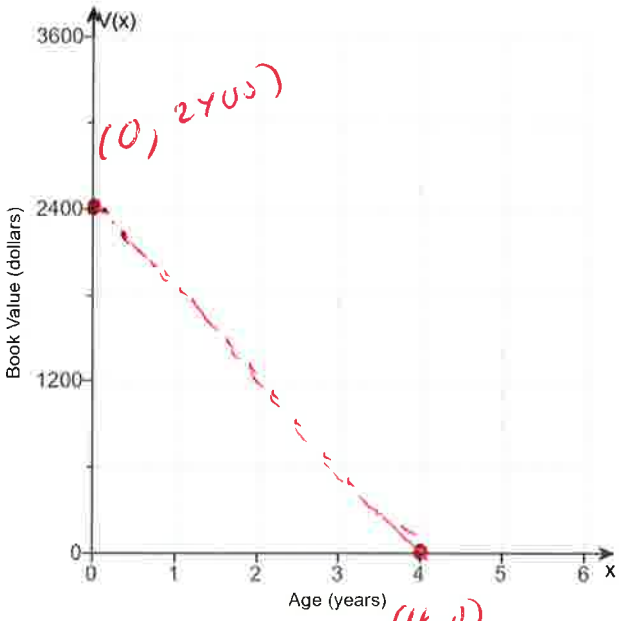
$y\text{-min} = -10$

$y\text{-max} = 10$

ID: 2.1.21

20.

Suppose that a company has just purchased a new computer for $2400. The company chooses to depreciate using the straight-line method for 4 years.



(a) Write a linear function that expresses the book value of the computer as a function of its age.

V(x) = ____

(Type your answer in slope-intercept form.)

(b) What is the implied domain of the function found in part **(a)**?

____

(Type your answer in interval notation.)

(c) Use the graphing tool to graph the linear equation.

(d) What is the book value of the computer after 3 years?

$ ____

(Round to the nearest dollar as needed.)

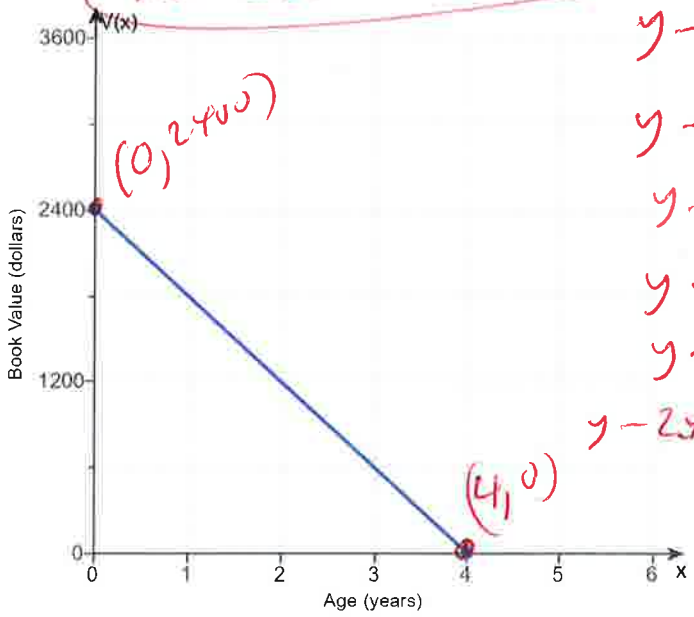
(e) When will the computer be worth $1200?

After ____ year(s) the computer will be worth $1200.

(Type a whole number.)

Answers $-600x + 2400$

[0,4]



600

2

ID: 2.1.51

Russell 6.1 2.3

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

$x^2 + 5x + 6$

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

- A. $x^2 + 5x + 6 =$ _____
- B. The polynomial is prime.

Answer: A. $x^2 + 5x + 6 =$ **(x + 2)(x + 3)**

$x^2+5x+6 = (x+2)(x+3)$

Check $(x+2)(x+3) = x^2+3x+2x+6 = x^2+5x+6$ Good

ID: 2.3.1

22. Solve the equation.

$(x - 6)(2x + 9) = 0$

$x-6=0$ OR $2x+9=0$

$x-6+6=0+6$ OR $2x+9-9=0-9$

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

$x=6$ or $2x=-9$

$\frac{2x}{2} = \frac{-9}{2}$

$x = -\frac{9}{2}$

Answer: $6, -\frac{9}{2}$

ID: 2.3.3

23. Is -6 a zero of the given function $f(x) = x^2 + 8x + 12$?

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

- A. -6 is a zero of the given function f(x) because $f(-6) =$ _____.
- B. -6 is not a zero of the given function f(x) because $f(-6) =$ _____.

Answer: A. -6 is a zero of the given function f(x) because $f(-6) =$ **0**.

ID: 2.3.6

is -6 a zero of the function

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

$f(-6) = (-6)^2 + 8(-6) + 12$

$f(-6) = (-6)(-6) + 8(-6) + 12$

$f(-6) = 36 - 48 + 12$

$f(-6) = 0$

Yes -1 is a zero of $f(x)$

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

$f(x) = x^2 - 15x$

$x^2 - 15x = 0$

$x(x-15) = 0$

$x = 0$ OR $x - 15 = 0$

OR $x - 15 + 15 = 0 + 15$

$x = 15$

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

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

Answer: B. The zeros and the x-intercepts are the same. They are **0,15**.

ID: 2.3.13

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

Possible: 12, 1, 6, 2, 3, 4

$F(x) = x^2 + x - 12$

$x^2 + x - 12 = 0$

$(x-3)(x+4) = 0$

$x - 3 = 0$ OR $x + 4 = 0$

$x - 3 + 3 = 0 + 3$ OR $x + 4 - 4 = 0 - 4$

$x = 3$ OR $x = -4$

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 **−4,3**.

ID: 2.3.17

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

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

$2x^2 - x - 1 = 0$

$(2x+1)(x-1) = 0$

$2x + 1 = 0$ OR $x - 1 = 0$

$2x + 1 - 1 = 0 - 1$ OR $x - 1 + 1 = 0 + 1$

OR $x = 1$

$2x = -1$

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

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

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

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

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

ID: 2.3.19

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

$g(x) = x(x + 12) + 32$

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 _____
- 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 **−4, −8**.

ID: 2.3.23

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

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

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

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

Answer: A. The zeros and the x-intercepts are the same. They are **6, −2**.

ID: 2.3.29

29. 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?

$f(x) = x^2 + 10x + 22$

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 **−5 + √3, −5 − √3**.

ID: 2.3.39

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

30. 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?

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

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

$a = 8,\ b = 12,\ c = 1$

$x = \frac{-(12) \pm \sqrt{(12)^2 - 4(8)(1)}}{2(8)} = \frac{-12 \pm \sqrt{144 - 32}}{16}$

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.)

$= \frac{-12 \pm \sqrt{112}}{16}$

- 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.

$= \frac{-12 \pm \sqrt{16 \cdot 7}}{16}$

$= \frac{-12 \pm \sqrt{16}\sqrt{7}}{16}$

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

$= \frac{-12 \pm 4\sqrt{7}}{16}$

$\frac{-3 \pm \sqrt{7}}{4}$

$x = \frac{-3+\sqrt{7}}{4}$ OR $x = \frac{-3-\sqrt{7}}{4}$ $= \frac{4(-3 \pm 1\sqrt{7})}{4(4)}$

ID: 2.3.47

31. Find the real zeros of the quadratic function using any method you wish. What are the x-intercepts, if any, of the graph of the function?

$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a} = \frac{-(-11) \pm \sqrt{(-11)^2 - 4(10)(-6)}}{2(10)}$

$G(x) = 10x^2 - 11x - 6$

$a = 10,\ b = -11,\ c = -6$

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

$= \frac{11 \pm \sqrt{121 + 240}}{20}$

- 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 _____.

$= \frac{11 \pm \sqrt{361}}{20}$

$= \frac{11 \pm 19}{20}$

(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 $-\frac{2}{5}, \frac{3}{2}$

ID: 2.3.81

$x = \frac{11+19}{20}$ OR $x = \frac{11-19}{20}$

$x = \frac{30}{20}$ OR $x = \frac{-8}{20}$

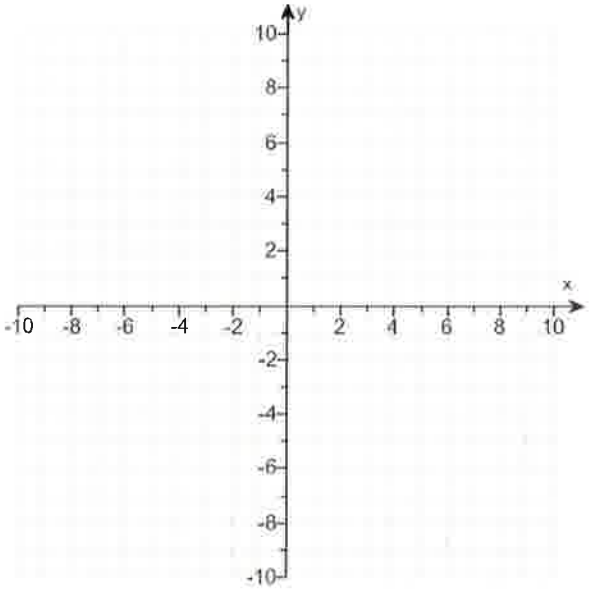
$x = \frac{10(3)}{10(2)}$ OR $x = \frac{4(-2)}{4(5)}$

$x = \frac{3}{2}$ OR $x = -\frac{2}{5}$

32.

a. Graph the following function using transformations.
b. Find the real zeros of the function.
c. Determine the x-intercepts on the graph of the function.

$g(x) = (x + 5)^2 - 9$



a. Graph the function using transformations.

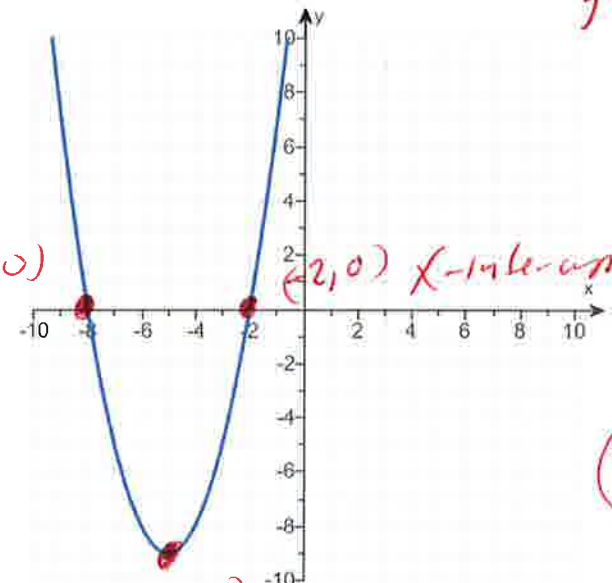
b. What are the zeros of the function?

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

c. What are the x-intercepts?

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

Answers



$g(x) = (x+5)^2 - 9$

x	g(x)
−8	0
−5	−9
−2	0

x-intercept (−8, 0) (−2, 0) x-intercept

Use Graphing Calculator

−2, −8

−2, −8

(−5, −9) vertex min

$y_1 = (x+5)^2 - 9$

shift left −5 shift down −9

ID: 2.3.89

Window

X-min = −12
X-max = 12
y-min = −10
y-max = 15

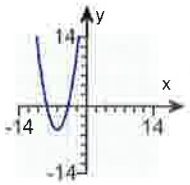
Or

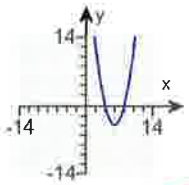
$y_1 = (x+5)^2 - 9$

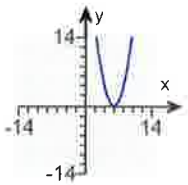
33. Match the graph with the following function.

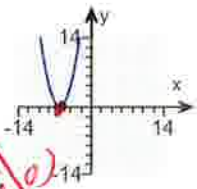
$f(x) = x^2 + 12x + 36$

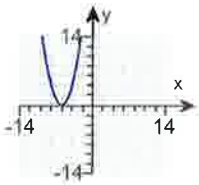
Choose the correct graph below.

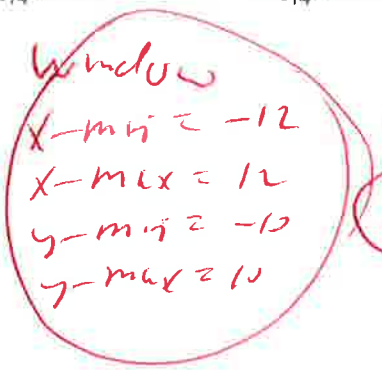
A. 

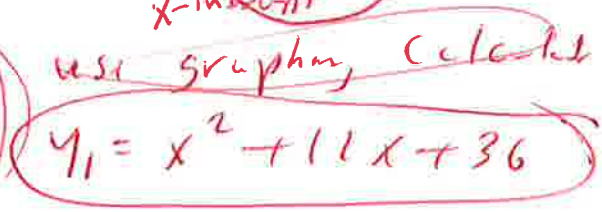
B. 

C. 

D. 

Answer: D. 

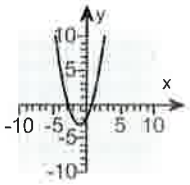


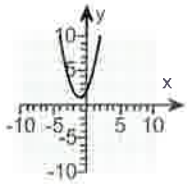


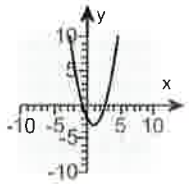
ID: 2.4.15

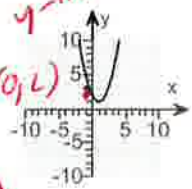
34. Match the function $f(x) = x^2 - 2x + 2$ to one of the given graphs.

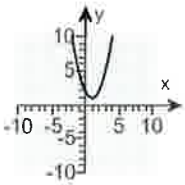
Choose the correct graph below.

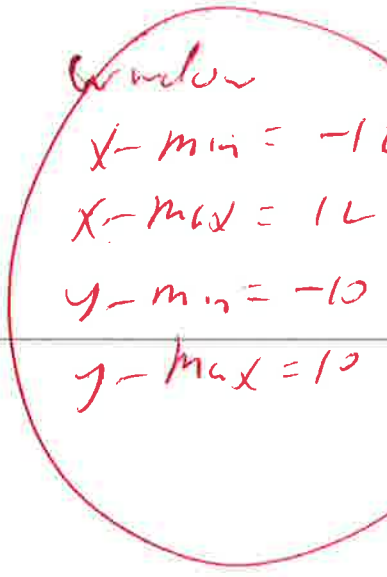
A. 

B. 

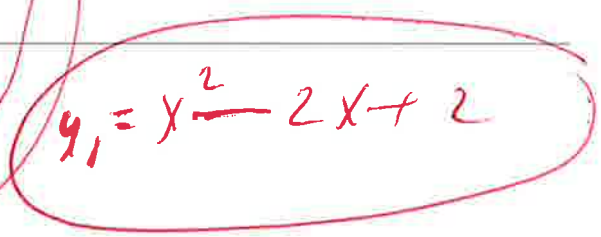
C. 

D. 

Answer: D. 



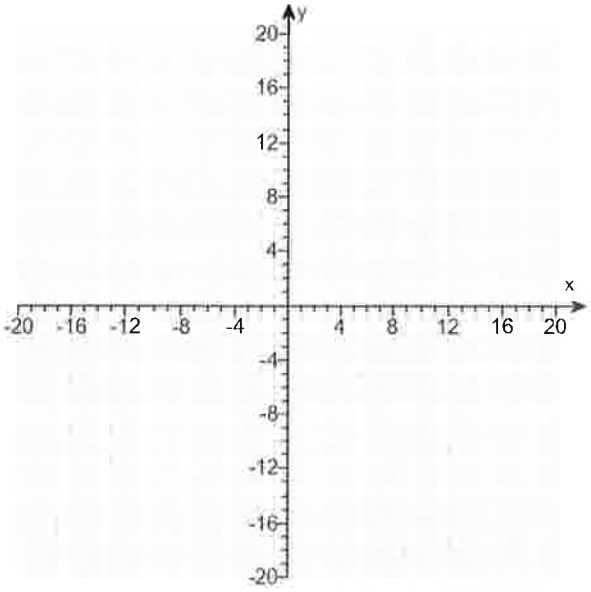
use graphing Calculator



ID: 2.4.17

35.

Graph the function $f(x) = -x^2 - 6x$ by starting with the graph of $y = x^2$ and using transformations (shifting, stretching/compressing, and/or reflecting).

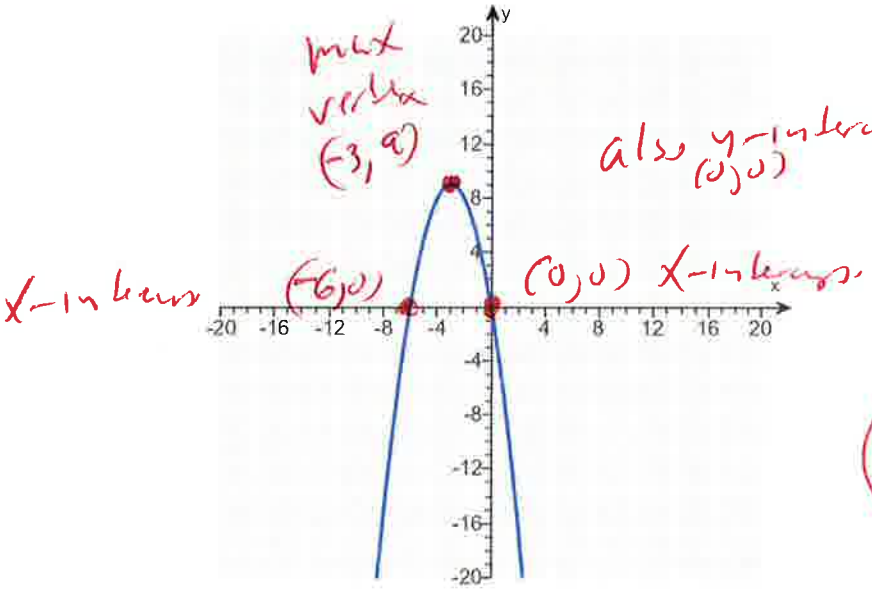


Select all the transformations needed to graph the given function using $y = x^2$.

- [x] **A.** Shift the graph to the left 3 units.
- [ ] **B.** Shift the graph down 9 units.
- [ ] **C.** Compress the graph vertically by a factor of 9.
- [x] **D.** Reflect the graph about the x-axis.
- [ ] **E.** Reflect the graph about the y-axis.
- [ ] **F.** Shift the graph to the right 3 units.
- [ ] **G.** Stretch the graph vertically by a factor of -3.
- [x] **H.** Shift the graph up 9 units.

Use the graphing tool to graph the function.

Answers A. Shift the graph to the left 3 units., D. Reflect the graph about the x-axis., H. Shift the graph up 9 units.



$y_1 = -x^2 - 6x$

x	f(x)
-6	0
-3	9
0	0

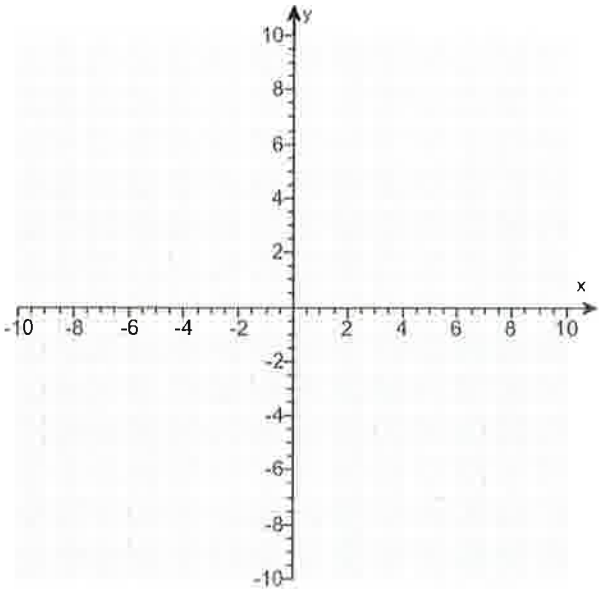
Use graphing Calculator

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

ID: 2.4.29-Setup & Solve

36.

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

$f(x) = -2x^2 + 2x - 1$
$a=-2,\ b=2,\ c=-1$

$\text{Vertex} = \left(-\frac{b}{2a}, f\left(\frac{b}{2a}\right)\right)$

$= \left(\frac{-(2)}{2(-2)}, f\frac{-(2)}{2(-2)}\right)$

$= \left(\frac{-2}{-4}, f\left(\frac{-2}{-4}\right)\right)$

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

$= \left(\frac{1}{2}, f\left(\frac{1}{2}\right)\right)$

$= \left(\frac{1}{2}, -2\left(\frac{1}{2}\right)^2 + 2\left(\frac{1}{2}\right) - 1\right)$

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

$= \left(\frac{1}{2}, -2\left(\frac{1}{4}\right) + \frac{2}{2} - 1\right)$

$= \left(\frac{1}{2}, -\frac{2}{4} + \frac{2}{2} - 1\right)$

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

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

(1) ○ up.
○ down.

Answers (1) down.

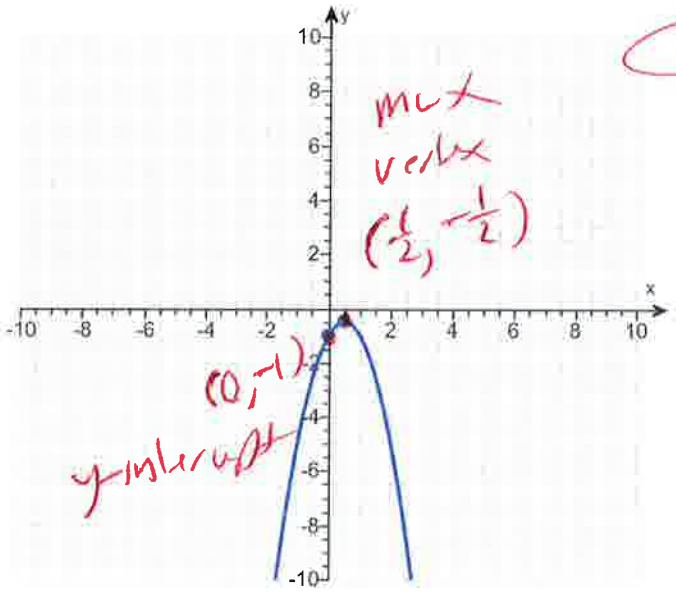
$\left(\frac{1}{2}, -\frac{1}{2}\right)$

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

A. The y-intercept is [−1].(Type an integer or a decimal.)

B. There is no x-intercept.

$f(x) = -2x^2 + 2x - 1$
$f(0) = -2(0)^2 + 2(0) - 1$
$f(0) = -2(0)(0) + 2(0) - 1$
$f(0) = -2(0) + 2(0) - 1$
$f(0) = 0 + 0 - 1$
$f(0) = -1$



$(-\infty, \infty)$

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

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

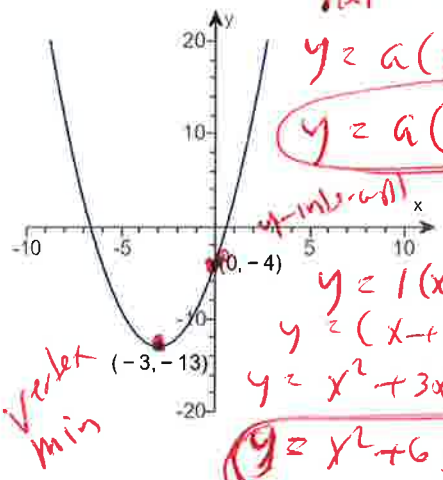
$\left[\frac{1}{2}, \infty\right)$

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

use graphing Calculator
LAH
$y_1 = -2x^2 + 2x$ BIG

ID: 2.4.43

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



Answer: $x^2 + 6x - 4$

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

ID: 2.4.49

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

$f(x) = -3x^2 + 30x - 1$

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

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

What is this minimum or maximum value?

____

(Simplify your answer.)

Answers The function f has a maximum value.

74

ID: 2.4.59

39. 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.

$f(x) = x^3 + 3x^2 - 13x - 15$

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.

$f(x) = 1x^3 + 3x^2 - 13x - 15$

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.)

Possible $\frac{\text{Last}}{\text{first}}$

Answers A. x = **−5, −1, 3**

use Synthetic divis...

(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.)

$(x + 1)(x + 5)(x - 3)$

ID: 3.2.45

$\frac{\pm 15}{\pm 1}$

$\pm 15, \pm 5, \pm 3, \pm 1$

$\frac{\pm 15, \pm 5, \pm 3, \pm 1}{\pm 1} =$

$\pm\frac{15}{1} \pm \frac{5}{1} \pm \frac{3}{1} \pm \frac{1}{1} =$

$\pm 15, \pm 5, \pm 3, \pm 1$

−1	1	3	−13	−15
		−1	−2	15
	1	2	−15	0

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

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

$x - 3 = 0$ OR $x + 5 = 0$

$x - 3 + 3 = 0 + 3$ OR $x + 5 - 5 = 0 - 5$

$x = 3$ OR $x = -5$

Answers

$-1, 3, -5$

40. 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 = **−5,1,2,−2**
(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

41. Solve the equation in the real number system.

$7x^4 - 120x^3 + 542x^2 - 768x + 99 = 0$

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

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

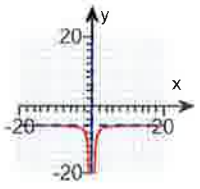
B. There are no real solutions.

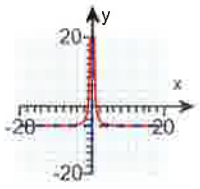
Answer: A. x = $\frac{1}{7}$, 3, 11
(Simplify your answer. Type an exact answer, using radicals as needed. Use integers or fractions for any numbers in the expression. Use a comma to separate answers as needed. Type each answer only once; do not duplicate answers in the case of repeated roots.)

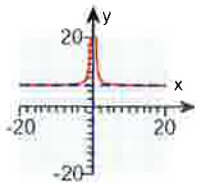
ID: 3.2.67

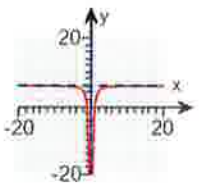
42. For the function $F(x) = \frac{6x^2 - 7}{x^2}$, (a) graph the rational function using transformations, (b) use the final graph to find the domain and range, and (c) use the final graph to list any vertical, horizontal, or oblique asymptotes.

(a) Choose the correct graph below.

○ A. 

○ B. 

○ C. 

○ D. 

(b) What is the domain of the given function? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

○ A. The domain of the given function is $\{x|x$ is a real number, $x \neq$ 0 $\}$.
(Type an integer or a simplified fraction. Use a comma to separate answers as needed.)

○ B. The domain of the given function is $\{x|x$ is a real number, $x <$ ____ $\}$.
(Type an integer or a simplified fraction.)

○ C. The domain of the given function is $\{x|x$ is a real number, $x >$ ____ $\}$.
(Type an integer or a simplified fraction.)

○ D. The domain of the given function is the set of all real numbers.

What is the range of the given function? Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

○ A. The range of the given function is $\{y|y$ is a real number, $y <$ 6 $\}$.
(Type an integer or a simplified fraction.)

○ B. The range of the given function is $\{y|y$ is a real number, $y \neq$ ____ $\}$.
(Type an integer or a simplified fraction. Use a comma to separate answers as needed.)

○ C. The range of the given function is $\{y|y$ is a real number, $y >$ ____ $\}$.
(Type an integer or a simplified fraction.)

○ D. The range of the given function is the set of all real numbers.

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

○ A. There is one vertical asymptote. It is $x = 0$.
(Type an equation. Use integers or fractions for any numbers in the equation.)

○ B. The left vertical asymptote is ____. The right vertical asymptote is ____.
(Type equations. Use integers or fractions for any numbers in the equations.)

○ C. There is no vertical asymptote.

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

○ A. There is one horizontal asymptote. It is ____.
(Type an equation. Use integers or fractions for any numbers in the equation.)

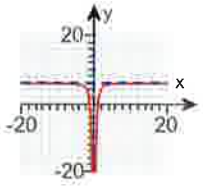
○ B. The top horizontal asymptote is ____. The bottom horizontal asymptote is ____.

○ C. There is no horizontal asymptote.

_____.
(Type equations. Use integers or fractions for any numbers in the equations.)

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

- **A.** The oblique asymptote with the positive slope is _____ and the oblique asymptote with the negative slope is _____.
  (Type equations. Use integers or fractions for any numbers in the equations.)
- **B.** There is one oblique asymptote. It is _____.
  (Type an equation. Use integers or fractions for any numbers in the equation.)
- **C.** There is no oblique asymptote.



Answers D.

A. The domain of the given function is $\{x|x$ is a real number, $x \neq$ **0** $\}$.
(Type an integer or a simplified fraction. Use a comma to separate answers as needed.)

A. The range of the given function is $\{y|y$ is a real number, $y <$ **6** $\}$.
(Type an integer or a simplified fraction.)

A. There is one vertical asymptote. It is **x = 0**.
(Type an equation. Use integers or fractions for any numbers in the equation.)

A. There is one horizontal asymptote. It is **y = 6**.
(Type an equation. Use integers or fractions for any numbers in the equation.)

C. There is no oblique asymptote.

ID: 3.4.43

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

$$R(x) = \frac{9x}{x+20}$$

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

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

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

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

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

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

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

A. The horizontal asymptote(s) is/are y = **9**.(Use a comma to separate answers as needed.)

B. There is no oblique asymptote.

ID: 3.4.45

R(x) = 9x / x+20

Let x+20=0

x+20−20=0−20

x=−20 Vertical asymptote

Horizontal asymptote 9x/x = 9

y=9

No oblique since Power are same

Top / bottom

44. Find the vertical, horizontal, and oblique asymptotes, if any, for the given rational function.

$$Q(x) = \frac{5x^2 - 2x - 3}{3x^2 - 2x - 1} = \frac{(5x+3)(x-1)}{(3x+1)(x-1)} = \frac{5x+3}{3x+1}$$

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. Use integers or fractions for any numbers in the expression.)
- **B.** There is no vertical asymptote.

Vertical asymptote

$3x+1=0$

$3x+1-1=0-1$

$3x=-1$

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

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

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. Use integers or fractions for any numbers in the expression.)
- **B.** There is no horizontal asymptote.

Vertical 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. Use integers or fractions for any numbers in the expression.)
- **B.** There is no oblique asymptote.

Horizontal asymptote

$\frac{5x}{3x} = \frac{5}{3}$

Answers A. The vertical asymptote(s) is/are x = $-\frac{1}{3}$.

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

A. The horizontal asymptote(s) is/are y = $\frac{5}{3}$.

$y = 5/3$

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

B. There is no oblique asymptote.

Horizontal asymptote

No oblique

Power same

Up stair

down Stairs

ID: 3.4.51

45. For $f(x) = 9x + 9$ and $g(x) = 7x$, find the following composite functions and state the domain of each.

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

$(f \circ g)(x) = f(g(x)) = f(7x) = 9(7x) + 9 = 63x + 9$ ✓

(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.

$(g \circ f)(x) = g(f(x)) = g(9x + 9) = 7(9x + 9) = 63x + 63$ ✓

(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.

$(f \circ f)(x) = f(f(x)) = f(9x + 9) = 9(9x + 9) + 9 = 81x + 81 + 9 = 81x + 90$ ✓

(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.

$(g \circ g)(x) = g(g(x)) = g(7x) = 7(7x) = 49x$ ✓

(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 63x + 9

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

63x + 63

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

81x + 90

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

49x

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

ID: 4.1.23

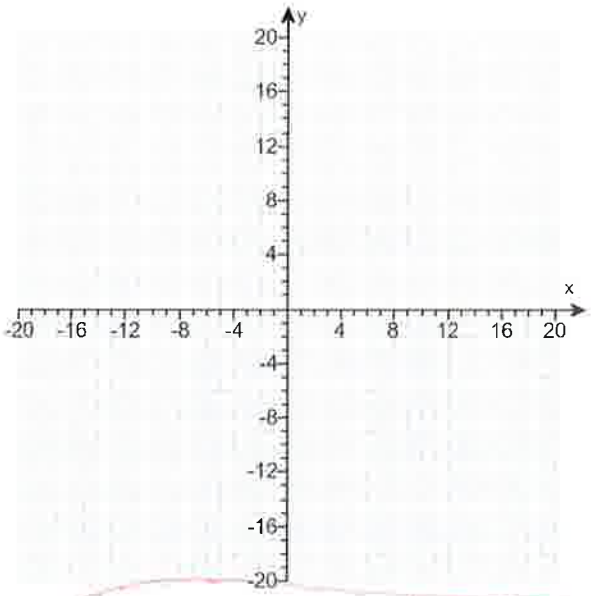
46.

The function $f(x) = 2x - 1$ is one-to-one.

(a) Find the inverse of f and check the answer.

(b) Find the domain and the range of f and f^{-1}.

(c) Graph f, f^{-1}, and $y = x$ on the same coordinate axes.



(a) $f^{-1}(x) =$ ☐

(Simplify your answer. Use integers or fractions for any numbers in the expression.)

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

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

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

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

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

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

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

- A. The range is $\{y|y \neq$ ☐ $\}$.
- B. The range is $\{y|y \leq$ ☐ $\}$.
- C. The range is $\{y|y \geq$ ☐ $\}$.
- 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.

$f(x) = 2x - 1$

$y = 2x - 1$ Set $y =$ inv var

$x = 2y - 1$

$x + 1 = 2y - 1 + 1$ Solve for y

$x + 1 = 2y$

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

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

$y = \frac{x+1}{2}$ inverse function

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

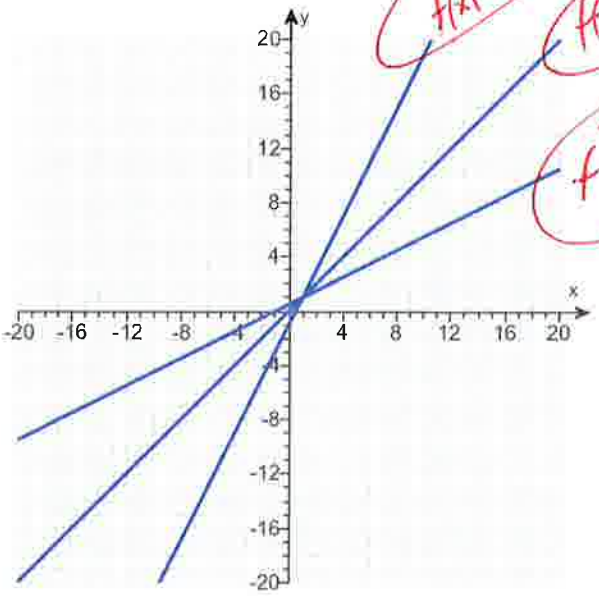
Answers $\frac{x+1}{2}$

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.



$f(x) = 2x - 1$

$f(x) = x$

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

ID: 4.2.53

47. Solve the equation.

$64^{-x+39} = 128^{x}$

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

Answer: 18

ID: 4.3.73

48. Find the domain of the function.

$g(x) = \ln(x-3)$

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

Answer: $(3,\infty)$

ID: 4.4.39

Set $x - 3 > 0$

$x - 3 + 3 > 0 + 3$

$x > 3$

$(3, \infty)$

formula domain

$f(x) = \ln(Ax+B)$

Set $Ax + B > 0$ only

49. Solve the equation.

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

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 $2x+3=2^3$

$\frac{5}{2}$

ID: 4.4.91-Setup & Solve

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

$2^3 = 2x+3$

$2\cdot 2\cdot 2 = 2x+3$

$8 = 2x+3$

$8-3 = 2x+3-3$

$5 = 2x$

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

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

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

$\log_2\left(\frac{x^{10}}{x-4}\right), x>4$

$\log_2\left(\frac{x^{10}}{x-4}\right)$ = [ ] (Simplify your answer.)

Answer: $10\log_2 x - \log_2(x-4)$

ID: 4.5.49

formula

$\log_2\left(\frac{A}{B}\right) = \log_2(A) - \log_2(B)$

$\log_2(A^N) = N\log_2(A)$

$\log_2\left(\frac{x^{10}}{x-4}\right) =$

$\log_2(x^{10}) - \log_2(x-4) =$

$10\log_2(x) - \log_2(x-4) =$

51. Solve the following logarithmic equation.

$\log_2(5x) = 2$

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

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

B. There is no solution.

Answer: A. The solution set is { $\frac{4}{5}$ }.
(Simplify your answer. Type an exact answer. Use a comma to separate answers as needed.)

ID: 4.6.7

$\log_2(5x) = 2$

$2^2 = 5x$

$2\cdot 2 = 5x$

$4 = 5x$

$\frac{4}{5} = \frac{5x}{5}$

$\frac{4}{5} = x$

52. Solve the logarithmic equation.

$\log_3(x+4) = \log_3 13$

Determine the equation to be solved after removing the logarithm.

[ ]

(Type an equation. Do not simplify.)

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

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

○ **B.** There is no solution.

Answers $x + 4 = 13$

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

ID: 4.6.9-Setup & Solve

53. Solve the logarithmic equation.

$\log x + \log(x+99) = 2$

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 $x(x+99) = 10^2$

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

ID: 4.6.17-Setup & Solve

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

$200 invested at 7% compounded quarterly after a period of 4 years

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

Answer: 263.99

ID: 4.7.7

55. How many years will it take for an initial investment of $30,000 to grow to $75,000? Assume a rate of interest of 4% compounded continuously.

It will take about [ ] years for the investment to grow to $75,000.
(Round to two decimal places as needed.)

Answer: 22.91

ID: 4.7.41

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

$$\begin{cases} 4x - 2y = 2 \\ 5x + y = 6 \end{cases}$$

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

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

Answer: A. The solution of the system is x = 1 and y = 1
(Type an integers or simplified fractions.)

ID: 6.1.33

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

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

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 = **−2**, y = **−1**, and z = **1**. (Type integers or simplified fractions.)

ID: 6.1.45

2ND, matrix, edit, [A], enter 3×4

$$A = \begin{bmatrix} 1 & -3 & 4 & 5 \\ 2 & 1 & 1 & -4 \\ -2 & 3 & -3 & -2 \end{bmatrix}$$

Use graphing calculator

2ND, matrix, math, ↓, rref(( ))

rref([A]) =

$$\begin{bmatrix} 1 & 0 & 0 & -2 \\ 0 & 1 & 0 & -1 \\ 0 & 0 & 1 & 1 \end{bmatrix}$$

$(x, y, z) = (-2, -1, 1)$

58. Write down the first five terms of the sequence.

$$\left\{\frac{n}{n+6}\right\}$$

Type the first five terms of the sequence $\{a_n\} = \left\{\frac{n}{n+6}\right\}$. Assume $n \geq 1$.

$a_1 =$ ☐ (Simplify your answer.) $a_1 = \frac{1}{1+6} = \frac{1}{7}$

$a_2 =$ ☐ (Simplify your answer.) $a_2 = \frac{2}{2+6} = \frac{2}{8} = \frac{2(1)}{2(4)} = \frac{1}{4}$

$a_3 =$ ☐ (Simplify your answer.) $a_3 = \frac{3}{3+6} = \frac{3}{9} = \frac{3(1)}{3(3)} = \frac{1}{3}$

$a_4 =$ ☐ (Simplify your answer.) $a_4 = \frac{4}{4+6} = \frac{4}{10} = \frac{2(2)}{2(5)} = \frac{2}{5}$

$a_5 =$ ☐ (Simplify your answer.) $a_5 = \frac{5}{5+6} = \frac{5}{11}$

Answers $\frac{1}{7}$, $\frac{1}{4}$, $\frac{1}{3}$, $\frac{2}{5}$, $\frac{5}{11}$

ID: 7.1.17

59. Expand the expression using the Binomial Theorem.

$(3p+2)^4$

$(3p+2)^4 =$ ☐ (Simplify your answer.)

Answer: $81p^4 + 216p^3 + 216p^2 + 96p + 16$

ID: 7.5.21

use Graph. Calc

4 Math, PRB, nCr, enter 0 = 1

4 Math, PRB, nCr, enter 1 = 4

4 Math PRB, nCr, enter 2 = 6

4 Math, PRB, nCr enter 3 = 4

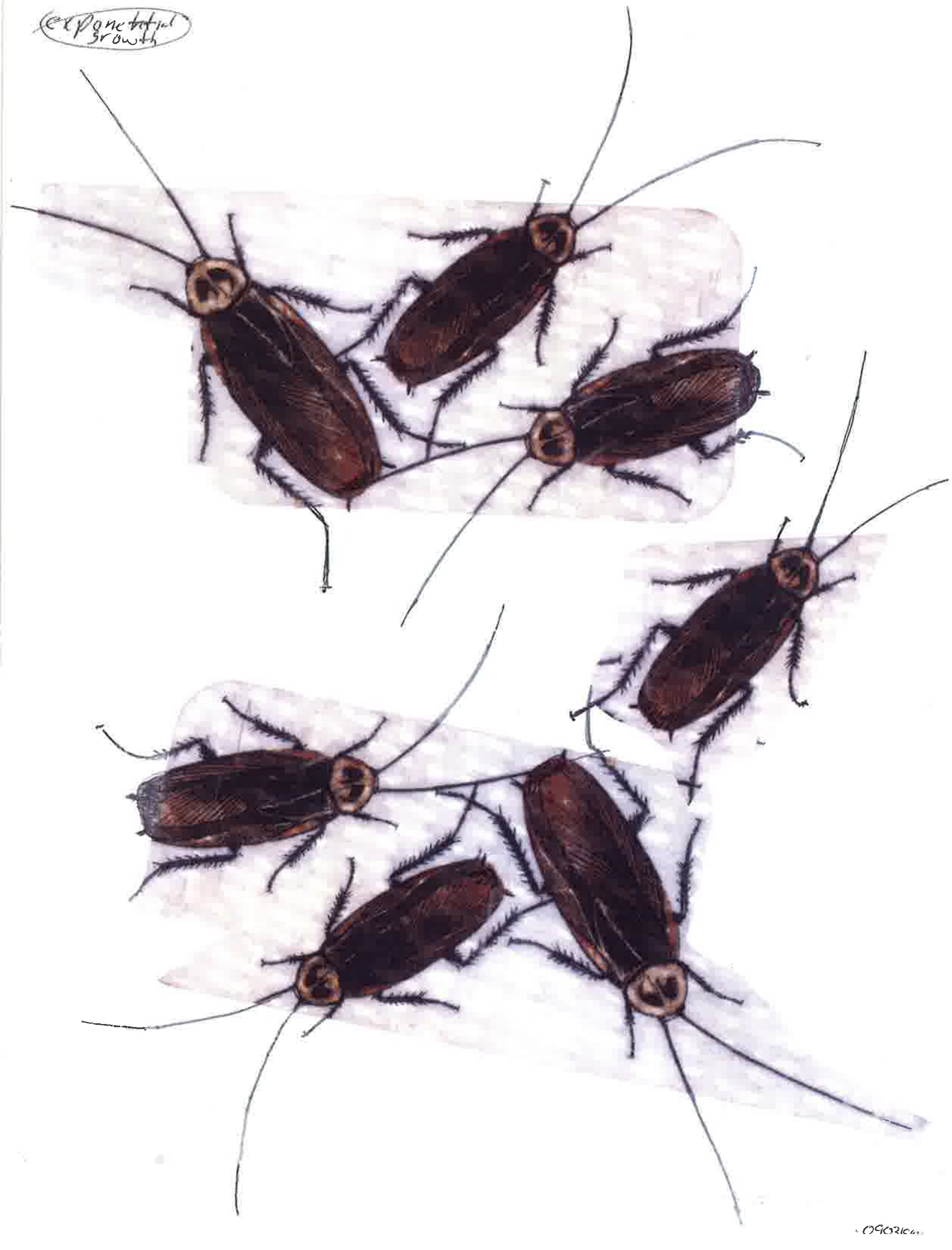
4 Math, PRB, nCr, enter 4 = 1

$\binom{4}{0}(3p)(2)^4 + \binom{4}{1}(3p)^3(2) + \binom{4}{2}(3p)^2(2)^2 + \binom{4}{3}(3p)(2)^3 + \binom{4}{4}(3p)^4(2)^0 =$

$(1)(3^4p^4)(1) + (4)(3^3p^3)(2) + (6)(3^2p^2)(4) + (4)(3p)(8) + (1)(1)(16) =$

$(1)(81p^4)(1) + (4)(27p^3)(2) + (6)(9p^2)(4) + (4)(3p)(8) + (1)(1)(16) =$

$81p^4 + 216p^3 + 216p^2 + 96p + 16$


exponential growth