03-05-20 03-07-20 03-09-20 03-11-20

Student: _____ **Instructor:** Alfredo Alvarez **Assignment:** test1m131456spring2020
Date: _____ **Course:** Math 1314 Sullivan Coreq

1. Solve the equation.

$5x^3 + x^2 - 20x - 4 = 0$

Use Synthetic division

2 | 5 1 -20 -4
10 22 -4
5 11 2 0 rem

Possible Zeros / Factors: ±1, ±2, ±4, ±1/5, ±2/5

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

Answer: $-\frac{1}{5}, -2, 2$

Use Synthetic division

-2 | 5 11 2
-10 -2
5 1 0 rem

$5x + 1 = 0$
$5x + 1 - 1 = 0 - 1$
$5x = -1$
$\frac{5x}{5} = \frac{-1}{5}$
$x = -\frac{1}{5}$

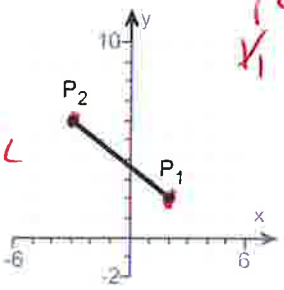
Possible ±4, ±2, ±1, ±4/5, ±2/5, ±1/5

ID: PF.4.39

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

$P_1 = (2,2)$
$P_2 = (-3,6)$

(2,2) (-3,6) x_1 y_1 x_2 y_2



$d = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$
$d = \sqrt{((2) - (-3))^2 + ((2) - (6))^2}$
$d = \sqrt{(2+3)^2 + (2-6)^2}$
$d = \sqrt{(5)^2 + (-4)^2}$
$d = \sqrt{25 + 16}$

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

Answer: $\sqrt{41}$

$d = \sqrt{41}$ OR $d = 6.403$ Round

$d = 6.403124237$

ID: F.1.21

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

$P_1 = (2, -3)$; $P_2 = (8, 3)$ (2, -3) (8, 3) x_1 y_1 x_2 y_2

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

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

Answer: (5,0)

$\text{Midpoint} = \left(\frac{(2) + (8)}{2}, \frac{(-3) + (3)}{2}\right)$

ID: F.1.39

$\text{Midpoint} = \left(\frac{2+8}{2}, \frac{-3+3}{2}\right)$

$\text{Midpoint} = \left(\frac{10}{2}, \frac{0}{2}\right)$

$\text{Midpoint} = (5, 0)$

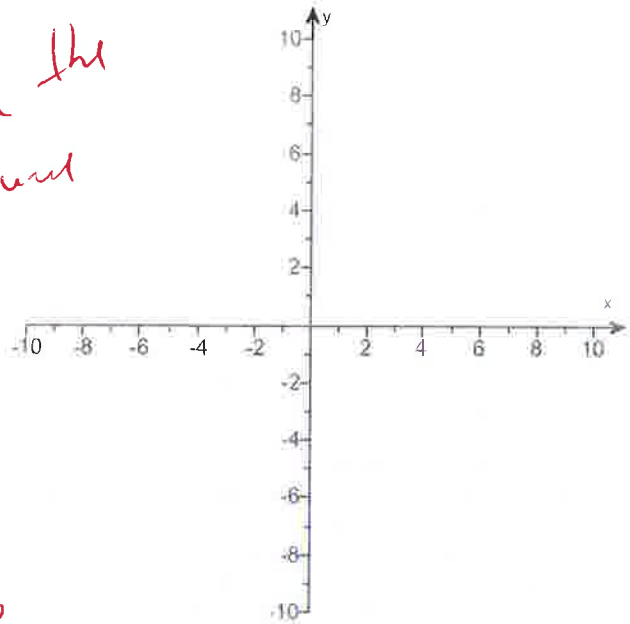
Math Shark

4.

For the equation $x^2 + y^2 - 8x - 4y - 16 = 0$, 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.

Complete the Square



(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.

$x^2 - 8x + y^2 - 4y = 16$ rewrite

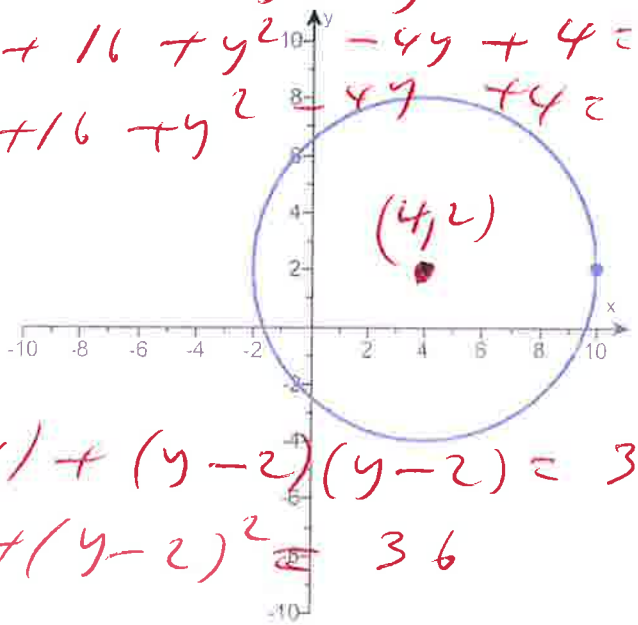
$x^2 - 8x + \left(\frac{1}{2}(-8)\right)^2 + y^2 - 4y + \left(\frac{1}{2}(-4)\right)^2 = 16 + \left(\frac{1}{2}(-8)\right)^2 + \left(\frac{1}{2}(-4)\right)^2$

Answers (4,2)

$x^2 - 8x + (-4)^2 + y^2 - 4y + (-2)^2 = 16 + (-4)^2 + (-2)^2$

$x^2 - 8x + 16 + y^2 - 4y + 4 = 16 + 16 + 4$

$x^2 - 8x + 16 + y^2 - 4y + 4 = 36$



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

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

CENTER (4, 2)

Radius $= \sqrt{36} = 6$

A. The intercept(s) is/are $(4-4\sqrt{2},0), (4+4\sqrt{2},0), (0,2-2\sqrt{5}), (0,2+2\sqrt{5})$.
(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

5. Find the domain of the function.

$f(x) = \sqrt{6x - 36}$

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

Answer: [6,∞)

ID: 1.1.59

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

$f(x) = \sqrt{6x-36}$

set $6x-36 \geq 0$

$6x - 36 + 36 \geq 0 + 36$

$6x \geq 36$

$\frac{6x}{6} \geq \frac{36}{6}$

$x \geq 6$

$[6, \infty)$

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

$f(x) = 5x + 3$; $g(x) = 8x - 9$

(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$\}$.

$(f+g)(x) = 13x - 6$

domain $(-\infty, \infty)$

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

domain $(-\infty, \infty)$

$(f \cdot g)(x) = 40x^2 - 21x - 27$

domain $(-\infty, \infty)$

$\frac{5x+3}{8x-9}$

$8x - 9 \neq 0$

$8x \neq 9$

$\frac{8x}{8} \neq \frac{9}{8}$

domain $x \neq \frac{9}{8}$

$(f+g)(3) = 13(3) - 6$

$(f+g)(3) = 39 - 6$

$(f+g)(3) = 33$

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

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

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

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

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

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

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

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

Answers $13x-6$

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

$-3x+12$

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

$40x^2-21x-27$

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

$\frac{5x+3}{8x-9}$

A. The domain is $\left\{x \middle| x \neq \frac{9}{8}\right\}$.

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

33

6

529

-8

ID: 1.1.67

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.

$f(x) = x^2 - 8x + 5$

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

Answer: $2x + h - 8$

$f(x) = x^2 - 8x + 5$

ID: 1.1.83

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

$$\frac{(x+h)^2 - 8(x+h) + 5) - (x^2 - 8x + 5)}{h} =$$

$$\frac{(x+h)(x+h) - 8x - 8h + 5 - x^2 + 8x - 5}{h} =$$

$$\frac{x^2 + 1xh + 1xh + h^2 - 8x - 8h + 5 - x^2 + 8x - 5}{h} =$$

$$\frac{x^2 + 2xh + h^2 - 8x - 8h + 5 - x^2 + 8x - 5}{h} =$$

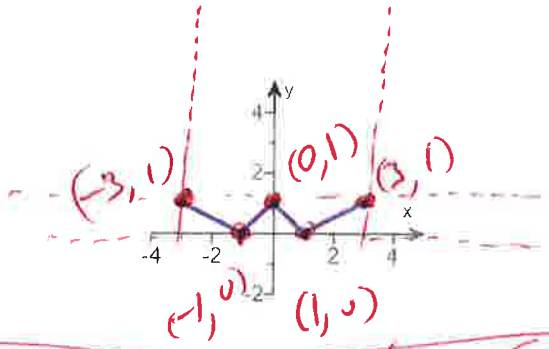
$$\frac{2xh + h^2 - 8h}{h} =$$

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

$$2x + h - 8 =$$

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

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



x-intercept x-intercept y-intercept

(a) What are the intercepts?

(-1, 0) (1, 0) (0, 1)

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

Example Favorite place for a double meat, double cheese double bacon hamburger with a diet Tea

(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] [1, 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, 1]
  (Type your answer in interval notation. Use a comma to separate answers as needed.)
- **B.** The graph is not decreasing on any interval.

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

- **A.** The graph is constant on _____.
  (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)
- even.
- odd.
- neither odd nor even.

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

$[-3,3]$

$[0,1]$

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

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

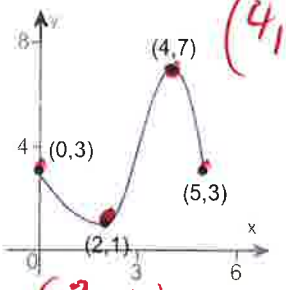
B. The graph is not constant on any interval.

(1) even.

ID: 1.3.25

absolute max (4,7)

9. 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.



(2,1) 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(4) = 7. or (4, 7) point
(Type integers or simplified fractions.)

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

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

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

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

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

A. The local maximum of y = f(x) is f(4) = 7. or (4, 7) point
(Type integers or simplified fractions.)

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

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

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

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

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

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

Answers A. The absolute maximum of y = f(x) is f(4) = 7 .
(Type integers or simplified fractions.)

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

A. The local maximum of y = f(x) is f(4) = 7 .
(Type integers or simplified fractions.)

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

ID: 1.3.51

10. The function f is defined as follows.

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

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

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

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

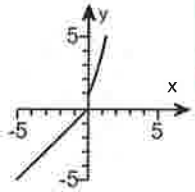
x-intercept

○ **A.** The intercept(s) is/are $(-3, 0)$ $(0, 0)$ x-intercept also y-intercept (Both)
(Type an ordered pair. Use a comma to separate answers as needed.)

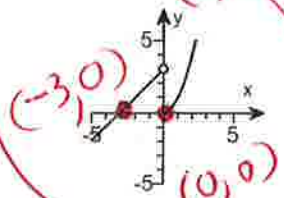
○ **B.** There are no intercepts.

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

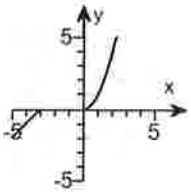
○ **A.**



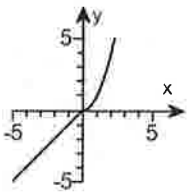
○ **B.** (0, 3) open circle



○ **C.**



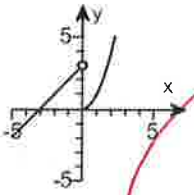
○ **D.**



(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 **(−3,0),(0,0)**
(Type an ordered pair. Use a comma to separate answers as needed.)



B.

$(-\infty, \infty)$

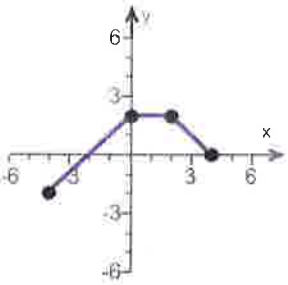
Window
x-min = −12
x-max = 12
y-min = −10
y-max = 10

use graphing calculator

ID: 1.4.37

$Y_1 = 3 + X$ (2nd math) $(X < 0)$ open circle
$Y_2 = X^2$ (2nd math) $(X \geq 0)$ closed circle

11. 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.

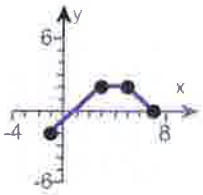


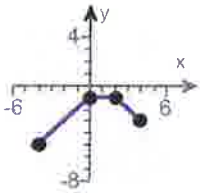
(a) $F(x) = f(x) + 3$ (b) $G(x) = f(x + 4)$ (c) $P(x) = -f(x)$

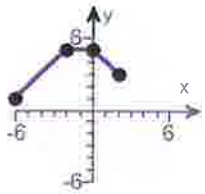
(d) $H(x) = f(x + 2) - 2$ (e) $Q(x) = \frac{1}{2}f(x)$ (f) $g(x) = f(-x)$

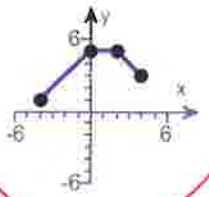
(g) $h(x) = f(2x)$

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

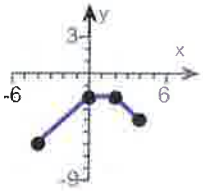
A. 

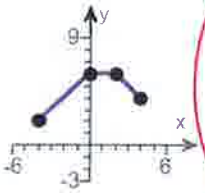
B. 

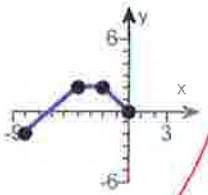
C. 

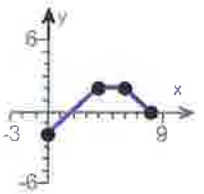
D. 

(b) Choose the correct graph of $G(x) = f(x + 4)$ below.

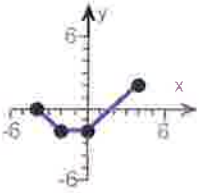
A. 

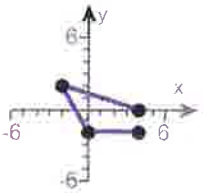
B. 

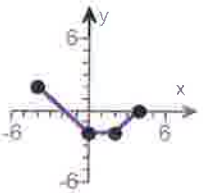
C. 

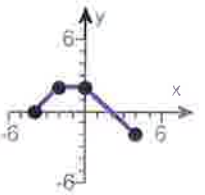
D. 

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

A. 

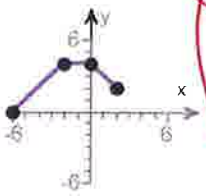
B. 

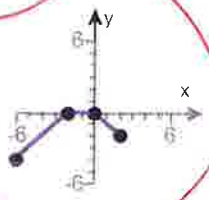
C. 

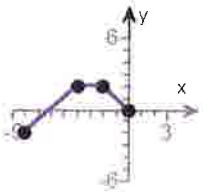
D. 

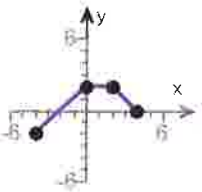
(d) Choose the correct graph of $H(x) = f(x + 2) - 2$ below.

Shift left −2 ↑ Shift down −2

A. 

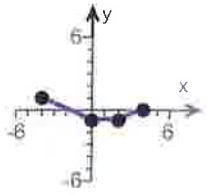
B. 

C. 

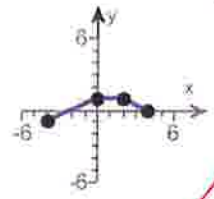
D. 

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

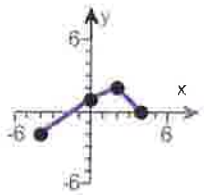
A.



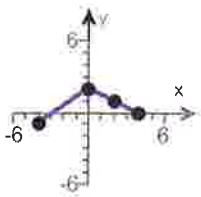
B.



C.

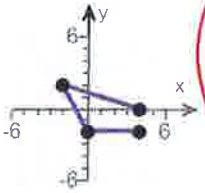


D.

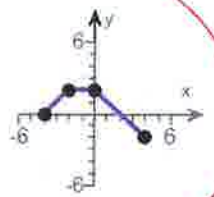


(f) Choose the correct graph of $g(x) = f(-x)$ below.

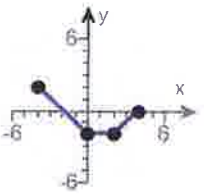
A.



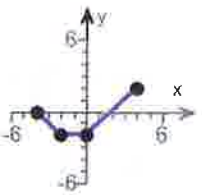
B.



C.

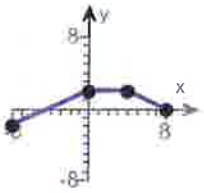


D.

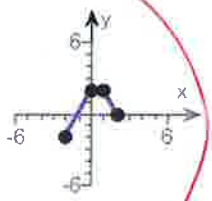


(g) Choose the correct graph of $h(x) = f(2x)$ below.

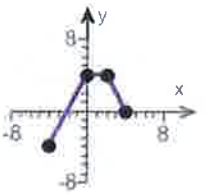
A.



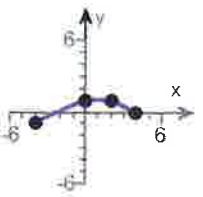
B.



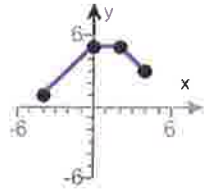
C.



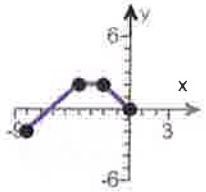
D.



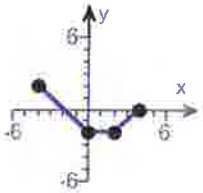
Answers



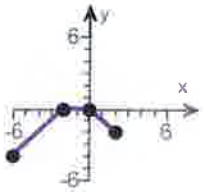
D.



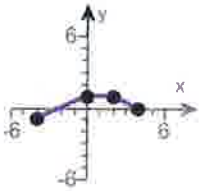
C.



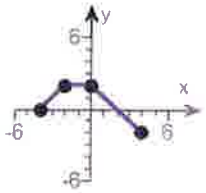
C.



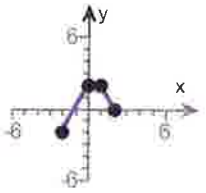
B.



B.



B.

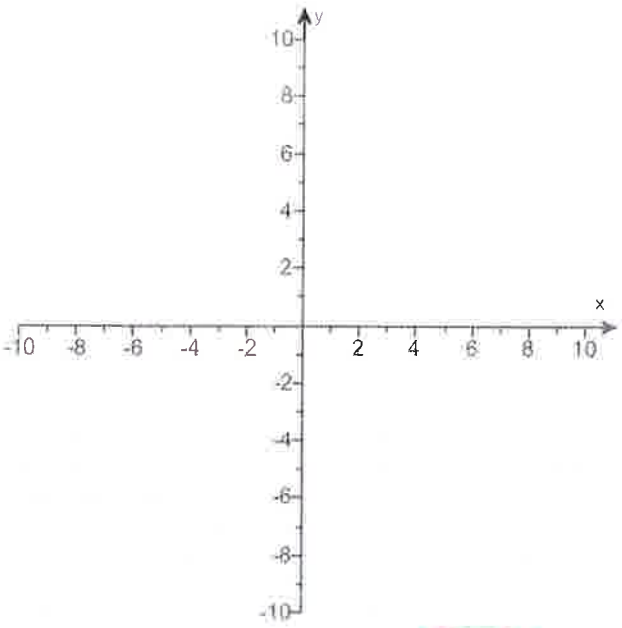


B.

ID: 1.5.63

12.

(a) Graph $f(x) = |x + 5| - 2$ using transformations.
(b) Find the area of the region bounded by f and the x-axis that lies below the x-axis.

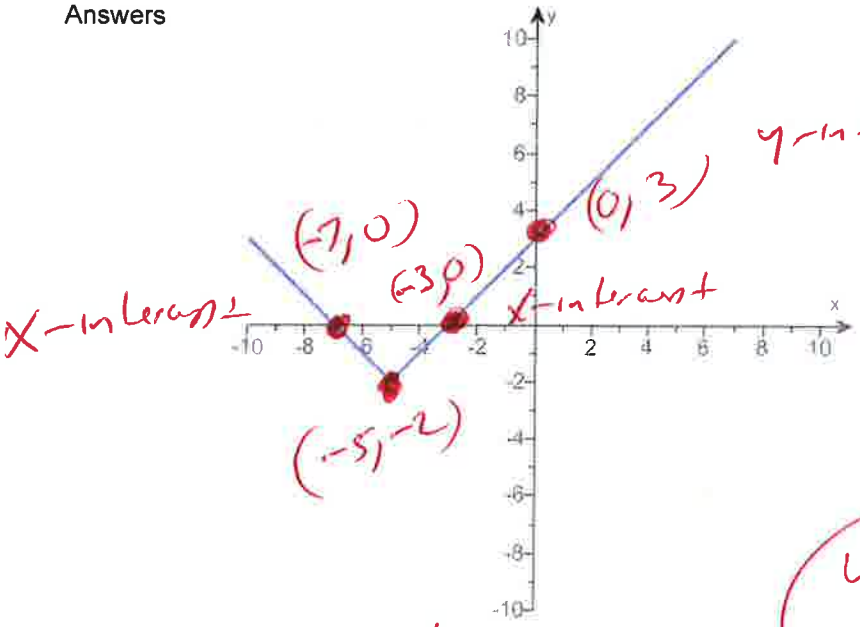


(a) Graph f(x).

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

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

Answers



x	f(x)
-7	0
-5	-2
-3	0
0	3

Use graphing calculator

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

y_1 = Math, Num, abs

$y_1 = abs(x+5) - 2$

Shift left -5 Shift down -2

4

ID: 1.5.81

13. Solve the following equation using the quadratic formula.

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

The solution set is { }.

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

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

ID: Quick Check P2.2.2

---

14. 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?

$f(x) = 8x^2 + 3 + 12x$

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

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

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

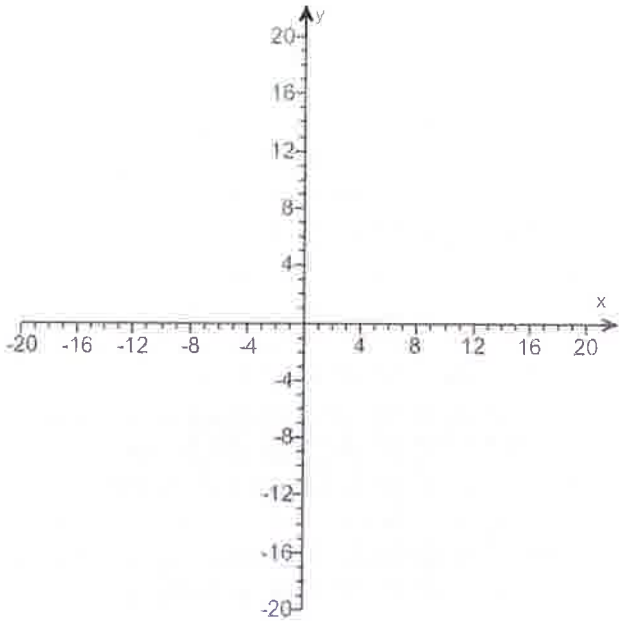
ID: 2.3.47

15

Next page

15.

For the quadratic function $f(x) = x^2 - 4x - 12$, answer parts **(a)** through **(c)**.



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

Does the graph of f open up or down?

- up
- down

What are the coordinates of the vertex?

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

What is the equation of the axis of symmetry?

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

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

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

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

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

Use the graphing tool to graph the function.

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

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

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

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

Example Swimming in the ocean at 236 am on Saturday night by yourself.

Answers up

(2, − 16)

x = 2

A. The x-intercept(s) is/are **6, − 2** .

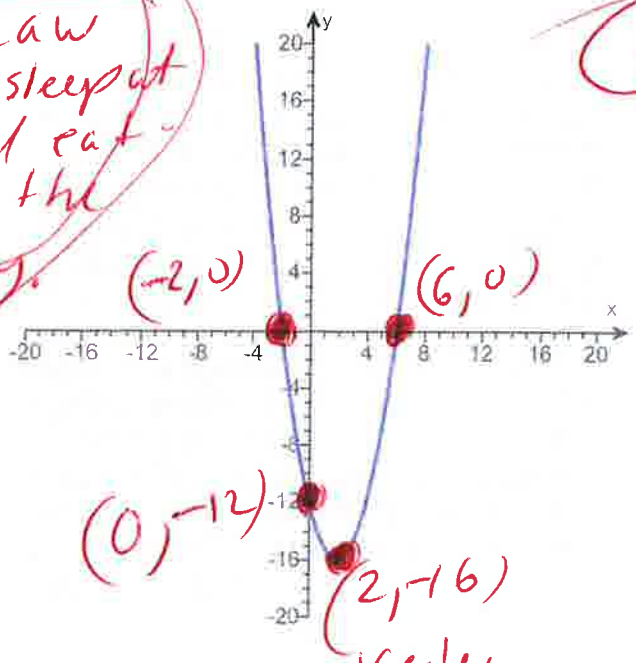
(Type an integer or a decimal. Use a comma to separate answers as needed.)

A. The y-intercept is **− 12** .(Type an integer or a decimal.)

$f(x) = x^2 - 4x - 12$

x	f(x)
−2	0
0	−12
2	−16
6	0

Shark Law
Sharks sleep at night and eat only in the day.



(− ∞,∞)

[− 16,∞)

[2,∞)

(− ∞,2]

Use Graphing Calculator

Windows
X-Min = −12
X-Max = 12
Y-Min = −16
Y-Max = 16

$Y_1 = X^2 - 4X - 12$ (BIG BIG)

ID: 2.4.37

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

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

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?

_____

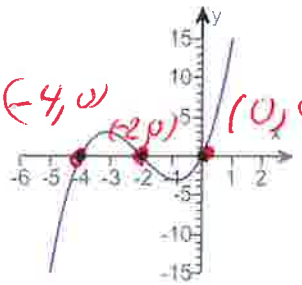
(Simplify your answer.)

Answers The function f has a maximum value.

5

ID: 2.4.59

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



Choose the correct answer below.

- A. $f(x) = x^2(x+2)(x+4)$
- B. $f(x) = x^2(x-2)(x-4)$
- C. $f(x) = x(x-2)(x-4)$
- D. $f(x) = x(x+2)(x+4)$

Answer: D. $f(x) = x(x+2)(x+4)$

ID: 3.1.73

18. Solve the equation in the complex number system.

$x^2 - 12x + 45 = 0$

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

Answer: $6 - 3i, 6 + 3i$

ID: 3.3.2

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

$1x^2 - 12x + 45 = 0$, $a=1$, $b=-12$, $c=45$

$x = \frac{-(-12) \pm \sqrt{(-12)^2 - 4(1)(45)}}{2(1)}$

$x = \frac{12 \pm \sqrt{144-180}}{2}$

$x = \frac{12 \pm \sqrt{-36}}{2}$

$x = \frac{12 \pm 6i}{2}$

$x = \frac{12}{2} \pm \frac{6i}{2}$

$x = 6 \pm 3i$

$x = 6-3i$ or $x = 6+3i$

---

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

$f(x) = x^3 - 15x^2 + 79x - 145$

use Synthetic division

The complex zeros of f are _____.

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

Use the complex zeros to factor f.

use Synthetic division

$f(x) =$ _____

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

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

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

formula

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

ID: 3.3.33

$f(x) = 1x^3 - 15x^2 + 79x - 145$

1 rem

5	1	−15	79	−145
		5	−50	145
	1	−10	29	0

$1x^2 - 10x + 29 = 0$

$a=1$, $b=-10$, $c=29$

$x = \frac{-(-10) \pm \sqrt{(-10)^2 - 4(1)(29)}}{2(1)}$

$x = \frac{10 \pm \sqrt{100-116}}{2}$

$x = \frac{10 \pm \sqrt{-16}}{2}$

$x = \frac{10 \pm 4i}{2}$

$x = \frac{10}{2} \pm \frac{4i}{2}$

$x = 5 \pm 2i$

$x = 5+2i$ or $x = 5-2i$

answers

$5, 5+2i, 5-2i$

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

$$R(x) = \frac{17x}{x+18}$$

$R(x) = \frac{17x}{1x+18}$ Set bottom = 0

$1x + 18 = 0$

$1x + 18 - 18 = 0 - 18$

$1x = -18$

$x = -18$

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.

Vertical asymptote $x = -18$

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.

$R(x) = \frac{17x}{1x+18}$ ($y = \frac{\text{highest power top}}{\text{highest power bottom}}$)

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.

$y = \frac{17x}{1x}$

$y = \frac{17}{1}$

$y = 17$

Answers A. The vertical asymptote(s) is/are x = **−18**.
(Use a comma to separate answers as needed.)

A. The horizontal asymptote(s) is/are y = **17**.
(Use a comma to separate answers as needed.)

B. There is no oblique asymptote.

Horizontal asymptote $y = 17$

ID: 3.4.45

Since highest power on top is the same as highest power on bottom then there is no oblique asymptote

21. For $f(x) = 5x + 5$ and $g(x) = 5x$, find the following composite functions and state the domain of each.

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

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

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

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

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

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

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

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

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

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

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

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

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

Answers 25x + 5

B. The domain of f ∘ g is all real numbers.

25x + 25

B. The domain of g ∘ f is all real numbers.

25x + 30

B. The domain of f ∘ f is all real numbers.

25x

B. The domain of g ∘ g is all real numbers.

ID: 4.1.23

21a $f(x) = 5x + 5$ and $g(x) = 5x$ (inside here)

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

$f(g(x)) =$

$f(5x) =$

$5(5x) + 5 =$

$25x + 5 =$

domain: $(-\infty, \infty)$

21b $f(x) = 5x + 5$ and $g(x) = 5x$ (inside here)

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

$g(f(x)) =$

$g(5x + 5) =$

$5(5x + 5) =$

$25x + 25 =$

domain: $(-\infty, \infty)$

22.

(21) c inside itself

$f(x) = 5x+5$ and $g(x) = 5^x$

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

$f(f(x)) =$

$f(5x+5) =$

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

$25x+25+5 =$

$25x+30 =$

domain $(-\infty, \infty)$

(21) d $f(x) = 5x+5$ and $g(x) = 5x$

inside itself

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

$g(g(x)) =$

$g(5x) =$

$5(5x) =$

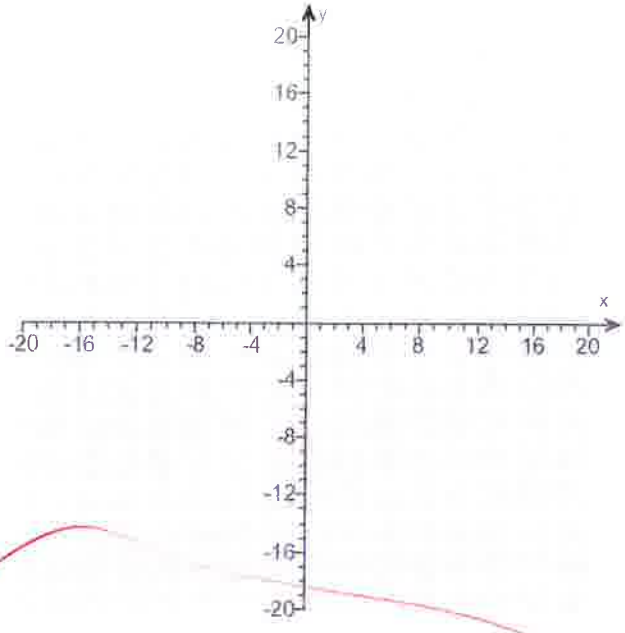
$25x =$

The function $f(x) = 20x - 4$ is one-to-one.

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

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

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



(a) $f^{-1}(x) =$ _____

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

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

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

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

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

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

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

$f(x) = 20x - 4$

$y = 20x - 4$ Set y =

$x = 20y - 4$ Inv var (x-y)

$x + 4 = 20y - 4 + 4$ Solve for y

$x + 4 = 20y$

$\frac{x+4}{20} = \frac{20y}{20}$

$\frac{x+4}{20} = y$ Rewrite

$y = \frac{x+4}{20}$

$f^{-1}(x) = \frac{x+4}{20}$ Inverse

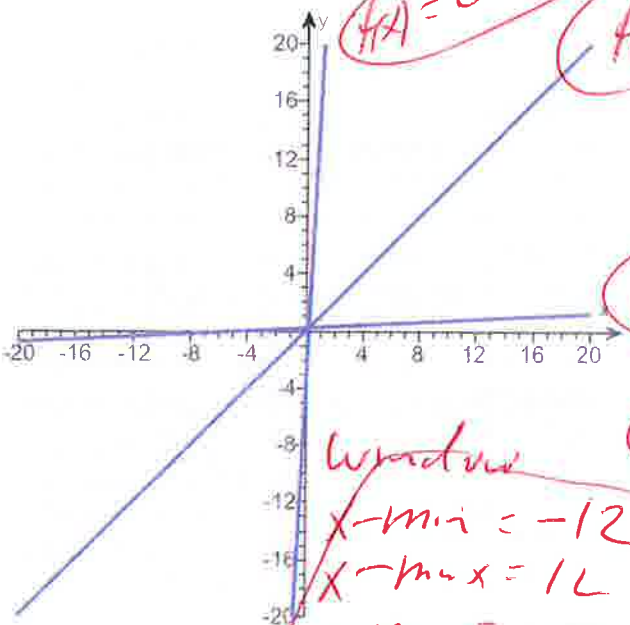
Answers $\frac{x+4}{20}$

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

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

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

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



$y_1 = 2x - 4$

$f(x) = 2x - 4$

$y_2 = x$

$f(x) = x$

$f^{-1}(x) = (x+4) \div (2)$

$y_3 = (x+4) \div (2)$

Use Graphing Calculator

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

ID: 4.2.53

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23. The function

$D(h) = 9e^{-0.59h}$

$D(h) = 9e^{-0.59h}$

can be used to find the number of milligrams D of a certain drug that is in a patient's bloodstream h hours after the drug has been administered. How many milligrams will be present after 1 hour? After 6 hours?

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

After 6 hours, there will be _____ milligrams. (Round to two decimal places as needed.)

Answers 4.99

0.26

2ND LN

$D(1) = 9e^{1}(-0.59(1))$

$D(1) = 4.988945556$ OR

$D(1) = 4.99$ Round

ID: 4.3.111

2ND LN

$D(6) = 9e^{1}(-0.59(6))$

$D(6) = 0.261115943$

$D(6) = 0.26$ Round

24. Find the domain of the function.

$f(x) = \ln(x-8)$

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

Answer: $(8,\infty)$

ID: 4.4.39

formula domain
$f(x) = \ln(Ax+B)$ set $Ax+B>0$

set $x-8>0$
$x-8+8>0+8$
$x>8$
$(8,\infty)$

25. Find the real solutions of the equation.

$2+\sqrt{7x-6} = x$ → $\sqrt{7x-6} = x-2$ rewrite

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

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

Answer: A. The solution set is {10}
(Simplify your answer. Use a comma to separate answers as needed.)

ID: A.8.55

square both sides

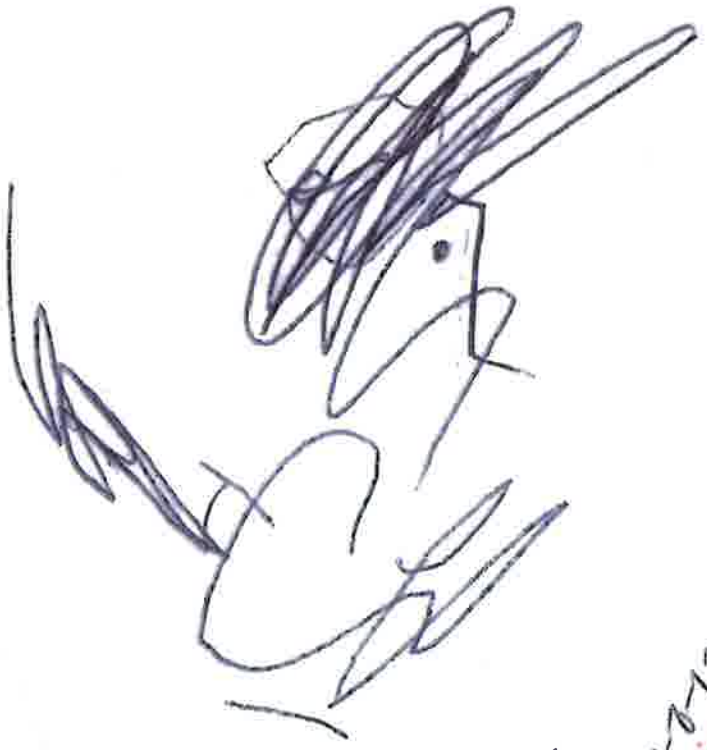
$(\sqrt{7x-6})^2 = (x-2)^2$
$7x-6 = (x-2)(x-2)$
$7x-6 = x^2-2x-2x+4$
$7x-6 = x^2-4x+4$
$0 = x^2-4x+4-7x+6$
$0 = x^2-11x+10$
$0 = (x-1)(x-10)$
$x-1=0$ or $x-10=0$
$x-1+1=0+1$ or $x-10+10=0+10$
$x=1$ or $x=10$ Check

Check
Try $x=1$
$2+\sqrt{7x-6} = x$
$2+\sqrt{7(1)-6} = (1)$
$2+\sqrt{7-6} = 1$
$2+\sqrt{1} = 1$
$2+1 = 1$
$3 \neq 1$ Bad

Try $x=10$
$2+\sqrt{7(10)-6} = (10)$
$2+\sqrt{70-6} = 10$
$2+\sqrt{64} = 10$
$2+8 = 10$
$10=10$ Good

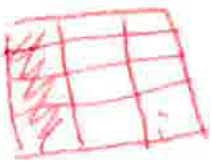
Answer
$x=10$ only


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



SMART Bird 5-8-17

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



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

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

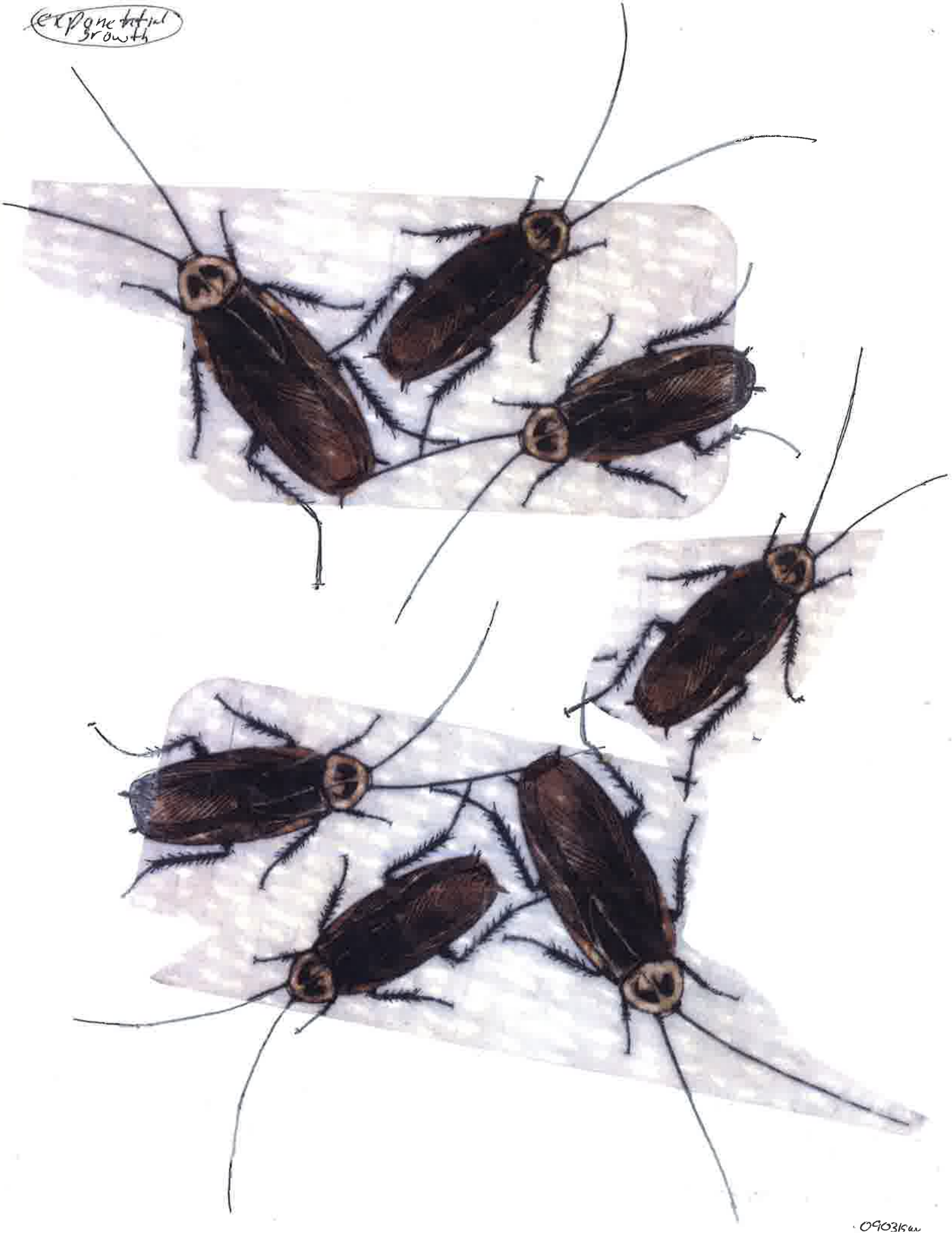

MATH is
FUN


BROKEN SURFBOARD
121119.AP14

(exponential growth)

090315

exponential growth



090315ur