

07-19-19

07-21-19

07-23-19

07-25-19

Student: _____

Instructor: Alfredo Alvarez

Assignment:

MA1314FIESTACOREQ14FIN0119jj

Date: _____

Course: Math 1314 Alvarez

1. Evaluate the algebraic expression for the given value.

$x^2 - 5x + 3$, for $x = 7$

When $x = 7$, $x^2 - 5x + 3 =$
 (Simplify your answer.)

Answer: 17

$(7)^2 - 5(7) + 3 =$
 $(7)(7) - 5(7) + 3 =$
 $49 - 35 + 3 =$
 $14 + 3 =$
 $17 =$

ID: P.1.7

2. Simplify the given algebraic expression.

$9(2y - 9) - (3y + 3)$

$9(2y - 9) - (3y + 3) =$

Answer: $15y - 84$

$9(2y - 9) - (3y + 3) =$
 $18y - 81 - 3y - 3 =$
 $15y - 84 =$

ID: P.1.91

3. Use the formula $BAC = \frac{600n}{w(0.6n + 169)}$, where n is the number of drinks consumed and w is the weight of the person.

Using this formula and a calculator, compute the BAC for a 193-pound person for integers from $n = 1$ to $n = 10$. According to this model, how many drinks can a 193-pound person consume in an hour without exceeding the legal measure of drunk driving ($BAC \geq 0.08\%$)?

Compute the BAC for a 193-pound person for integers from $n = 1$ to $n = 10$.

Number of Drinks	1	2	3	4	5	6	7
BAC							

(Round to three decimal places as needed.)

How many drinks can a 193-pound person consume in an hour without exceeding the legal measure of drunk driving, that is with a BAC of less than 0.08%?

(Type a whole number.)

Answers 0.018

0.037

0.055

0.073

0.090

0.108

0.126

0.143

0.160

0.178

4

$$BAC = \frac{600n}{w(0.6n + 169)}$$

$$BAC = \frac{600(4)}{193(0.6(4) + 169)}$$

$$BAC = \frac{2400}{193(2.4 + 169)}$$

$$BAC = \frac{2400}{193(171.4)}$$

$$BAC = \frac{2400}{33080.2}$$

$$BAC = 0.0725509519$$

$n=4$
 $w=193$
 193

ID: P.1.135

4. Simplify the expression.

$$\sqrt{28}$$

$$\sqrt{28} = \text{[]}$$

(Type an exact answer, using radicals as needed.)

Answer: $2\sqrt{7}$

$$\begin{aligned} \sqrt{4 \cdot 7} &= \\ \sqrt{4} \cdot \sqrt{7} &= \\ 2\sqrt{7} &= \end{aligned}$$

Primes 2, 3, 5, 7, ...

$$\begin{array}{r} 2 \overline{)28} \\ \underline{2} \\ 0 \\ 2 \overline{)14} \\ \underline{2} \\ 0 \\ 7 \overline{)7} \\ \underline{7} \\ 0 \end{array}$$

ID: P.3.13

Primes 2, 3, 5, 7, 11, 13, 17, ...

5. Use radical notation to rewrite the expression. Simplify, if possible.

$343^{2/3} =$

Answer: 49

ID: P.3.87

Handwritten work for problem 5:

$(7^3)^{2/3} = 7^2 = 49$

$(7^1)^{2/3} = 7^{2/3}$

$7 \frac{(3)(2)}{(1)(3)} = 7 \frac{2}{1} = 7^2 = 49$

$7 \cdot 7 = 49$

$7 \frac{2}{1} = 7^2 = 49$

Division: $7 \overline{)343}$
 $7 \overline{)49}$
 $7 \overline{)7}$
 1

6. Perform the indicated operation.

$(6x^3 - 9x^2 + 9x - 5) - (2x^3 - 3x^2 - 3x + 5) =$

Write the polynomial in standard form.

$(6x^3 - 9x^2 + 9x - 5) - (2x^3 - 3x^2 - 3x + 5) =$

What is the degree of the polynomial?

(Type a whole number.)

Answers $4x^3 - 6x^2 + 12x - 10$

3

Handwritten work for problem 6:

$6x^3 - 9x^2 + 9x - 5 - 2x^3 + 3x^2 + 3x - 5 =$

$4x^3 - 6x^2 + 12x - 10 =$

ID: P.4.11

7. Multiply.

$(x + 9)(x + 5)$

$(x + 9)(x + 5) =$ (Simplify your answer.)

Answer: $x^2 + 14x + 45$

ID: P.4.19

Handwritten work for problem 7:

$(x + 9)(x + 5) =$

$x^2 + 5x + 9x + 45 =$

$x^2 + 14x + 45 =$

8. Find the product.

$(x - 6)(x + 4)$

$(x - 6)(x + 4) =$

Answer: $x^2 - 2x - 24$

Handwritten work for problem 8:

$(x - 6)(x + 4) =$

$x^2 + 4x - 6x - 24 =$

$x^2 - 2x - 24 =$

ID: P.4.21

9. Use the FOIL method to multiply the binomials.

$(2x + 7)(3x + 5)$

$(2x + 7)(3x + 5) = \boxed{}$ (Simplify your answer.)

Answer: $6x^2 + 31x + 35$

$$(2x+7)(3x+5) =$$

$$6x^2 + 10x + 21x + 35 =$$

$$6x^2 + 31x + 35 =$$

ID: P.4.23

10. Find the product.

$(5x - 8)(8x + 9)$

$(5x - 8)(8x + 9) = \boxed{}$

Answer: $40x^2 - 19x - 72$

$$(5x-8)(8x+9) =$$

$$40x^2 + 45x - 64x - 72 =$$

$$40x^2 - 19x - 72 =$$

ID: P.4.25

11. Find the product.

$(x - 2)(x + 2)$

$(x - 2)(x + 2) = \boxed{}$ (Simplify your answer.)

Answer: $x^2 - 4$

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

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

$$x^2 - 4 =$$

ID: P.4.31

12. Multiply using the rule for the square of a binomial.

$(x - 10)^2$

$(x - 10)^2 = \boxed{}$

Answer: $x^2 - 20x + 100$

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

$$(x-10)(x-10) =$$

$$x^2 - 10x - 10x + 100 =$$

$$x^2 - 20x + 100 =$$

ID: P.4.45

13. Find the product.

$(x + 1)^3$

$(x + 1)^3 = \boxed{}$

(Simplify your answer.)

Answer: $x^3 + 3x^2 + 3x + 1$

ID: P.4.51

$(x+1)^3 =$
 $(x+1)(x+1)(x+1) =$
 $(x+1)(x^2 + 1x + 1x + 1) =$
 $(x+1)(x^2 + 2x + 1) =$
 $x^3 + 2x^2 + 1x + 1x^2 + 2x + 1 =$
 $x^3 + 3x^2 + 3x + 1 =$

14. Multiply using the rule for the product of the sum and difference of two terms.

$(6x + 5y)(6x - 5y)$

$(6x + 5y)(6x - 5y) = \boxed{}$

Answer: $36x^2 - 25y^2$

ID: P.4.79

$(6x+5y)(6x-5y) =$
 $36x^2 - 30xy + 30xy - 25y^2 =$
 $36x^2 - 25y^2 =$

15. Factor the greatest common factor from the polynomial.

$24x^2 + 16x$

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

A. $24x^2 + 16x = \boxed{}$

B. The polynomial is prime.

Answer: A. $24x^2 + 16x = \boxed{8x(3x + 2)}$

ID: P.5.3

check
 $8x(3x+2) =$
 $24x^2 + 16x =$
 $24x^2 + 16x =$
Good

16. Factor the given polynomial.

$x^2 + 10x + 21$

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

A. $x^2 + 10x + 21 = \boxed{}$

B. The polynomial is prime.

Answer: A. $x^2 + 10x + 21 = \boxed{(x + 3)(x + 7)}$

ID: P.5.17

$(x+3)(x+7)$
check
 $(x+3)(x+7) =$
 $x^2 + 7x + 3x + 21 =$
 $x^2 + 10x + 21 =$
Good

Possible
 $21 \cdot 1$
 $3 \cdot 7$

17. Factor the trinomial, or state that the trinomial is prime.

$$x^2 - 4x - 32$$

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

Possible
32, 1
16, 2
4, 8

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

- A. $x^2 - 4x - 32 =$ _____
- B. The polynomial is prime.

check

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

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

$$x^2 - 4x - 32 =$$

Answer: A. $x^2 - 4x - 32 =$ $(x-8)(x+4)$

Good

ID: P.5.19

18. Factor the given polynomial.

$$x^2 - 9x + 18$$

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

Possible
18, 1
9, 2
6, 3

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

- A. $x^2 - 9x + 18 =$ _____
- B. The polynomial is prime.

check

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

$$x^2 - 6x - 3x + 18 =$$

$$x^2 - 9x + 18 =$$

Answer: A. $x^2 - 9x + 18 =$ $(x-6)(x-3)$

Good

ID: P.5.21

19. Factor the trinomial completely.

$$13x^2 - 38x - 3$$

$$(13x+1)(x-3) =$$

Possible
13, 1 3, 1

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

- A. $13x^2 - 38x - 3 =$ _____ (Factor completely.)
- B. The polynomial is prime.

check

$$(13x+1)(x-3) =$$

$$13x^2 - 39x + 1x - 3 =$$

$$13x^2 - 38x - 3 =$$

Answer: A. $13x^2 - 38x - 3 =$ $(13x+1)(x-3)$ (Factor completely.)

Good

ID: P.5.23

20. Factor the difference of two squares.

$$100x^2 - 121y^2$$

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

- A. $100x^2 - 121y^2 =$ _____
- B. The polynomial is prime.

Answer: A. $100x^2 - 121y^2 =$ $(10x + 11y)(10x - 11y)$

ID: P.5.43

21. Factor completely, or state that the polynomial is prime.

$$2x^3 - 8x$$

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

- A. $2x^3 - 8x =$ _____
- B. The polynomial is prime.

Answer: A. $2x^3 - 8x =$ $2x(x + 2)(x - 2)$

ID: P.5.75

Formula

$$a^2 - b^2 = (a+b)(a-b)$$

$$100x^2 - 121y^2 =$$

$$(10x)^2 - (11y)^2 =$$

$$(10x + 11y)(10x - 11y) =$$

$$2x^3 - 8x =$$

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

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

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

Formula

$$a^2 - b^2 = (a+b)(a-b)$$

22. Graph the equation $y = x + 5$. Let $x = -3, -2, -1, 0, 1, 2,$ and 3 .

Find the following y -values. Then choose the correct graph of the equation to the right.

x	y
-3	
-2	
-1	
0	
1	
2	
3	

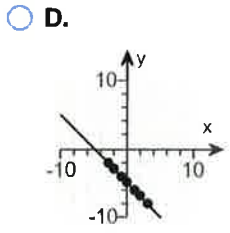
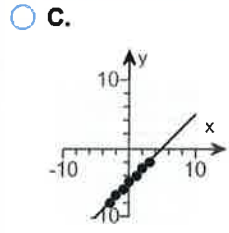
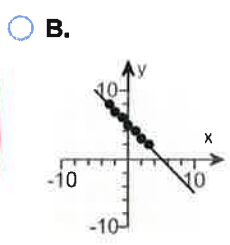
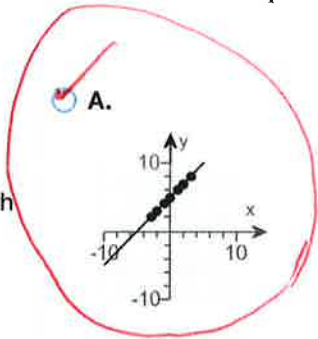
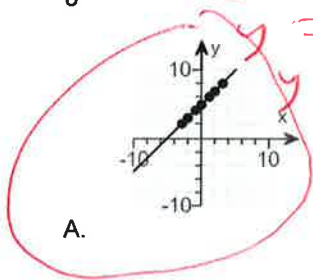
$y = x + 5$

$y = -3 + 5 = 2$
 $y = -2 + 5 = 3$
 $y = -1 + 5 = 4$
 $y = 0 + 5 = 5$
 $y = 1 + 5 = 6$
 $y = 2 + 5 = 7$
 $y = 3 + 5 = 8$

x	y
-3	2
-2	3
-1	4
0	5
1	6
2	7
3	8

Answers 2

- 3
- 4
- 5
- 6
- 7
- 8

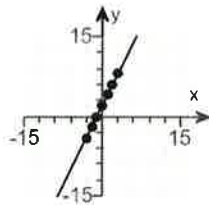


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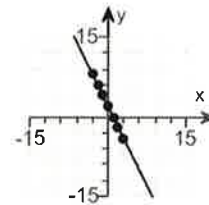
23. Graph the equation. Let $x = -3, -2, -1, 0, 1, 2,$ and 3 .
 $y = 2x - 2$

x	y
-3	
-2	
-1	
0	
1	
2	
3	

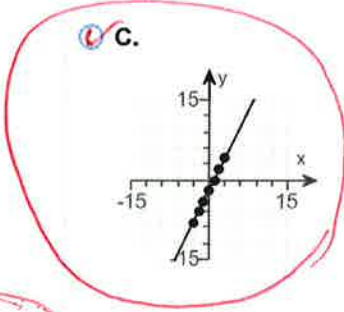
A.



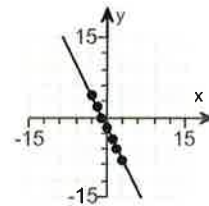
B.



C.



D.



Choose the graph on the right that connects the points.

Answers - 8

- 6

- 4

- 2

0

2

4

$y = 2x - 2$

$y = 2(-3) - 2 = -6 - 2 = -8$

$y = 2(-2) - 2 = -4 - 2 = -6$

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

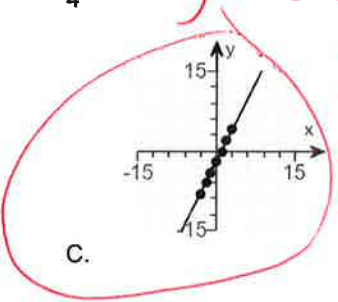
$y = 2(0) - 2 = 0 - 2 = -2$

$y = 2(1) - 2 = 2 - 2 = 0$

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

$y = 2(3) - 2 = 6 - 2 = 4$

x	y
-3	-8
-2	-6
-1	-4
0	-2
1	0
2	2
3	4



ID: 1.1.17

24.

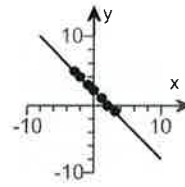
Find seven ordered pairs to the equation $y = 7 - x^2$. Then determine its graph.

x	y
-3	
-2	
-1	
0	
1	
2	
3	

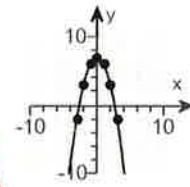
$y = 7 - x^2$

Choose the graph that connects the points.

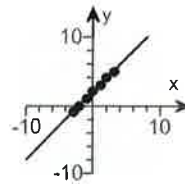
A.



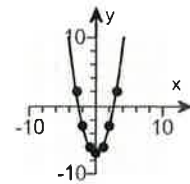
B.



C.



D.



Answers - 2

3

6

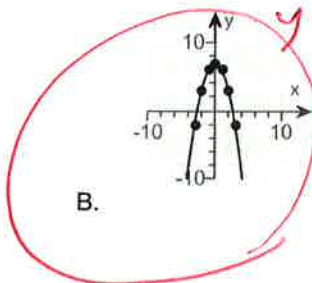
7

6

3

-2

$y = 7 - (-3)^2 = 7 - (-3)(-3) = 7 - (9) = 7 - 9 = -2$
 $y = 7 - (-2)^2 = 7 - (-2)(-2) = 7 - (4) = 7 - 4 = 3$
 $y = 7 - (-1)^2 = 7 - (-1)(-1) = 7 - (1) = 7 - 1 = 6$
 $y = 7 - (0)^2 = 7 - (0)(0) = 7 - (0) = 7 - 0 = 7$
 $y = 7 - (1)^2 = 7 - (1)(1) = 7 - (1) = 7 - 1 = 6$
 $y = 7 - (2)^2 = 7 - (2)(2) = 7 - (4) = 7 - 4 = 3$
 $y = 7 - (3)^2 = 7 - (3)(3) = 7 - (9) = 7 - 9 = -2$

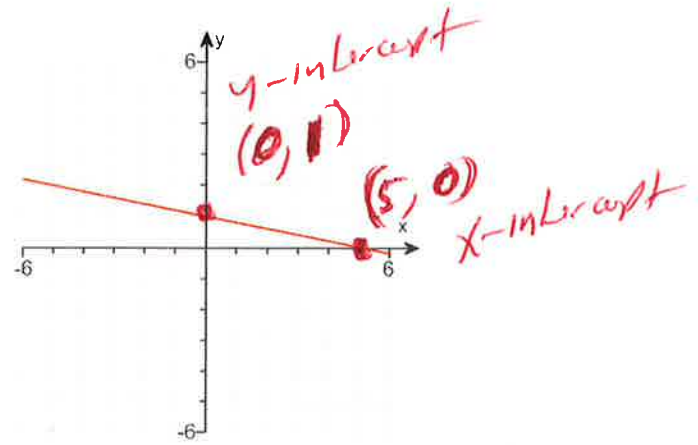


ID: 1.1.25

(y) OR

X	Y
-3	-2
-2	3
-1	6
0	7
1	6
2	3
3	-2

25. Use the graph to the right to complete the following. For the graph, tick marks along the axes represent one unit each.



- a. Determine the x-intercepts, if any.
- b. Determine the y-intercepts, if any.

a. 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 simplified fraction. Use a comma to separate answers as needed.)

B. There is no x-intercept.

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

A. The y-intercept(s) is/are _____.
(Type an integer or a simplified fraction. Use a comma to separate answers as needed.)

B. There is no y-intercept.

x-intercept x = 5 OR (5, 0)
y-intercept y = 1 OR (0, 1)

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

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

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

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

ID: 1.1.41

26. Find the value of the variable that satisfies the equation. Check your solution. Answers that are not integers may be left in fractional form or decimal form.

$$8x - 5 = 67$$

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

- A. The solution set is {_____}.
- B. The solution set is $\{x \mid x \text{ is a real number}\}$.
- C. The solution set is \emptyset .

Answer: A. The solution set is .

8x - 5 = 67
8x - 8 + 5 = 67 + 5
8x = 72
 $\frac{8x}{8} = \frac{72}{8}$
x = 9

Check
8x - 5 = 67
8(9) - 5 = 67
72 - 5 = 67
67 = 67
Good

ID: 1.2.1

27. Solve the equation. Be sure to check your proposed solution by substituting it for the variable in the original equation.

$8x - (4x - 3) = 15$

$\longrightarrow 8x - 4x + 3 = 15$

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

- A. The solution set is {_____}.
- B. The solution set is all real numbers.
- C. There is no solution.

$4x + 3 = 15$
 $4x + 3 - 3 = 15 - 3$
 $4x = 12$
 $\frac{4x}{4} = \frac{12}{4}$
 $x = 3$

Answer: A. The solution set is { }.

ID: 1.2.3

28. Solve the linear equation.

$6x + 9 = 4x + 47$

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

- A. The solution set is {_____}.
- B. The solution set is $\{x \mid x \text{ is a real number}\}$.
- C. The solution set is \emptyset .

$6x + 9 - 9 = 4x + 47 - 9$
 $6x = 4x + 38$
 $6x - 4x = 4x + 38 - 4x$
 $2x = 38$
 $\frac{2x}{2} = \frac{38}{2}$
 $x = 19$

Answer: A. The solution set is { }.

ID: 1.2.7

29. Solve the equation. Then determine whether the equation is an identity, a conditional equation, or an inconsistent equation.

$4x + 18 = 6(x + 3) - 2x$

$\longrightarrow 4x + 18 = 6x + 18 - 2x$

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

- A. The equation has a single solution. The solution set is {_____}.
- B. The solution set is $\{x \mid x \text{ is a real number}\}$.
- C. The solution set is \emptyset .

$4x + 18 = 4x + 18$
 $4x + 18 - 18 = 4x + 18 - 18$
 $4x = 4x$
 $4x - 4x = 4x - 4x$
 $0 = 0$

What type of equation is this?

- A. an identity
- B. a conditional equation
- C. an inconsistent equation

Answers B. The solution set is $\{x \mid x \text{ is a real number}\}$.

A. an identity

The solution set is all real numbers.

ID: 1.2.61

30. Solve the equation. Then determine whether the equation is an identity, a conditional equation, or an inconsistent equation.

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

$$\rightarrow 4x + 8 = 6 + 4x$$

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

- A. The equation has a single solution. The solution set is {_____}.
- B. The solution set is $\{x \mid x \text{ is a real number}\}$.
- C. The solution set is \emptyset .

$$4x + 8 - 8 = 6 + 4x - 8$$

$$4x = 4x - 2$$

$$4x - 4x = 4x - 2 - 4x$$

$$0 \neq -2$$

What type of equation is this?

- A. an identity
- B. a conditional equation
- C. an inconsistent equation

there is no solution
 \emptyset

Answers C. The solution set is \emptyset .

C. an inconsistent equation

ID: 1.2.63

31. Solve the equation. Then determine whether the equation is an identity, a conditional equation, or an inconsistent equation.

$$8x + 5 = 2x + 5$$

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

- A. The equation has a single solution. The solution set is {_____}.
- B. The solution set is $\{x \mid x \text{ is a real number}\}$.
- C. The solution set is \emptyset .

$$8x + 5 = 2x + 5$$

$$8x + 5 - 5 = 2x + 5 - 5$$

$$8x = 2x$$

$$8x - 2x = 2x - 2x$$

$$6x = 0$$

What type of equation is this?

- A. a conditional equation
- B. an identity
- C. an inconsistent equation

Answers A. The equation has a single solution. The solution set is { }.

A. a conditional equation

$$\frac{6x}{6} = \frac{0}{6}$$

$x = 0$

ID: 1.2.65

32. Use factoring to solve the quadratic equation. Check by substitution or by using a graphing utility and identifying x-intercepts.

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

The solution set is .

(Use a comma to separate answers as needed. Type repeated roots only once.)

Answer: -6,8

ID: 1.5.1

$$\rightarrow (x+6)(x-8) = 0$$

$$x+6=0 \text{ OR } x-8=0$$

Possibly
48.1
24.4
12.4
6.8
16.3

$$x+6-6=0-6 \text{ OR } x-8+8=0+8$$

$$\underline{x=-6} \text{ OR } \underline{x=8}$$

33. Solve the equation by factoring.

$$x^2 = 6x + 27$$

The solution set is .

(Use a comma to separate answers as needed.)

Answer: 9, -3

ID: 1.5.3

$$\rightarrow x^2 - 6x - 27 = 0 \text{ Rewrite (Possibly)}$$

$$(x+3)(x-9) = 0$$

Possibly
27.1
9.3

$$x+3=0 \text{ OR } x-9=0$$

$$x+3-3=0-3 \text{ OR } x-9+9=0+9$$

$$\underline{x=-3} \text{ OR } \underline{x=9}$$

34. Solve the equation by factoring.

$$9x^2 + 21x - 8 = 0$$

The solution set is .

(Use a comma to separate answers as needed.)

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

ID: 1.5.5

$$\rightarrow (3x-1)(3x+8) = 0$$

$$3x-1=0 \text{ OR } 3x+8=0$$

Possibly
9.1
3.3
8.1
2.4

$$3x-1+1=0+1 \text{ OR } 3x+8-8=0-8$$

$$3x=1 \text{ OR } 3x=-8$$

$$\frac{3x}{3} = \frac{1}{3} \text{ OR } \frac{3x}{3} = \frac{-8}{3}$$

$$\underline{x = \frac{1}{3}} \text{ OR } \underline{x = -\frac{8}{3}}$$

35. Use factoring to solve the quadratic equation. Check by substitution or by using a graphing utility and identifying x-intercepts.

$$3x^2 + 15x = 0$$

The solution set is .

(Use a comma to separate answers as needed.)

Answer: 0, -5

ID: 1.5.9

$$\rightarrow 3x(x+5) = 0$$

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

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

$$\underline{x=0} \text{ OR } \underline{x=-5}$$

36. Solve the equation by factoring.

$15 - 15x = (4x + 1)(x - 1)$

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

Answer: 1, -4

ID: 1.5.13

$15 - 15x = 4x^2 - 4x + 1x - 1$
 $15 - 15x = 4x^2 - 3x - 1$
 $0 = 4x^2 - 3x - 1 - 15 + 15x$ rewrite
 $0 = 4x^2 + 12x - 16$
 $0 = 4(x^2 + 3x - 4)$
 $0 = 4(x - 1)(x + 4)$
 OR $x - 1 = 0$ OR $x + 4 = 0$
 $x - 1 + 1 = 0 + 1$ OR $x + 4 - 4 = 0 - 4$
 $x = 1$ OR $x = -4$

Possible
4, 1
2, 2

37. Solve the equation by the square root property.

$(x - 6)^2 = 9$

What is the solution set?

(Use a comma to separate answers as needed.)

Answer: 3, 9

ID: 1.5.21

$\sqrt{(x-6)^2} = \pm\sqrt{9}$
 $x - 6 = \pm 3$
 $x - 6 = -3$ OR $x - 6 = 3$
 $x - 6 + 6 = -3 + 6$ OR $x - 6 + 6 = 3 + 6$
 $x = 3$ OR $x = 9$
 Good Good

Check
 $(3-6)^2 = 9$
 $(-3)^2 = 9$
 $(-3)(-3) = 9$
 $9 = 9$
 $(9-6)^2 = 9$
 $(3)^2 = 9$
 $(3)(3) = 9$
 $9 = 9$

38. Solve the following equation using the quadratic formula.

$x^2 + 9x + 20 = 0$

$a=1, b=9, c=20$

The solution set is .

(Type an exact answer, using radicals as needed. Use a comma to separate answers as needed.)

Answer: -4, -5

ID: 1.5.65

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
 $x = \frac{-9 \pm \sqrt{9^2 - 4(1)(20)}}{2(1)}$
 $x = \frac{-9 \pm \sqrt{81 - 80}}{2}$
 $x = \frac{-9 \pm 1}{2}$ OR $x = \frac{-9 \pm 1}{2}$
 $x = \frac{-10}{2}$ OR $x = \frac{-8}{2}$
 $x = -5$ OR $x = -4$

39. Solve for x using the quadratic formula.

$x^2 - 8x + 20 = 0$

$a=1, b=-8, c=20$

Answer: $4 + 2i, 4 - 2i$

ID: 1.5.73

formula
 $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
 $x = \frac{-(-8) \pm \sqrt{(-8)^2 - 4(1)(20)}}{2(1)}$
 $x = \frac{8 \pm \sqrt{64 - 80}}{2}$
 $x = \frac{8 \pm \sqrt{-16}}{2}$
 $x = \frac{8 \pm 4i}{2}$
 $x = 4 \pm 2i$
 $x = 4 + 2i$ OR $x = 4 - 2i$

for example
 formula
 $\sqrt{-1} = i$
 $\sqrt{-4} = 2i$
 $\sqrt{-9} = 3i$
 $\sqrt{-16} = 4i$
 $\sqrt{-25} = 5i$
 $\sqrt{-36} = 6i$
 $\sqrt{-49} = 7i$
 $\sqrt{-64} = 8i$

40. Solve the equation by the method of your choice.

$5x^2 - 13x = 6$

$5x^2 - 13x - 6 = 0$
 $a=5, b=-13, c=-6$
 $x = \frac{-(-13) \pm \sqrt{(-13)^2 - 4(5)(-6)}}{2(5)}$
 $x = \frac{13 \pm \sqrt{169 + 120}}{10}$

$x = \frac{30}{10}$ or $x = \frac{-4}{10}$
 $x = 3$ or $x = \frac{2(-2)}{2(5)}$
 $x = \frac{-2}{5}$

The solution set is

(Type an exact answer, using radicals as needed. Use a comma to separate answers as needed.)

Answer: $3, -\frac{2}{5}$

ID: 1.5.83

41. Solve the following equation.

$3x^2 - 18x + 27 = 0$

$3x^2 - 18x + 27 = 0$
 $3(x^2 - 6x + 9) = 0$

The solution set is

(Use a comma to separate answers as needed.)

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

Answer: 3

~~$3=0$~~ OR $x-3=0$ OR $x-3=0$

ID: 1.5.95

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

$x=3$ OR $x=3$

answer only

$x=3$

42. Determine the x-intercepts of the graph of the quadratic. Then match the function with its graph. Each graph is shown in a $[-10, 10, 1]$ by $[-10, 10, 1]$ viewing rectangle. *Window*

$y = x^2 - 4x - 5$

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

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

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

use graphing calculator
 $y_1 = x^2 - 4x - 5$
and Trace function

Choose the correct graph below.

A. B. C. D.

Answers B. The x-intercept(s) is/are $x =$.

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

B.

ID: 1.5.109

43. In a round-robin chess tournament, each player is paired with every other player once. The function, shown below, models the number of chess games, N , that must be played in a round-robin tournament with t chess players. In a round-robin chess tournament, 36 games were played. How many players entered the tournament?

$N = \frac{t^2 - t}{2}$ *→ 36 = (t^2 - t) / 2*

How many players entered the tournament?

players (Simplify your answer.)

Answer: 9

ID: 1.5.131

36(2) = 1(t^2 - t) cross mult
72 = t^2 - t
0 = t^2 - t - 72 rewrite
0 = (t + 8)(t - 9)
let t + 8 = 0 OR t - 9 = 0
~~*t + 8 = 0 - 8 OR t - 9 + 9 = 0 + 9*~~
~~*t = -8*~~ OR *t = 9*
only t = 9

44. Solve the radical equation.

$$\sqrt{x+15} = x-5$$

$$\begin{aligned} (\sqrt{x+15})^2 &= (x-5)^2 \\ x+15 &= (x-5)(x-5) \\ x+15 &= x^2 - 5x - 5x + 25 \\ x+15 &= x^2 - 10x + 25 \end{aligned}$$

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

A. The solution set is { }.

(Use a comma to separate answers as needed.)

B. There is no solution.

$$\begin{aligned} 0 &= x^2 - 10x + 25 - x - 15 \\ 0 &= x^2 - 11x + 10 \end{aligned}$$

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

ID: 1.6.13

$$\begin{aligned} 0 &= (x-1)(x-10) \\ x-1 &= 0 \quad \text{OR} \quad x-10=0 \\ x-1+1 &= 0+1 \quad \text{OR} \quad x-10+10=0+10 \end{aligned}$$

Check

$$\begin{aligned} \cancel{x=1} \quad \text{OR} \quad x=10 \\ \sqrt{1+15} &= 1-5 \\ \sqrt{16} &= 1-5 \\ 4 &\neq -4 \\ \text{BAD} \end{aligned}$$

$$\begin{aligned} \sqrt{10+15} &= 10-5 \\ \sqrt{25} &= 5 \\ 5 &= 5 \\ \text{GOOD} \end{aligned}$$

ONLY
Answer
X=10

45. Solve the given radical equation. Check all proposed solutions.

$$\sqrt{2x+22} = x+7$$

$$\begin{aligned} (\sqrt{2x+22})^2 &= (x+7)^2 \\ 2x+22 &= (x+7)(x+7) \end{aligned}$$

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

A. The solution set is { }.

(Use a comma to separate answers as needed.)

B. There is no solution.

$$\begin{aligned} 2x+22 &= x^2 + 7x + 7x + 49 \\ 0 &= x^2 + 14x + 49 - 2x - 22 \end{aligned}$$

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

ID: 1.6.15

$$\begin{aligned} 0 &= x^2 + 12x + 27 \\ 0 &= (x+3)(x+9) \end{aligned}$$

$$\begin{aligned} x+3 &= 0 \quad \text{OR} \quad x+9=0 \\ x+3-3 &= 0-3 \quad \text{OR} \quad x+9-9=0-9 \\ x &= -3 \quad \text{OR} \quad x = -9 \end{aligned}$$

Check

$$\begin{aligned} \sqrt{2(-3)+22} &= -3+7 \\ \sqrt{-6+22} &= 4 \\ \sqrt{16} &= 4 \\ 4 &= 4 \\ \text{GOOD} \end{aligned}$$

$$\begin{aligned} \sqrt{2(-9)+22} &= -9+7 \\ \sqrt{-18+22} &= -2 \\ \sqrt{4} &= -2 \\ 2 &\neq -2 \\ \text{BAD} \end{aligned}$$

Answer
X=-3
ONLY

46. Find the solution set for the equation.

$$|x-2| = 8$$

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. Use a comma to separate answers as needed.)

B. There is no solution.

Answer: A. The solution set is { }.

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

ID: 1.6.63

$$|x-2| = 8$$

$$x-2 = -8 \quad \text{OR} \quad x-2 = 8$$

$$x-2+2 = -8+2 \quad \text{OR} \quad x-2+2 = 8+2$$

$$x = -6$$

$$x = 10$$

Formula
 $|x|=a$
 $x=-a \quad \text{OR} \quad x=a$

47. Use interval notation to express the solution set and graph the solution set on a number line.

$$2x + 4 > 10$$

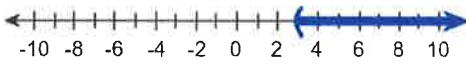

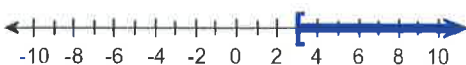
Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- A. The solution set is _____. (Type your answer using interval notation.)
- B. The solution set is \emptyset .

$$2x + 4 - 4 > 10 - 4$$

$$2x > 6$$

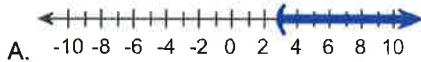
Choose the correct graph below.

- A. 
- B. 
- C. 
- D. The solution set is \emptyset .

$$\frac{2x}{2} > \frac{6}{2}$$

Answers A. The solution set is . (Type your answer using interval notation.)

$$x > 3$$



A.



$$(3, \infty)$$

ID: 1.7.27

48. Use interval notation to express the solution set and graph the solution set on a number line.

$$-5x \leq 30$$

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


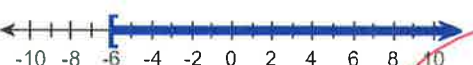
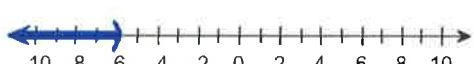
- A. The solution set is _____. (Type your answer using interval notation.)
- B. The solution set is \emptyset .

$$-5x \leq 30$$

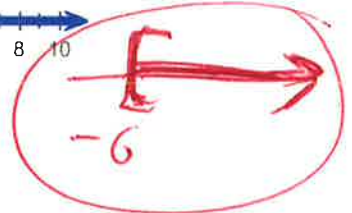
$$\frac{-5x}{-5} \geq \frac{30}{-5}$$

divide by a negative turn alligator around

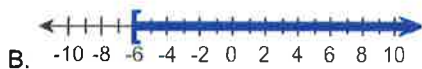
Choose the correct graph of the inequality.

- A. 
- B. 
- C. 
- D. The solution set is \emptyset .

$$x \geq -6$$



Answers A. The solution set is . (Type your answer using interval notation.)



B.

$$[-6, \infty)$$

ID: 1.7.31

49. Evaluate the function $f(x) = x^2 - 2x - 4$ at the given values of the independent variable and simplify.

- a. $f(-1)$ b. $f(x+5)$ c. $f(-x)$

a. $f(-1) = \boxed{}$ (Simplify your answer.)

b. $f(x+5) = \boxed{}$ (Simplify your answer.)

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

Answers - 1

$$x^2 + 8x + 11$$

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

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

$$f(-1) = (-1)^2 - 2(-1) - 4$$

$$f(-1) = (-1)(-1) - 2(-1) - 4$$

$$f(-1) = 1 + 2 - 4$$

$$f(-1) = -1$$

ID: 2.1.29

$$f(x+5) = (x+5)^2 - 2(x+5) - 4$$

$$f(x+5) = (x+5)(x+5) - 2(x+5) - 4$$

$$f(x+5) = x^2 + 5x + 5x + 25 - 2x - 10 - 4$$

$$f(x+5) = x^2 + 8x + 11$$

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

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

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

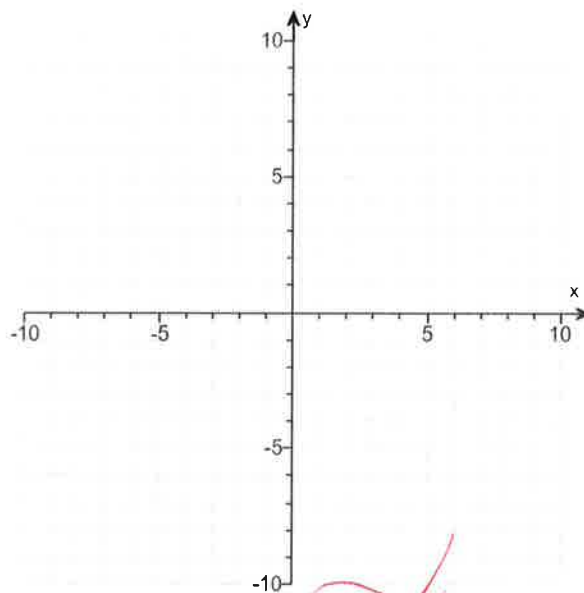
50. Graph the given functions, f and g , in the same rectangular coordinate system. Then describe how the graph of g is related to the graph of f .

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

Use the graphing tool to graph the functions.

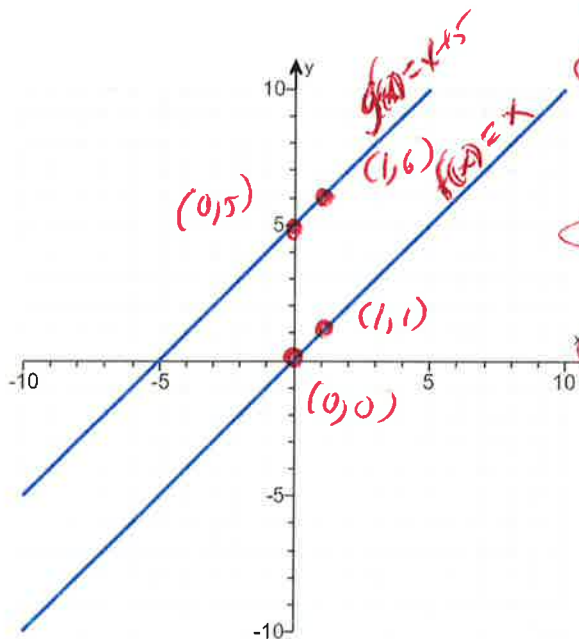
How is the graph of f shifted to get the graph of g ?

The graph of g is the graph of f shifted (1) by units.



- (1) up
 down

Answers



Handwritten work in red ink:

$f(x) = x$
 $f(0) = 0$
 $f(1) = 1$

x	$f(x)$
0	0
1	1

$g(x) = x + 5$
 $g(0) = 0 + 5 = 5$
 $g(1) = 1 + 5 = 6$

x	$g(x)$
0	5
1	6

(1) up
 5

ID: 2.1.39

51. Graph the given functions, f and g , in the same rectangular coordinate system. Describe how the graph of g is related to the graph of f .

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

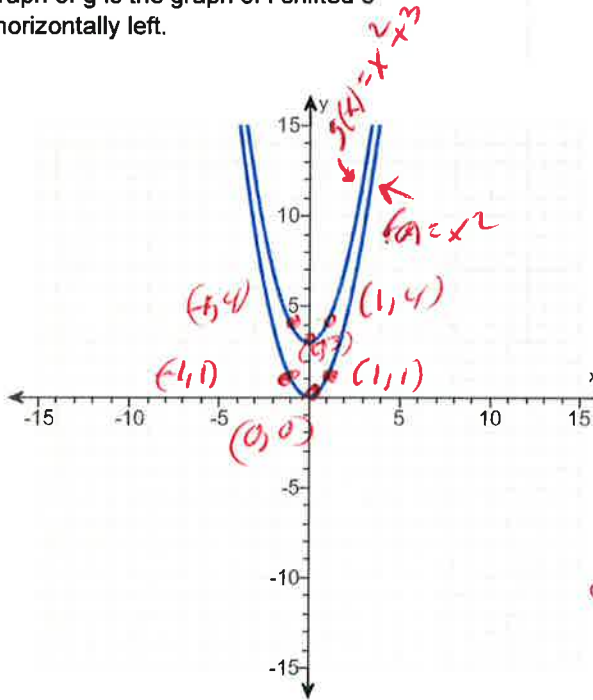
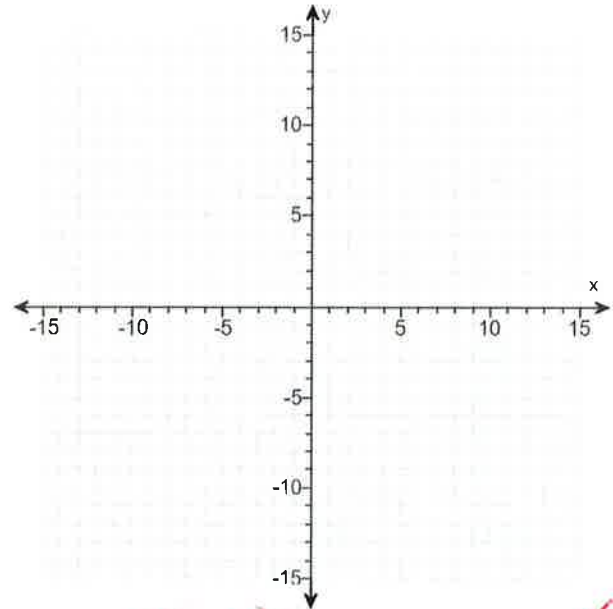
$$g(x) = x^2 + 3$$

Use the graphing tool to graph the functions.

How is the graph of g related to the graph of f ?

- A. The graph of g is the graph of f shifted 3 units vertically up.
- B. The graph of g is the graph of f shifted 3 units horizontally right.
- C. The graph of g is the graph of f shifted 3 units vertically down.
- D. The graph of g is the graph of f shifted 3 units horizontally left.

Answers



$f(x) = x^2$

$$f(-1) = (-1)^2 = (-1)(-1) = 1$$

$$f(0) = (0)^2 = (0)(0) = 0$$

$$f(1) = (1)^2 = (1)(1) = 1$$

x	$f(x)$
-1	1
0	0
1	1

$g(x) = x^2 + 3$

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

$$g(-1) = (-1)(-1) + 3$$

$$g(-1) = 1 + 3$$

$$g(-1) = 4$$

$$g(0) = (0)^2 + 3$$

$$g(0) = (0)(0) + 3$$

x	$g(x)$
-1	4
0	3
1	4

A. The graph of g is the graph of f shifted 3 units vertically up.

ID: 2.1.43

$$g(0) = 0 + 3$$

$$g(0) = 3$$

$$g(1) = (1)^2 + 3$$

$$g(1) = (1)(1) + 3$$

$$g(1) = 1 + 3$$

$$g(1) = 4$$

52. Graph the given functions, f and g , in the same rectangular coordinate system. Describe how the graph of g is related to the graph of f .

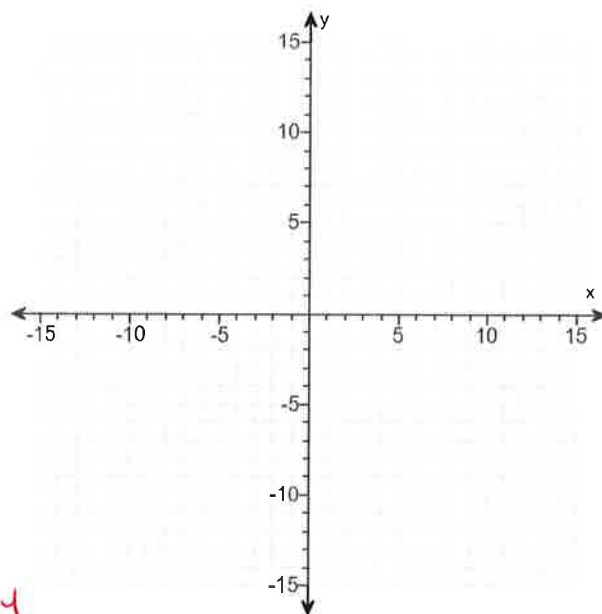
$$f(x) = |x|$$

$$g(x) = |x| + 4$$

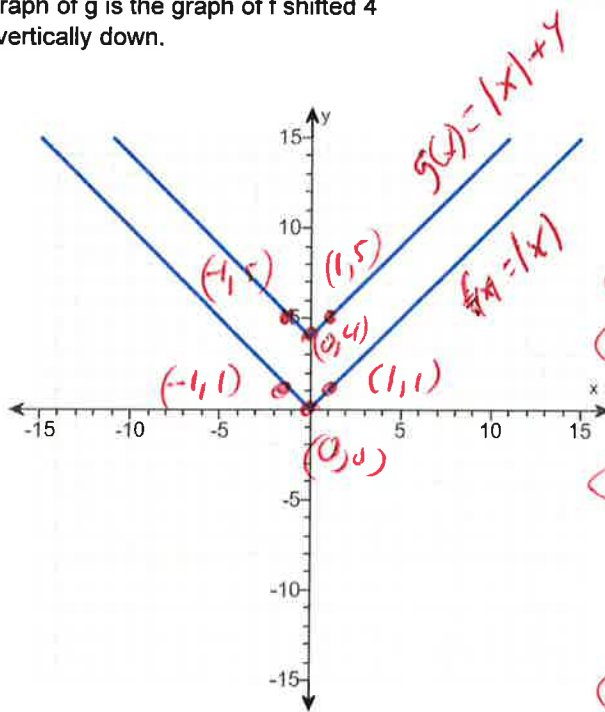
Use the graphing tool to graph the functions.

How is the graph of g related to the graph of f ?

- A. The graph of g is the graph of f shifted 4 units horizontally left.
- B. The graph of g is the graph of f shifted 4 units vertically up.
- C. The graph of g is the graph of f shifted 4 units horizontally right.
- D. The graph of g is the graph of f shifted 4 units vertically down.



Answers



$f(x) = |x|$
 $f(-1) = |-1| = 1$
 $f(0) = |0| = 0$
 $f(1) = |1| = 1$

x	f(x)
-1	1
0	0
1	1

$g(x) = |x| + 4$
 $g(-1) = |-1| + 4$
 $g(-1) = 1 + 4$
 $g(-1) = 5$

x	g(x)
-1	5
0	4
1	5

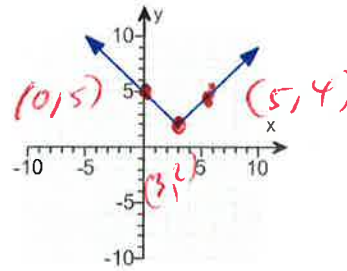
B. The graph of g is the graph of f shifted 4 units vertically up.

ID: 2.1.45

$g(0) = |0| + 4$
 $g(0) = 0 + 4$
 $g(0) = 4$
 $g(1) = |1| + 4$
 $g(1) = 1 + 4$
 $g(1) = 5$

53. Use the graph to determine the following.

- a. the function's domain
- b. the function's range
- c. the x-intercepts, if any
- d. the y-intercept, if any
- e. the function values, $f(0)$ and $f(5)$.



Assume that the graph of the function continues its trend beyond the displayed coordinate grid.

a. What is the function's domain?

(Type your answer in interval notation.)

b. What is the function's range?

(Type your answer in interval notation.)

c. Find the x-intercept(s), if there are any. Select the correct choice below and fill in any answer boxes within your choice.

A. _____ (Type an integer. Use a comma to separate answers as needed.)

B. There is no x-intercept.

d. Find the y-intercept(s), if there are any. Select the correct choice below and fill in any answer boxes within your choice.

A. _____ (Type an integer. Use a comma to separate answers as needed.)

B. There is no y-intercept.

e. Find the values of the function.

$f(0) =$

$f(5) =$

Answers ($-\infty, \infty$)

[2, ∞)

B. There is no x-intercept.

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

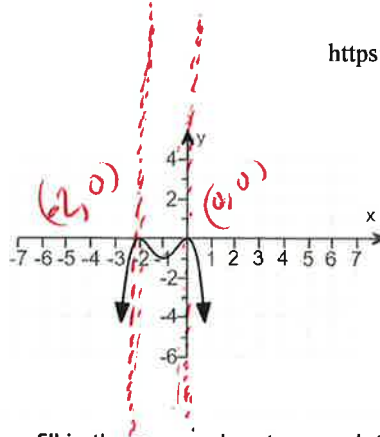
5

4

ID: 2.1.79

54. Use the graph to determine

- (a) open intervals on which the function is increasing, if any.
 (b) open intervals on which the function is decreasing, if any.
 (c) open intervals on which the function is constant, if any.



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

- A. The function is increasing on the interval(s) $(-\infty, -2) \cup (-1, 0)$
 (Type your answer in interval notation. Use a comma to separate answers as needed.)
 B. The function is never increasing.

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

- A. The function is decreasing on the interval(s) $(-2, -1) \cup (0, \infty)$
 (Type your answer in interval notation. Use a comma to separate answers as needed.)
 B. The function is never decreasing.

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

- A. The function is constant on the interval(s) _____
 (Type your answer in interval notation. Use a comma to separate answers as needed.)
 B. The function is never constant.

Answers A. The function is increasing on the interval(s) $(-\infty, -2), (-1, 0)$.
 (Type your answer in interval notation. Use a comma to separate answers as needed.)

A. The function is decreasing on the interval(s) $(-2, -1), (0, \infty)$.
 (Type your answer in interval notation. Use a comma to separate answers as needed.)

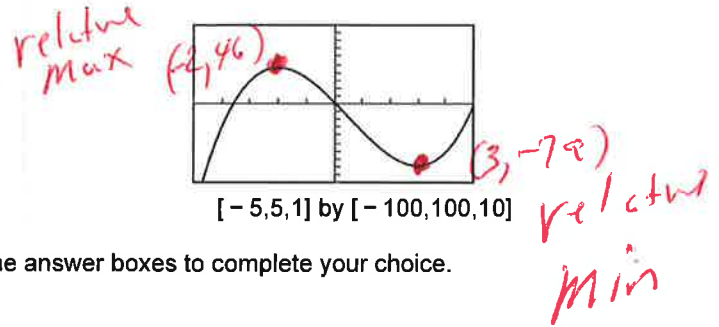
B. The function is never constant.

ID: 2.2.9

55.

- The graph and equation of the function f are given.
- Use the graph to find any values at which f has a relative maximum, and use the equation to calculate the relative maximum for each value.
 - Use the graph to find any values at which f has a relative minimum, and use the equation to calculate the relative minimum for each value.

$$f(x) = 2x^3 - 3x^2 - 36x + 2$$



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

- A. The function f has (a) relative maxima(maximum) at _____ and the relative maxima(maximum) are(is) _____.
(Use a comma to separate answers as needed.)

- B. The function f has no relative maxima.

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

- A. The function f has (a) relative minima(minimum) at _____ and the relative minima(minimum) are(is) _____.
(Use a comma to separate answers as needed.)

- B. The function f has no relative minima.

Answers A.

The function f has (a) relative maxima(maximum) at and the relative maxima(maximum) are(is) .
(Use a comma to separate answers as needed.)

A.

The function f has (a) relative minima(minimum) at and the relative minima(minimum) are(is) .
(Use a comma to separate answers as needed.)

ID: 2.2.15

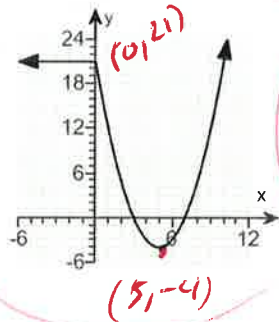
use graphing calc

window
 $x\text{-min} = -5$
 $x\text{-max} = 5$
 $y\text{-min} = -100$
 $y\text{-max} = 100$

$$y_1 = 2x^3 - 3x^2 - 36x + 2$$

relative max (-2, 46)
relative min (3, -79)

56. Use the graph to find the following.



- (a) the domain of f
- (b) the range of f
- (c) the x-intercepts
- (d) the y-intercept
- (e) intervals on which f is increasing
- (f) intervals on which f is decreasing
- (g) intervals on which f is constant
- (h) the number at which f has a relative minimum
- (i) the relative minimum of f
- (j) $f(-2)$
- (k) The values of x for which $f(x) = -3$
- (l) Is f even, odd or neither?

(a) What is the domain of f ?

(Type your answer in interval notation.)

(b) What is the range of f ?

(Type your answer in interval notation.)

(c) What are the zeros of the function?

The left zero of the function is 3 and the right zero is .

(d) What is the y-intercept?

The y-intercept of the function is .

(e) Over what interval is f increasing?

(Type your answer in interval notation.)

(f) Over what interval is f decreasing?

(Type your answer in interval notation.)

(g) Over what interval is f constant?

(Type your answer in interval notation.)

(h) What is the number at which f has a relative minimum?

(i) What is the relative minimum of f ?

(j) What is $f(-2)$?

$f(-2) =$

(k) What are the x-values where $f(x) = -3$? The leftmost x-value where $f(x) = -3$ is when $x = 4$.

What is the rightmost x-value where $f(x) = -3$?

$x =$

(l) Is f even, odd, or neither?

even

Answers $(-\infty, \infty)$

$[-4, \infty)$

7

21

$(5, \infty)$

$(0, 5)$

$(-\infty, 0)$

5

-4

21

6

neither

ID: 2.2.33

57. The domain of the piecewise function is $(-\infty, \infty)$.

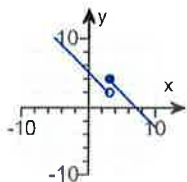
a. Graph the function.

b. Use your graph to determine the function's range.

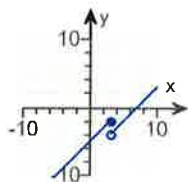
$$f(x) = \begin{cases} x + 1 & \text{if } x < 3 \\ x - 1 & \text{if } x \geq 3 \end{cases}$$

a. Choose the correct graph below.

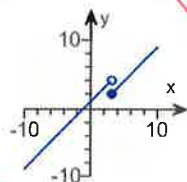
A.



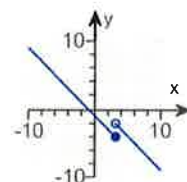
B.



C.

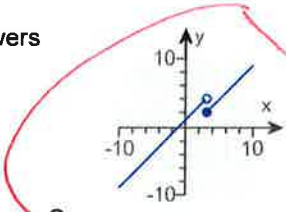


D.



b. The range of $f(x)$ is . (Type your answer in interval notation.)

Answers



C.
 $(-\infty, \infty)$

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

Handwritten note:
 use graphing calculator

Handwritten note:
 2ND Math

ID: 2.2.47

Handwritten notes:
 $y_1 = x + 1 \div (x < 3)$ OPEN circle
 $y_2 = x - 1 \div (x \geq 3)$ closed circle

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

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

$$\frac{f(x+h) - f(x)}{h} = \frac{((x+h)^2 - 4(x+h) + 3) - (x^2 - 4x + 3)}{h} =$$

Answer: $2x + h - 4$

$$\frac{(x+h)(x+h) - 4x - 4h + 3 - x^2 + 4x - 3}{h} =$$

$$\frac{x^2 + xh + xh + h^2 - 4x - 4h + 3 - x^2 + 4x - 3}{h} =$$

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

ID: 2.2.61

59. Find the slope of the line passing through the pair of points or state that the slope is undefined. Then indicate whether the line through the points rises, falls, is horizontal, or is vertical.

(7, -4) and (4,8)

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

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

Indicate whether the line through the points rises, falls, is horizontal, or is vertical.

- The line is horizontal.
- The line is vertical.
- The line rises from left to right.
- The line falls from left to right.

Answers A. The slope is . (Simplify your answer.)

The line falls from left to right.

ID: 2.3.7

Slope $\left\{ \begin{matrix} (7, -4) \text{ and } (4, 8) \\ x_1 \ y_1 \quad x_2 \ y_2 \end{matrix} \right.$

$$m = \frac{y_1 - y_2}{x_1 - x_2}$$

$$m = \frac{(-4) - (8)}{(7) - (4)}$$

$$m = \frac{-4 - 8}{7 - 4}$$

$$m = \frac{-12}{3}$$

$$m = -4$$

60. Write the point-slope form of the line's equation satisfying the given conditions. Then use the point-slope form of the equation to write the slope-intercept form of the equation.

Slope = 5, passing through (6,2)

What is the point-slope form of the equation of the line?

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

What is the slope-intercept form of the equation of the line?

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

Answers $y - 2 = 5(x - 6)$

$y = 5x - 28$

ID: 2.3.11

61. Use the given conditions to write an equation for the line in point-slope form and slope-intercept form.

Passing through (-4, -9) and (1,6)

What is the equation of the line in point-slope form?

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

What is the equation of the line in slope-intercept form?

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

Answers $y + 9 = 3(x + 4)$

$y = 3x + 3$

ID: 2.3.29

Handwritten work for problem 61:

$$y - y_1 = \frac{y_2 - y_1}{x_2 - x_1} (x - x_1)$$

$$y - (-9) = \frac{(-9) - (6)}{(-4) - (1)} (x - (-4))$$

$$y + 9 = \frac{-9 - 6}{-4 - 1} (x + 4)$$

$$y + 9 = \frac{-15}{-5} (x + 4)$$

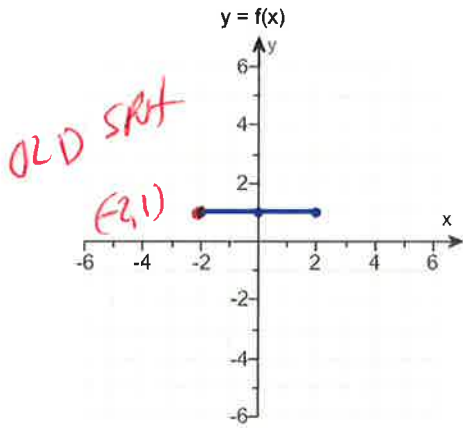
$$y + 9 = 3(x + 4)$$

$$y + 9 = 3x + 12$$

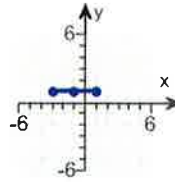
$$y + 9 - 9 = 3x + 12 - 9$$

$$y = 3x + 3$$

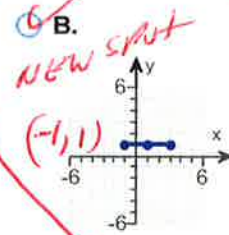
62. Use the graph of $y = f(x)$ to graph the function $g(x) = f(x - 1)$. Choose the correct graph of g below.



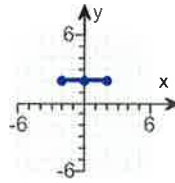
A.



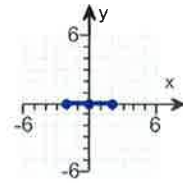
B.



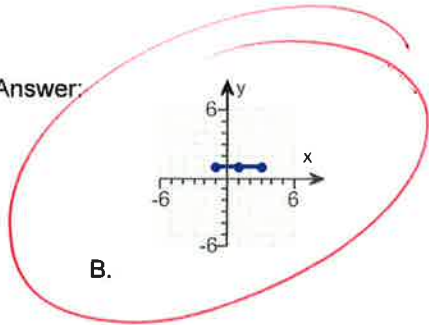
C.



D.



Answer:

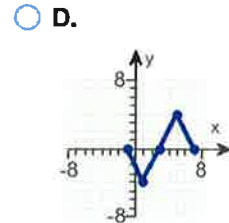
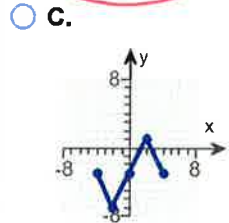
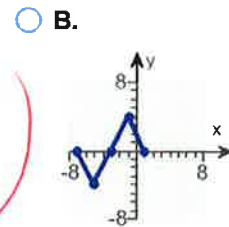
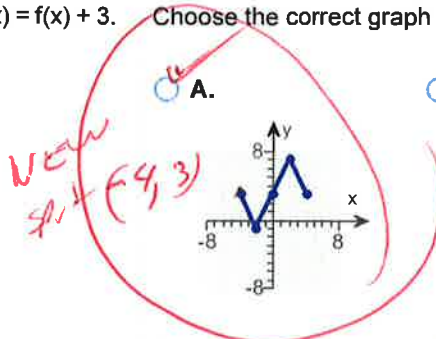
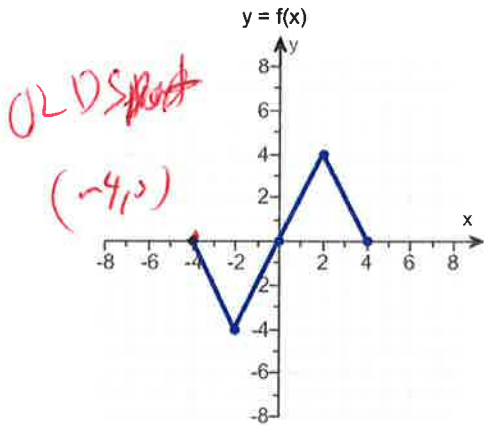


ID: 2.5.3

$$g(x) = f(x - 1)$$

Shift right 1
Opposite

63. Use the graph of $y = f(x)$ to graph the function $g(x) = f(x) + 3$. Choose the correct graph of g below.



Answer:

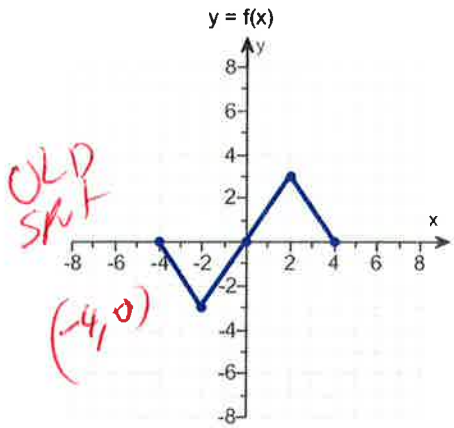
A.

ID: 2.5.17

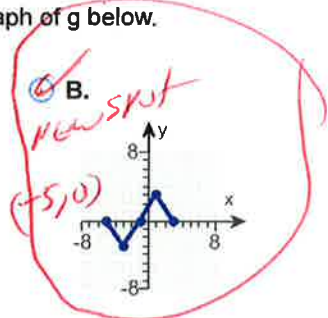
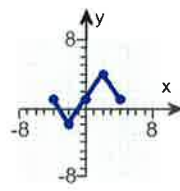
$g(x) = f(x) + 3$
Shift up 3

64. Use the graph of $y = f(x)$ to graph the function $g(x) = f(x + 1)$.

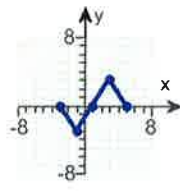
Choose the correct graph of g below.



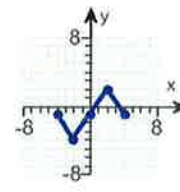
A.



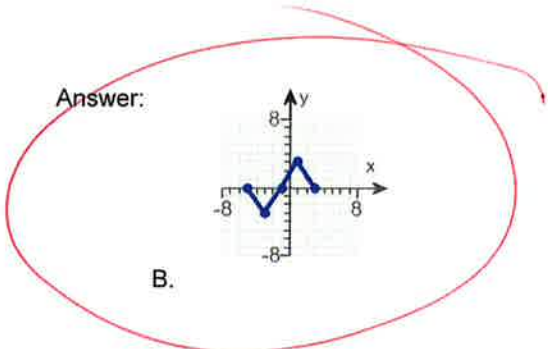
C.



D.



Answer:

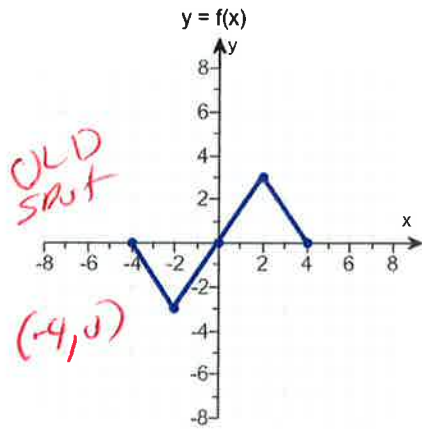


ID: 2.5.19

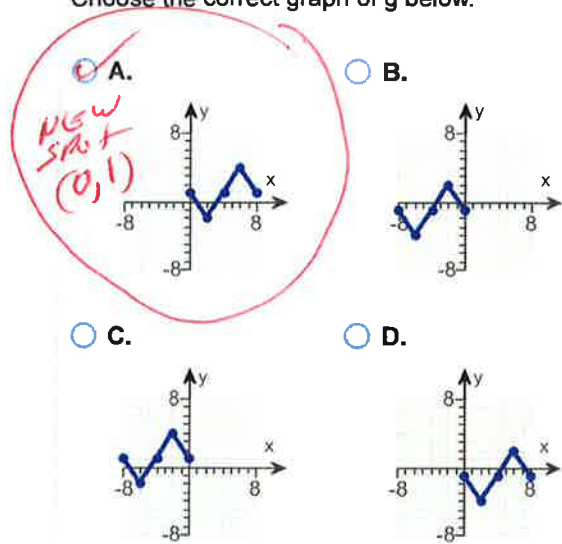
$$g(x) = f(x+1)$$

Shift left -1
opposite

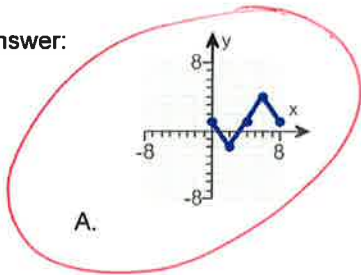
65. Use the graph of $y = f(x)$ to graph the function $g(x) = f(x - 4) + 1$.



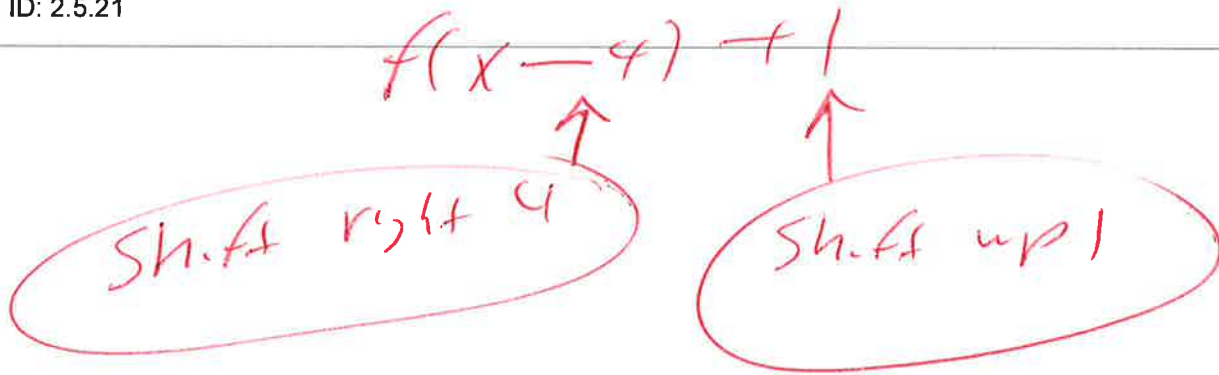
Choose the correct graph of g below.



Answer:



ID: 2.5.21



66. Begin by graphing the absolute value function, $f(x) = |x|$. Then use transformations of this graph to graph the given function.

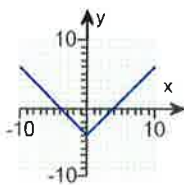
$$h(x) = |x - 4|$$

What transformations are needed in order to obtain the graph of $h(x)$ from the graph of $f(x)$? Select all that apply.

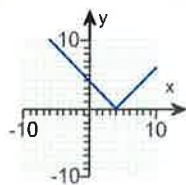
- A. Reflection about the x-axis
- B. Reflection about the y-axis
- C. Vertical stretch/shrink
- D. Horizontal translation
- E. Horizontal stretch/shrink
- F. Vertical translation

Choose the correct graph of $h(x) = |x - 4|$ below.

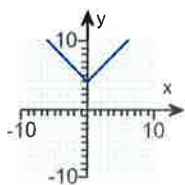
A.



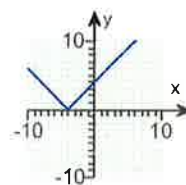
B.



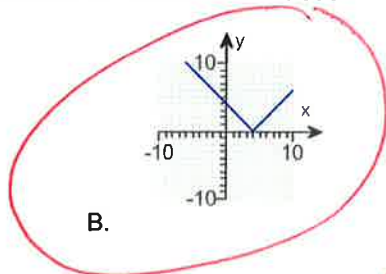
C.



D.



Answers D. Horizontal translation



ID: 2.5.83

$$h(x) = |x - 4|$$

Shift ~~Left~~ Right
 use graphing calculator
 $y_1 = \text{math, num, abs}$

Windows

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

$$y_1 = \text{abs}(x - 4)$$

67. Begin by graphing the absolute value function, $f(x) = |x|$. Then use transformations of this graph to graph the given function.

$$h(x) = |x + 3| - 6$$

What transformations are needed in order to obtain the graph of $h(x)$ from the graph of $f(x)$? Select all that apply.

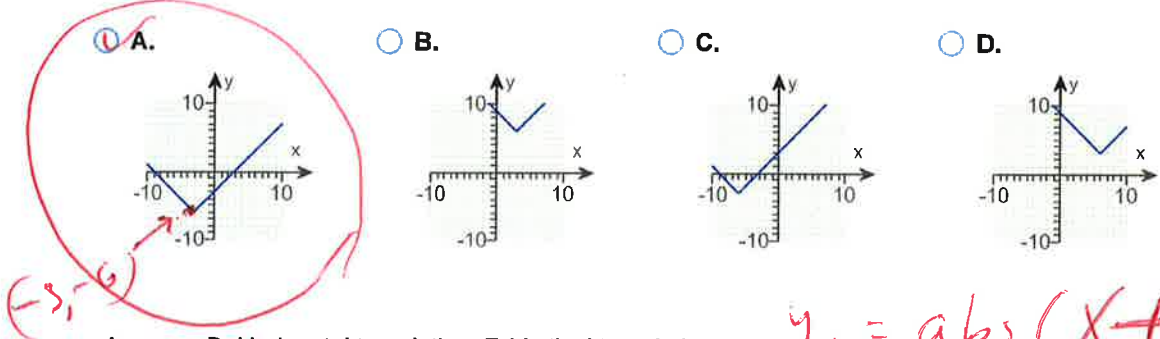
- A. Horizontal stretch/shrink
- B. Horizontal translation
- C. Vertical stretch/shrink
- D. Reflection about the x-axis
- E. Reflection about the y-axis
- F. Vertical translation

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

use graphs calculator
 $y_1 = \text{math num abs}$

$y_1 = \text{abs}(x + 3) - 6$

Choose the correct graph of $h(x)$ below.



Answers B. Horizontal translation, F. Vertical translation

$y_1 = \text{abs}(x + 3) - 6$

Shift left -3
Shift down -6

ID: 2.5.85

68. Find the domain of the function.

$$f(x) = \sqrt{20 - 5x}$$

What is the domain of f ?

(Type your answer in interval notation.)

Answer: $(-\infty, 4]$

ID: 2.6.23

set $f(x) = \sqrt{20 - 5x}$
so $20 - 5x \geq 0$
 $20 - 5x - 20 \geq 0 - 20$
 $-5x \geq -20$
 $\frac{-5x}{-5} \leq \frac{-20}{-5}$
 $x \leq 4$

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

divided by negative then flip sign

$x \leq 4$

$(-\infty, 4]$

69. First find $f + g$, $f - g$, fg and $\frac{f}{g}$. Then determine the domain for each function.

$f(x) = 6x - 3$, $g(x) = x + 2$

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

What is the domain of $f + g$?

- $(-\infty, \infty)$
- $\left(-\infty, \frac{1}{7}\right) \cup \left(\frac{1}{7}, \infty\right)$
- $[0, \infty)$
- $\left[\frac{1}{7}, \infty\right)$

$f(x) + g(x) =$
 $(6x - 3) + (x + 2) =$
 $6x - 3 + x + 2 =$
 $7x - 1 =$ domain = $(-\infty, \infty)$

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

What is the domain of $f - g$?

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

$f(x) - g(x) =$
 $(6x - 3) - (x + 2) =$
 $6x - 3 - x - 2 =$
 $5x - 5 =$ domain = $(-\infty, \infty)$

$(fg)(x) =$

What is the domain of fg ?

- $[0, \infty)$
- $(-\infty, \infty)$
- $(-\infty, -2) \cup (-2, \infty)$
- $\left(-\infty, \frac{1}{2}\right) \cup \left(\frac{1}{2}, \infty\right)$

$f \cdot g(x) =$
 $(6x - 3)(x + 2) =$
 $6x^2 + 12x - 3x - 6 =$
 $6x^2 + 9x - 6 =$ domain $(-\infty, \infty)$

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

What is the domain of $\frac{f}{g}$?

- $(-\infty, -2) \cup (-2, \infty)$
- $(-2, \infty)$
- $(-\infty, \infty)$
- $[0, \infty)$

$\frac{f(x)}{g(x)} =$
 $\frac{6x - 3}{x + 2} =$ domain $(-\infty, -2) \cup (-2, \infty)$

Answers $7x - 1$

$$(-\infty, \infty)$$

$$5x - 5$$

$$(-\infty, \infty)$$

$$6x^2 + 9x - 6$$

$$(-\infty, \infty)$$

$$\frac{6x - 3}{x + 2}$$

$$(-\infty, -2) \cup (-2, \infty)$$

ID: 2.6.31

70. First find $f + g$, $f - g$, fg and $\frac{f}{g}$. Then determine the domain for each function.

$f(x) = 3x^2 - 11x - 42$, $g(x) = x - 6$

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

$f(x + g(x))$
 $(3x^2 - 11x - 42) + (x - 6) =$
 $3x^2 - 11x - 42 + x - 6 =$
 $3x^2 - 10x - 48 =$

What is the domain of $f + g$?

- $(-\frac{24}{5}, \infty)$
- $[0, \infty)$
- $(-\infty, \infty)$
- $(-\infty, -\frac{24}{5}) \cup (-\frac{24}{5}, \infty)$

$3x^2 - 10x - 48 =$
 domain $(-\infty, \infty)$

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

$f(x) - g(x)$
 $(3x^2 - 11x - 42) - (x - 6) =$
 $3x^2 - 11x - 42 - x + 6 =$

What is the domain of $f - g$?

- $(-\infty, \infty)$
- $(-\infty, -\frac{42}{11}) \cup (-\frac{42}{11}, \infty)$
- $[0, \infty)$
- $(-\frac{24}{5}, \infty)$

$3x^2 - 12x - 36 =$
 domain $(-\infty, \infty)$

$(fg)(x) = \text{[]}$

$f(x) \cdot g(x) =$
 $(3x^2 - 11x - 42)(x - 6) =$
 $3x^3 - 18x^2 - 11x^2 + 66x - 42x + 252 =$

What is the domain of fg ?

- $(-\infty, \infty)$
- $(-\infty, -3) \cup (-3, \infty)$
- $(-\infty, 6) \cup (6, \infty)$
- $(-3, \infty)$

$3x^3 - 29x^2 + 24x + 252 =$
 domain $(-\infty, \infty)$

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

$\frac{f(x)}{g(x)}$

What is the domain of $\frac{f}{g}$?

- $[0, \infty)$
- $(-\infty, \infty)$
- $(-\infty, 6) \cup (6, \infty)$
- $(6, \infty)$

$\frac{3x^2 - 11x - 42}{x - 6} =$
 $(3x + 7)(x - 6) =$
 $(x - 6)$

domain is
 $x - 6 \neq 0$
 $x - 6 + 6 = 0 + 6$
 $x \neq -6$

$\frac{(3x + 7)(x - 6)}{(x - 6)} =$ simplify
 $3x + 7 =$
 domain $(-\infty, 6) \cup (6, \infty)$

Answers $3x^2 - 10x - 48$

$(-\infty, \infty)$

$3x^2 - 12x - 36$

$(-\infty, \infty)$

$3x^3 - 29x^2 + 24x + 252$

$(-\infty, \infty)$

$3x + 7$

$(-\infty, 6) \cup (6, \infty)$

ID: 2.6.35

71. For $f(x) = 5x$ and $g(x) = x + 9$, find the following functions.

a. $(f \circ g)(x)$; b. $(g \circ f)(x)$; c. $(f \circ g)(3)$; d. $(g \circ f)(3)$

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

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

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

$f(x+9) =$

c. $(f \circ g)(3) =$

$5(x+9) =$

d. $(g \circ f)(3) =$

$5x + 45 =$ ✓

Answers $5x + 45$

$5x + 9$

60

24

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

$g(f(x)) =$

$g(5x) =$

$(5x) + 9 =$ ✓

$5x + 9 =$

ID: 2.6.51

$(f \circ g)(x) = 5x + 45$

$(f \circ g)(3) = 5(3) + 45$

$(f \circ g)(3) = 15 + 45$ ✓

$(f \circ g)(3) = 60$

$(g \circ f)(x) = 5x + 9$

$(g \circ f)(3) = 5(3) + 9$

$(g \circ f)(3) = 15 + 9$ ✓

$(g \circ f)(3) = 24$

72. For $f(x) = x + 3$ and $g(x) = 5x + 2$, find the following functions.

a. $(f \circ g)(x)$; b. $(g \circ f)(x)$; c. $(f \circ g)(-2)$; d. $(g \circ f)(-2)$

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

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

c. $(f \circ g)(-2) = \boxed{}$

d. $(g \circ f)(-2) = \boxed{}$

Answers $5x + 5$

$5x + 17$

-5

7

ID: 2.6.53

Handwritten work for problem 72:

$(f \circ g)(x) = (f \circ g)(x) = 5x + 5$
 $f(x) = x + 3$
 $f(5x + 2) = (5x + 2) + 3 = 5x + 5$
 $(f \circ g)(-2) = 5(-2) + 5 = -10 + 5 = -5$

$(g \circ f)(x) = 5x + 17$
 $(g \circ f)(-2) = 5(-2) + 17 = -10 + 17 = 7$

Answers: $5x + 5$, $5x + 17$, -5 , 7

73. For $f(x) = 1 - x$ and $g(x) = 3x^2 + x + 2$, find the following functions.

a. $(f \circ g)(x)$; b. $(g \circ f)(x)$; c. $(f \circ g)(3)$; d. $(g \circ f)(3)$

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

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

c. $(f \circ g)(3) = \boxed{}$

d. $(g \circ f)(3) = \boxed{}$

Answers $-3x^2 - x - 1$

$3x^2 - 7x + 6$

-31

12

ID: 2.6.59

Handwritten work for problem 73:

$(f \circ g)(x) = -3x^2 - x - 1$
 $f(x) = 1 - x$
 $f(3x^2 + x + 2) = 1 - (3x^2 + x + 2) = -3x^2 - x - 1$
 $(f \circ g)(3) = -3(3)^2 - (3) - 1 = -27 - 3 - 1 = -31$

$(g \circ f)(x) = 3x^2 - 7x + 6$
 $(g \circ f)(3) = 3(3)^2 - 7(3) + 6 = 27 - 21 + 6 = 12$

Answers: $-3x^2 - x - 1$, $3x^2 - 7x + 6$, -31 , 12

Work for (b):
 $(g \circ f)(x) = 3(1-x)^2 + (1-x) + 2 = 3(1-2x+x^2) + 1-x+2 = 3-6x+3x^2+1-x+2 = 3x^2-7x+6$

74. The function $f(x) = 7x + 4$ is one-to-one.

Find an equation for $f^{-1}(x)$, the inverse function.

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

(Type an expression for the inverse. Use integers or fractions for any numbers in the expression.)

Answer: $\frac{x-4}{7}$

$y = 7x + 4$

$x = 7y + 4$ inv variable

$x - 4 = 7y + 4 - 4$ solve for y

$x - 4 = 7y$

$\frac{x-4}{7} = \frac{7y}{7}$

$\frac{x-4}{7} = y$

$f^{-1}(x) = \frac{x-4}{7}$ ✓

ID: 2.7.15

75. Find the distance between the pair of points.

(3,7) and (9,15)

The distance between the points is units.

(Round to two decimal places as needed.)

Answer: 10

$d = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$ formula

$d = \sqrt{(3 - 9)^2 + (7 - 15)^2}$

$d = \sqrt{(-6)^2 + (-8)^2}$

$d = \sqrt{36 + 64}$

$d = \sqrt{100}$

$d = 10$ ✓

$d = 10$ ✓

formula

ID: 2.8.1

76. Find the midpoint of the line segment with the given endpoints.

(6,2) and (4,8)

The midpoint of the segment is .

(Type an ordered pair.)

Answer: (5,5)

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

Midpoint = $(\frac{(6) + (4)}{2}, \frac{(2) + (8)}{2})$

= $(\frac{6+4}{2}, \frac{2+8}{2})$

= $(\frac{10}{2}, \frac{10}{2})$

= (5, 5) ✓

ID: 2.8.19

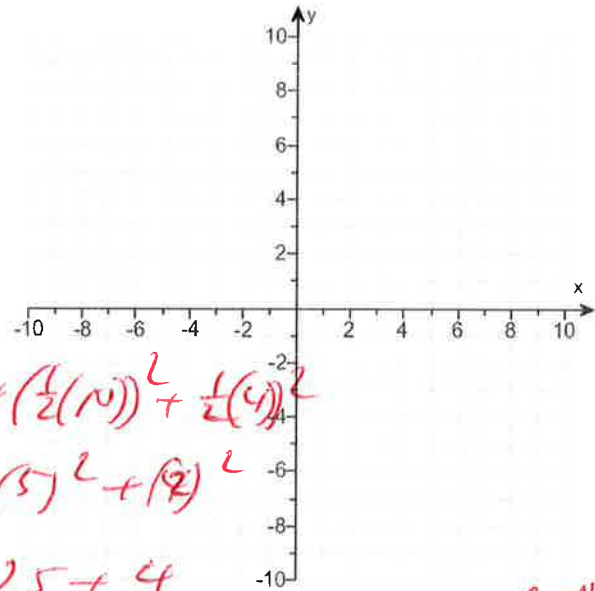
77. Complete the square and write the equation of the circle in standard form. Then determine the center and radius of the circle to graph the equation.

$$x^2 + y^2 + 10x + 4y + 28 = 0$$

$$x^2 + 10x + y^2 + 4y = -28$$

The equation in standard form is .
(Simplify your answer.)

Use the graphing tool to graph the circle.



$$x^2 + 10x + (\frac{1}{2}(10))^2 + y^2 + 4y + (\frac{1}{2}(4))^2 = -28 + (\frac{1}{2}(10))^2 + \frac{1}{2}(4))^2$$

$$x^2 + 10x + (5)^2 + y^2 + 4y + (2)^2 = -28 + (5)^2 + (2)^2$$

$$x^2 + 10x + 25 + y^2 + 4y + 4 = -28 + 25 + 4$$

$$(x+5)(x+5) + (y+2)(y+2) = 1$$

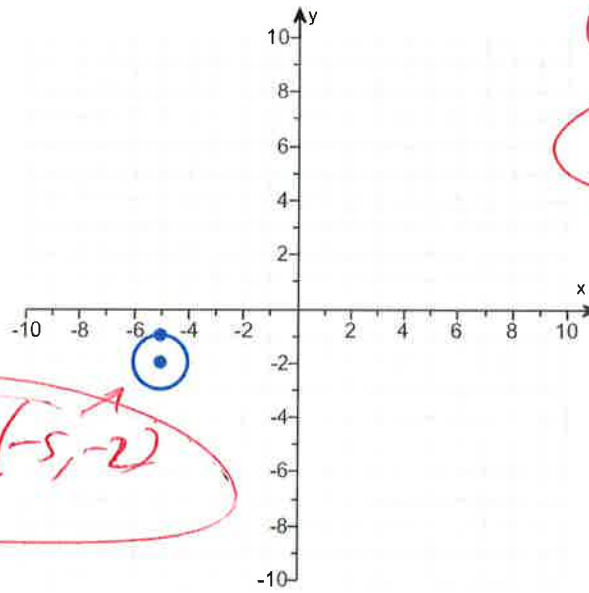
Answers $(x+5)^2 + (y+2)^2 = 1$

formula

$$(x+5)^2 + (y+2)^2 = 1$$

$$\text{Center} = (-5, -2)$$

$$\text{Radius} = \sqrt{1} = 1$$



$$\text{Center } (-5, -2)$$

ID: 2.8.53

78. In the following exercise, find the coordinates of the vertex for the parabola defined by the given quadratic function.

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

The vertex is . (Type an ordered pair.)

Answer: (-2, 6)

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

$$\text{Vertex} = (-2, 6)$$

formula

$$f(x) = a(x+h)^2 + c$$

$$\text{Vertex} = (-h, c)$$

ID: 3.1.11

79. In the following exercise, find the coordinates of the vertex for the parabola defined by the given quadratic function.

$$f(x) = 4x^2 - 16x + 6$$

The vertex is . (Type an ordered pair.)

Answer: (2, -10)

ID: 3.1.13

$$f(x) = 4x^2 - 16x + 6$$

$$a=4, b=-16, c=6$$

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

$$\text{Vertex} = \left(-\frac{-16}{2(4)}, f\left(-\frac{-16}{2(4)}\right)\right)$$

$$\text{Vertex} = \left(\frac{16}{8}, f\left(\frac{16}{8}\right)\right)$$

$$\text{Vertex} = (2, f(2))$$

$$\text{Vertex} = (2, 4(2)^2 - 16(2) + 6)$$

$$\text{Vertex} = (2, 4(2)(2) - 16(2) + 6)$$

$$\text{Vertex} = (2, 4(4) - 16(2) + 6)$$

$$\text{Vertex} = (2, 16 - 32 + 6)$$

$$\text{Vertex} = (2, -16 + 6)$$

$$\text{Vertex} = (2, -10)$$

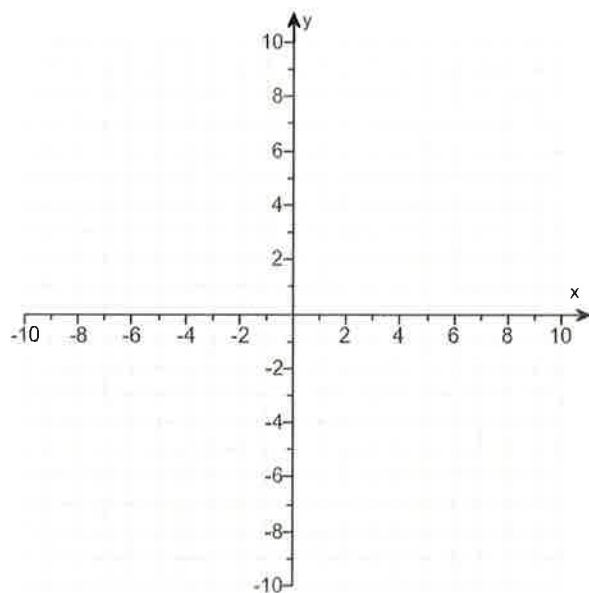
Formula
Vertex
 $\left(-\frac{b}{2a}, f\left(-\frac{b}{2a}\right)\right)$

80. Use the vertex and intercepts to sketch the graph of the quadratic function. Give the equation of the parabola's axis of symmetry. Use the graph to determine the domain and range of the function.

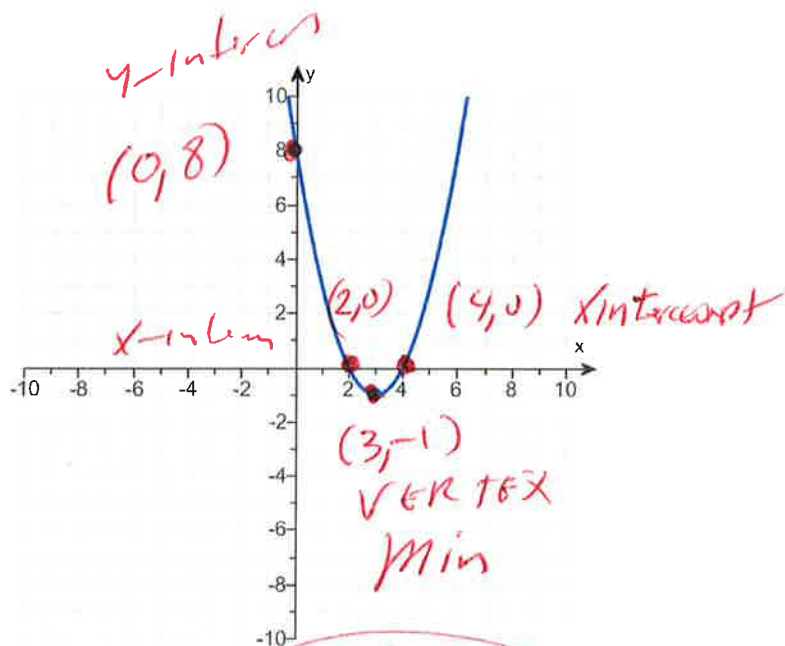
$$f(x) = (x - 3)^2 - 1$$

Use the graphing tool to graph the function. Use the vertex and one of the intercepts when drawing the graph.

The axis of symmetry is .
 (Type an equation. Simplify your answer.)
 The domain of the function is .
 (Type your answer in interval notation.)
 The range of the function is .
 (Type your answer in interval notation.)



Answers



x	f(x)
0	8
2	0
3	-1
4	0

x = 3
 (-∞, ∞)
 [-1, ∞)

ID: 3.1.17

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

use graphy calculator

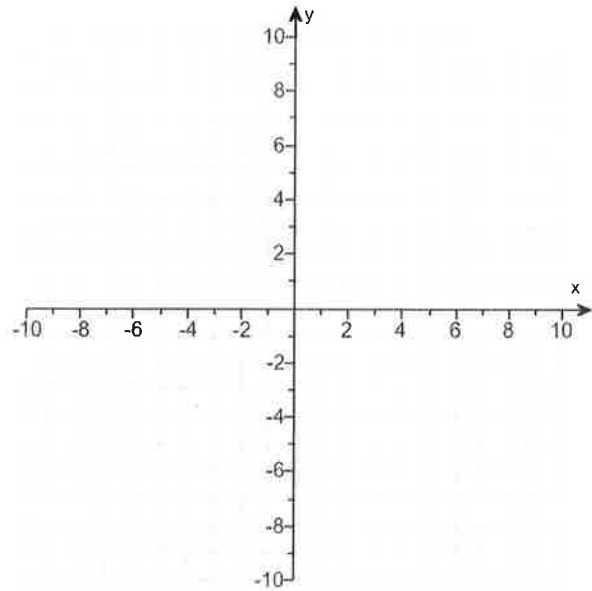
$$y_1 = (x - 3)^2 - 1$$

Shift right 3
 Shift down 1

81. Use the vertex and intercepts to sketch the graph of the quadratic function. Give the equation of the parabola's axis of symmetry. Use the graph to determine the function's domain and range.

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

Use the graphing tool to graph the equation. Use the vertex and one of the intercepts when drawing the graph.

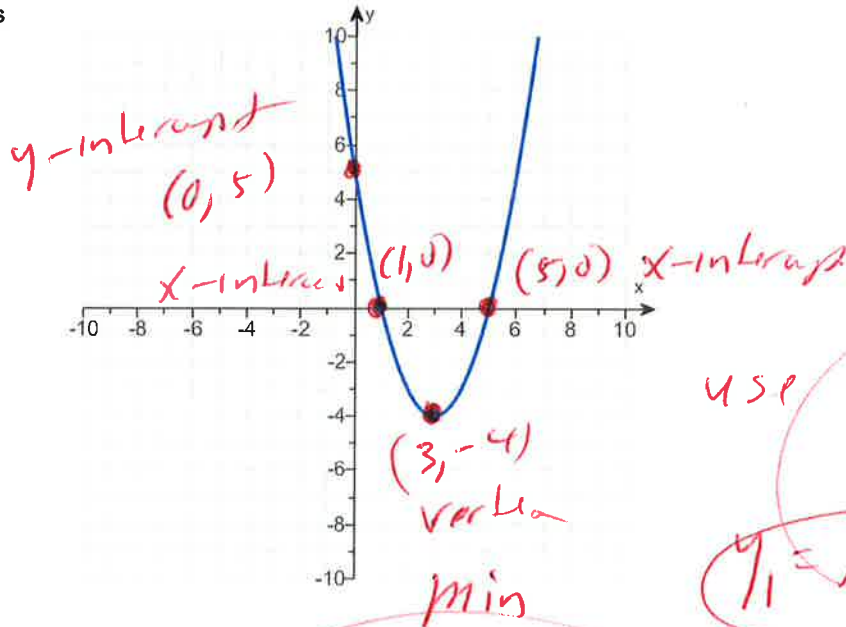


The axis of symmetry is .
(Type an equation.)

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

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

Answers



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

use graphing calculator
 $y = x^2 - 6x + 5$

$x = 3$
 $(-\infty, \infty)$
 $[-4, \infty)$

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

ID: 3.1.27

82. Use the vertex and intercepts to sketch the graph of the quadratic function. Give the equation of the parabola's axis of symmetry. Use the graph to determine the domain and range of the function.

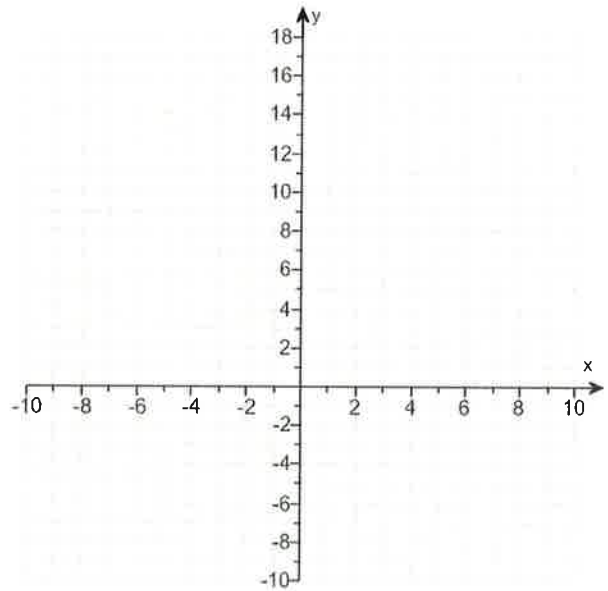
$$f(x) = 4x - x^2 + 12$$

Use the graphing tool to graph the equation. Use the vertex and one of the intercepts to draw the graph.

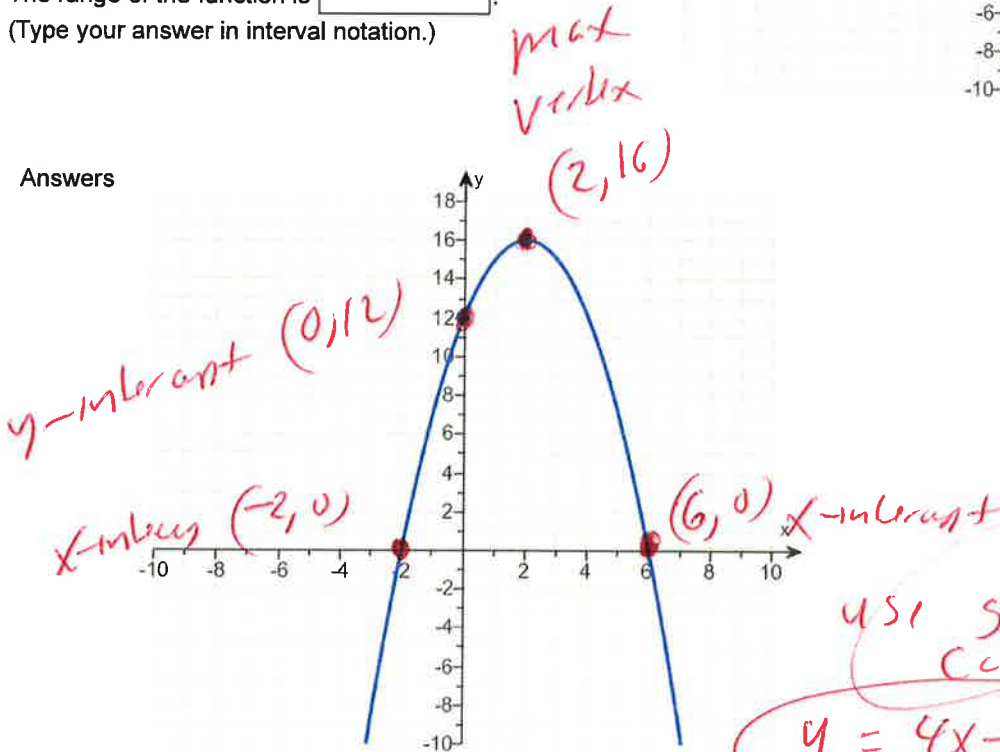
The axis of symmetry is .
(Type an equation.)

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

The range of the function is .
(Type your answer in interval notation.)



Answers



x	f(x)
-2	0
0	12
2	16
6	0

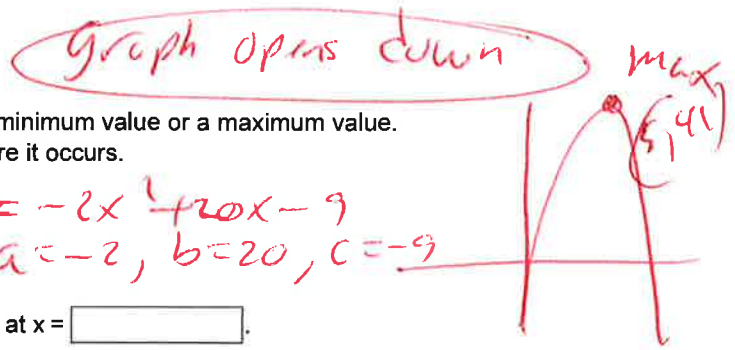
use graphing calculator
 $y_1 = 4x - x^2 + 12$

x = 2
 (-∞, ∞)
 (-∞, 16]

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

ID: 3.1.31

83. Consider the function $f(x) = -2x^2 + 20x - 9$.



- a. Determine, without graphing, whether the function has a minimum value or a maximum value.
- b. Find the minimum or maximum value and determine where it occurs.
- c. Identify the function's domain and its range.

$f(x) = -2x^2 + 20x - 9$
 $a = -2, b = 20, c = -9$

- a. The function has a (1) value.
- b. The minimum/maximum value is . It occurs at $x =$.
- c. The domain of f is . (Type your answer in interval notation.)

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

- (1) maximum
- minimum

$max = vertex = (-\frac{b}{2a}, f(\frac{b}{2a}))$
 $= (-\frac{20}{2(-2)}, f(\frac{20}{2(-2)}))$
 $= (-\frac{20}{-4}, f(-\frac{20}{-4}))$
 $= (5, f(5))$
 $= (5, -2(5)^2 + 20(5) - 9)$
 $= (5, -2(25) + 20(5) - 9)$
 $= (5, -50 + 100 - 9)$
 $= (5, 41)$
 Max

Answers (1) maximum

- 41
- 5
- $(-\infty, \infty)$
- $(-\infty, 41]$

ID: 3.1.41

84. Write the equation of the following parabola in standard form.

The vertex is $(-5, -1)$ and the graph passes through the point $(1, 11)$.

formula
 $y = f(x) = a(x-h)^2 + c$

Choose the correct equation below.

- A. $f(x) = (x - 5)^2 - 1$
- B. $f(x) = -\frac{5}{3}(x + 5)^2 - 1$
- C. $f(x) = \frac{1}{3}(x + 5)^2 + 1$
- D. $f(x) = \frac{1}{3}(x + 5)^2 - 1$

vertex = $(-5, -1)$
~~vertex = $(-5, 1)$~~
 vertex = $(-5, c)$

$y = f(x) = a(x+5)^2 - 1$

use
 $(1, 11)$
 $x = 1$

$y = a(x+5)^2 - 1$

$11 = a(1+5)^2 - 1$

$11 = a(6)^2 - 1$

$11 = a(36) - 1$

$11 = a(36) - 1$

$11 + 1 = 36a - 1 + 1$

$12 = 36a$

$\frac{12}{36} = \frac{36a}{36}$

$\frac{12}{36} = a$

$\frac{12(1)}{12(3)} = a$

$\frac{1}{3} = a$

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

Answer: D. $f(x) = \frac{1}{3}(x + 5)^2 - 1$

ID: 3.1.97

85. Divide using synthetic division.

$$(x^3 + 9x^2 - 9x + 2) \div (x - 3)$$

$$(x^3 + 9x^2 - 9x + 2) \div (x - 3) = \boxed{} + \frac{\boxed{}}{x - 3}$$

(Simplify your answers. Do not factor. Use integers or fractions for any numbers in the expressions.)

Answers $x^2 + 12x + 27$

83

$x^3 + 9x^2 - 9x + 2$

$$\begin{array}{r|rrrr} 3 & 1 & 9 & -9 & 2 \\ & & 3 & 36 & 81 \\ \hline & 1 & 12 & 27 & 83 \end{array}$$

$x^2 + 12x + 27 + \frac{83}{x-3}$

ID: 3.3.21

86. Solve the equation $x^3 + 2x^2 - 5x - 6 = 0$ given that 2 is a zero of $f(x) = x^3 + 2x^2 - 5x - 6$.

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

Answer: 2, -1, -3

ID: 3.3.43

Use synthetic division

$$\begin{array}{r|rrrr} 2 & 1 & 2 & -5 & -6 \\ & & 2 & 8 & 6 \\ \hline & 1 & 4 & 3 & 0 \end{array}$$

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

$(x+1)(x+3) = 0$

$x+1=0$ OR $x+3=0$

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

$x=-1$ OR $x=-3$

Answer

$2, -1, -3$

87. The following function is given.

$$f(x) = 3x^3 - 7x^2 - 75x + 175$$

a. List all rational zeros that are possible according to the Rational Zero Theorem. Choose the correct answer below.

- A. $\pm 1, \pm 3, \pm \frac{1}{5}, \pm \frac{3}{5}, \pm \frac{1}{25}, \pm \frac{3}{25}, \pm \frac{1}{7}, \pm \frac{3}{7}, \pm \frac{1}{35}, \pm \frac{3}{35}, \pm \frac{1}{175}, \pm \frac{3}{175}$
- B. $\pm 1, \pm 5, \pm 25, \pm 7, \pm 35, \pm 175, \pm \frac{1}{3}, \pm \frac{5}{3}, \pm \frac{25}{3}, \pm \frac{7}{3}, \pm \frac{35}{3}, \pm \frac{175}{3}$
- C. $\pm 1, \pm 3, \pm \frac{1}{5}, \pm \frac{3}{5}, \pm \frac{1}{10}, \pm \frac{3}{10}, \pm \frac{1}{7}, \pm \frac{3}{7}, \pm \frac{1}{35}, \pm \frac{3}{35}, \pm \frac{1}{175}, \pm \frac{3}{175}$
- D. $\pm 1, \pm 5, \pm 10, \pm 7, \pm 35, \pm 175, \pm \frac{1}{3}, \pm \frac{5}{3}, \pm \frac{10}{3}, \pm \frac{7}{3}, \pm \frac{35}{3}, \pm \frac{175}{3}$

Possibly
Least
First
 ± 175
 ± 3

$\pm 175, \pm 35, \pm 25, \pm 7, \pm 1$
 $\pm 1, \pm 3$

b. Use synthetic division to test several possible rational zeros in order to identify one actual zero.

One rational zero of the given function is .
(Simplify your answer.)

Possibly
 $\pm 1, \pm 5, \pm 7, \pm 25, \pm 35, \pm 175$
 $\pm \frac{1}{3}, \pm \frac{5}{3}, \pm \frac{25}{3}, \pm \frac{7}{3}, \pm \frac{35}{3}$
 $\pm \frac{175}{3}$

c. Use the zero from part (b) to find all the zeros of the polynomial function.

The zeros of the function $f(x) = 3x^3 - 7x^2 - 75x + 175$ are .
(Simplify your answer. Type an integer or a fraction. Use a comma to separate answers as needed.)

Answers
B. $\pm 1, \pm 5, \pm 25, \pm 7, \pm 35, \pm 175, \pm \frac{1}{3}, \pm \frac{5}{3}, \pm \frac{25}{3}, \pm \frac{7}{3}, \pm \frac{35}{3}, \pm \frac{175}{3}$

$$\frac{7}{3}$$

$$\frac{7}{3}, 5, -5$$

Use synthetic division
try $x=5$

ID: 3.4.11

$$\begin{array}{r|rrrr} 5 & 3 & -7 & -75 & 175 \\ & & 15 & 40 & -175 \\ \hline & 3 & 8 & -35 & 0 \end{array}$$

$$3x^2 + 8x - 35 = 0$$

$$(3x - 7)(x + 5) = 0$$

Let $3x - 7 = 0$ OR $x + 5 = 0$
 $3x - 7 + 7 = 0 + 7$ OR $x + 5 - 5 = 0 - 5$

$$3x = 7$$

$$\frac{3x}{3} = \frac{7}{3}$$

$$x = \frac{7}{3}$$

OR $x = -5$

Answers
 $(5, \frac{7}{3}, -5)$

88. The following equation is given.

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

a. List all rational roots that are possible according to the Rational Zero Theorem.

(Use a comma to separate answers as needed.)

b. Use synthetic division to test several possible rational roots in order to identify one actual root.

One rational root of the given equation is .

(Simplify your answer.)

c. Use the root from part (b.) and solve the equation.

The solution set of $x^3 - 5x^2 - 4x + 20 = 0$ is .

(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.)

Answers 1, -1, 2, -2, 20, -20, 5, -5, 10, -10, 4, -4

5

5, 2, -2

Possibly
Last
First

± 20
 ± 1

$\pm 20, \pm 10, \pm 5, \pm 4, \pm 2, \pm 1$
 ± 1

ID: 3.4.17

Use Synthetic division

try $x=2$

$$\begin{array}{r|rrrr}
 2 & 1 & -5 & -4 & 20 \\
 & & 2 & -6 & -20 \\
 \hline
 & 1 & -3 & -10 & 0
 \end{array}$$

Remainder 0

$$x^2 - 3x - 10 = 0$$

$$(x+2)(x-5) = 0$$

Let

$$x+2=0$$

OR

$$x-5=0$$

$$x+2-2=0-2$$

OR

$$x-5+5=0+5$$

$$x = -2$$

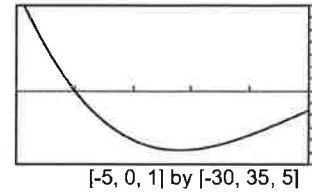
OR

$$x = 5$$

Answer

$$2, -2, 5$$

89. An incomplete graph of the polynomial function $f(x) = -x^3 - x^2 + 10x - 8$ is shown on the right.



- a. Find all zeros of the function.
- b. Without using a graphing utility, draw a complete graph of the function.

a. The zeros are .
(Use a comma to separate answers as needed.)

b. Choose the correct graph of the function below. The scale for each graph is $[-10, 10, 1]$ by $[-60, 65, 5]$.

A. B. C. D.

Answers -4,1,2

D. *Window:*
 $x\text{-min} = -10$
 $x\text{-max} = 10$
 $y\text{-min} = -60$
 $y\text{-max} = 65$

Use graphing calculator
 $y_1 = -x^3 - x^2 + 10x - 8$
 BB BIG

ID: 3.4.53

90. Find the vertical asymptotes, if any, and the values of x corresponding to holes, if any, of the graph of the rational function.

$$h(x) = \frac{x+3}{x(x+9)}$$

set Bottom only

Select the correct choice below and, if necessary, fill in the answer box to complete your choice. (Type an equation. Use a comma to separate answers as needed.)

- A. There are no vertical asymptotes but there is(are) hole(s) corresponding to $x=0$ or $x+9=0$
- B. The vertical asymptote(s) is(are) $x=0$ or $x+9=0$. There are no holes.
- C. The vertical asymptote(s) is(are) $x=-9$ and hole(s) corresponding to $x=0$
- D. There are no discontinuities.

Answer: B. The vertical asymptote(s) is(are) . There are no holes.

ID: 3.5.23

Vertical asymptotes, x=0 or x=-9

91. Find the horizontal asymptote, if any, of the graph of the rational function.

$$f(x) = \frac{19x}{5x^2 + 8}$$

$$\lim_{x \rightarrow \infty} \left(\frac{19x}{5x^2 + 8} \right) \frac{\frac{1}{x}}{\frac{1}{x}} = \lim_{x \rightarrow \infty} \frac{\frac{19x}{x^2}}{\frac{5x^2 + 8}{x^2}} = \lim_{x \rightarrow \infty} \frac{\frac{19}{x}}{5 + \frac{8}{x^2}}$$

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

- A. The horizontal asymptote is _____ . (Type an equation.)
- B. There is no horizontal asymptote.

Answer: A. The horizontal asymptote is . (Type an equation.)

ID: 3.5.37

Formule $\lim_{x \rightarrow \infty} \frac{1}{x^n} = 0$ horizontal asymptote $y = 0$

92. Find the horizontal asymptote, if any, of the graph of the rational function.

$$g(x) = \frac{18x^2}{9x^2 + 8}$$

$$\lim_{x \rightarrow \infty} \left(\frac{18x^2}{9x^2 + 8} \right) \frac{\frac{1}{x^2}}{\frac{1}{x^2}} = \lim_{x \rightarrow \infty} \frac{\frac{18x^2}{x^2}}{\frac{9x^2 + 8}{x^2}} = \frac{18}{9 + \frac{8}{x^2}}$$

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

- A. The horizontal asymptote is _____ . (Type an equation.)
- B. There is no horizontal asymptote.

Answer: A. The horizontal asymptote is . (Type an equation.)

ID: 3.5.39

Formule $\lim_{x \rightarrow \infty} \frac{1}{x^n} = 0$ horizontal asymptote $y = 2$

93. Find the horizontal asymptote, if any, of the graph of the rational function.

$$f(x) = \frac{-8x + 3}{5x + 4}$$

$$\lim_{x \rightarrow \infty} \left(\frac{-8x + 3}{5x + 4} \right) \frac{\frac{1}{x}}{\frac{1}{x}} = \lim_{x \rightarrow \infty} \frac{\frac{-8x + 3}{x}}{\frac{5x + 4}{x}} = \frac{-8 + \frac{3}{x}}{5 + \frac{4}{x}}$$

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

- A. The horizontal asymptote is _____ . (Type an equation. Simplify your answer. Use integers or fractions for any numbers in the equation.)
- B. There is no horizontal asymptote.

Answer: A. The horizontal asymptote is .

(Type an equation. Simplify your answer. Use integers or fractions for any numbers in the equation.)

ID: 3.5.43

horizontal asymptote $y = -\frac{8}{5}$

94. a. Find the slant asymptote of the graph of the rational function and b. Use the slant asymptote to graph the rational function.

$$f(x) = \frac{x^2 + x - 12}{x - 7}$$

Use Synthetic Division

$$\begin{array}{r|rrrr} 7 & 1 & 1 & -12 & \\ & & 7 & 50 & \\ \hline & 1 & 8 & 38 & \end{array}$$

slant asymptote

$$y = x + 8$$

(44) rem

a. Find the slant asymptote of the graph of f. Select the correct choice below and fill in any answer boxes within your choice.

A. $y =$ _____

B. There is no slant asymptote.

find y-intercept let x=0

$$y = \frac{x^2 + x - 12}{x - 7}$$

$$y = \frac{(0)^2 + (0) - 12}{(0) - 7} = \frac{0 + 0 - 12}{0 - 7} = \frac{-12}{-7} = \frac{12}{7}$$

b. Use the slant asymptote to graph the rational function.

First determine the symmetry of the graph of f.

A. The graph has y-axis symmetry: $f(-x) = f(x)$.

B. The graph has origin symmetry: $f(-x) = -f(x)$.

C. The graph has both y-axis and origin symmetry.

D. The graph has neither y-axis nor origin symmetry.

find x-intercept let y=0

$$0 = \frac{x^2 + x - 12}{x - 7}$$

$$0(x - 7) = 1(x^2 + x - 12)$$

Find the y-intercept(s). Select the correct choice below and fill in any answer boxes within your choice.

A. The y-intercept is _____.

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

B. There is no y-intercept.

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

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

$$x - 3 = 0 \text{ OR } x + 4 = 0$$

Find the x-intercept(s). Select the correct choice below and fill in any answer boxes within your choice.

A. The x-intercept is _____.

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

B. There is no x-intercept.

x-intercepts (3, 0) and (-4, 0)

$$x - 3 + 3 = 0 + 3 \text{ OR } x + 4 - 4 = 0 + 4$$

$$x = 3 \text{ OR } x = -4$$

Find the vertical asymptote(s). Select the correct choice below and fill in any answer boxes within your choice.

A. $x =$ _____

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

B. There is no vertical asymptote.

Find the horizontal asymptote(s). Select the correct choice below and fill in any answer boxes within your choice.

A. $y =$ _____

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

B. There is no horizontal asymptote.

$$y_1 = (x^2 + x - 12) \div (x - 7)$$

Use graphing calculator

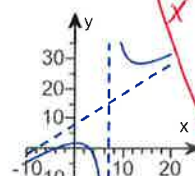
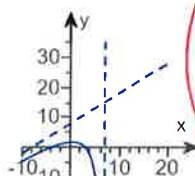
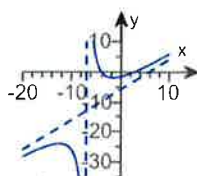
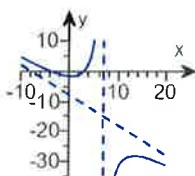
Plot points between and beyond each x-intercept and vertical asymptote, then use the information above to graph the rational function. Choose the correct graph below.

A.

B.

C.

D.



x min = -10
x max = 20
y min = -12
y max = 40

Answers A. $y = \boxed{x + 8}$

D. The graph has neither y-axis nor origin symmetry.

A. The y-intercept is $\boxed{\frac{12}{7}}$.

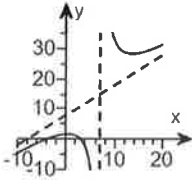
(Type an integer or a simplified fraction. Use a comma to separate answers as needed.)

A. The x-intercept is $\boxed{-4,3}$.

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

A. $x = \boxed{7}$ (Type an integer or a simplified fraction. Use a comma to separate answers as needed.)

B. There is no horizontal asymptote.



D.

ID: 3.5.85

95. Graph the given function by making a table of coordinates.

$f(x) = 4^x$

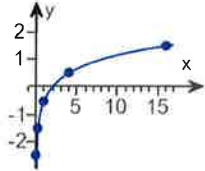
Complete the table of coordinates.

x	-2	-1	0	1	2
y					

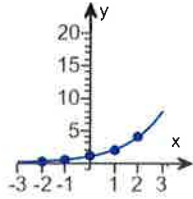
(Type integers or fractions. Simplify your answers.)

Choose the correct graph below.

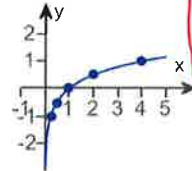
A.



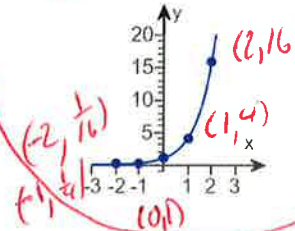
B.



C.



D.



- Answers
- 1
 - 16
 - 1/4
 - 1
 - 4
 - 16

$f(x) = 4^x$

$f(-2) = 4^{-2} = \frac{1}{4^2} = \frac{1}{16}$

$f(-1) = 4^{-1} = \frac{1}{4}$

$f(0) = 4^0 = 1$

$f(1) = 4^1 = 4$

$f(2) = 4^2 = 4 \cdot 4 = 16$

x	f(x)
-2	1/16
-1	1/4
0	1
1	4
2	16

ID: 4.1.11

96. Find the domain of the logarithmic function.

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

The domain of $f(x) = \log(8 - x)$ is .
(Type your answer in interval notation.)

Answer: $(-\infty, 8)$

ID: 4.2.77

formulas
domain
 $f(x) = \log(Ax+B)$
all $Ax+B > 0$
only

$8-x > 0$
 $8-x-0 > 0-8$
 $-x > -8$
 $\frac{-x}{-1} < \frac{-8}{-1}$
 $x < 8$

divide by a negative
turn around

$(-\infty, 8)$

97. Use properties of logarithms to expand the logarithmic expression as much as possible. Evaluate logarithmic expressions without using a calculator if possible.

$$\log_b \left(\frac{x^3 y}{z^4} \right) = \log_b (x^3 y) - \log_b (z^4) =$$

$$\log_b (x^3) + \log_b (y) - \log_b (z^4) =$$

$$\log_b \left(\frac{x^3 y}{z^4} \right) = \boxed{} \quad (3 \log_b (x) + \log_b (y) - 4 \log_b (z) =)$$

Answer: $3 \log_b x + \log_b y - 4 \log_b z$ formula

ID: 4.3.27

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

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

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

98. Use properties of logarithms to expand the logarithmic expression as much as possible. Evaluate logarithmic expressions without using a calculator if possible.

$$\ln \left[\frac{x^7 \sqrt{x^2+7}}{(x+7)^3} \right] = \ln (x^7 \sqrt{x^2+7}) - \ln (x+7)^3 =$$

$$\ln (x^7) + \ln \sqrt{x^2+7} - \ln (x+7)^3 =$$

$$\ln (x^7) + \ln (x^2+7)^{1/2} - \ln (x+7)^3 =$$

$$\ln (x^7) + \frac{1}{2} \ln (x^2+7) - 3 \ln (x+7) =$$

Answer: $7 \ln x + \frac{1}{2} \ln (x^2+7) - 3 \ln (x+7)$

ID: 4.3.37

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

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

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

99. Solve the following exponential equation by expressing each side as a power of the same base and then equating exponents.

$$4^{x+4} = 16^{x-2}$$

The solution set is $\boxed{}$.

Answer: 8

ID: 4.4.19

$$(2^2)^{x+4} = (2^4)^{x-2}$$

$$2^{2x+8} = 2^{4x-8}$$

rewrite

$$2x+8 = 4x-8$$

$$2x+8-8 = 4x-8-8$$

$$2x = 4x-16$$

$$2x-4x = 4x-16-4x$$

$$-2x = -16$$

$$\frac{-2x}{-2} = \frac{-16}{-2}$$

$$x = 8$$

100. Solve the following exponential equation by taking the natural logarithm on both sides. Express the solution in terms of natural logarithms. Then, use a calculator to obtain a decimal approximation for the solution.

$$2e^{3x} = 812$$

What is the solution in terms of natural logarithms?

The solution set is

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

What is the decimal approximation for the solution?

The solution set is

(Use a comma to separate answers as needed. Round to two decimal places as needed.)

Answers $\frac{\ln 406}{3}$
2.00

ID: 4.4.31

$$\frac{2e^{3x}}{2} = \frac{812}{2}$$

$$e^{3x} = 406$$

formula
 $\ln(A^N) = N \ln(A)$
 $\ln(e) = 1$

$$\ln(e^{3x}) = \ln(406)$$

$$3x \ln(e) = \ln(406)$$

$$3x(1) = \ln(406)$$

$$3x = \ln(406)$$

$$x = 2.00211772$$

$$\frac{3x = \ln(406)}{3}$$

$$x = \frac{\ln(406)}{3}$$

$$x = 2.00$$

Round

101. Solve the exponential equation. Express the solution in terms of natural logarithms. Then use a calculator to obtain a decimal approximation for the solution.

$$9^{(x-2)} = 317$$

What is the solution in terms of natural logarithms?

The solution set is

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

What is the decimal approximation for the solution?

The solution set is

(Use a comma to separate answers as needed. Round to two decimal places as needed.)

Answers $\frac{\ln 317}{\ln 9} + 2$
4.62

ID: 4.4.37

$$\ln(9^{x-2}) = \ln(317)$$

$$(x-2) \ln(9) = \ln(317)$$

$$\frac{(x-2) \ln(9)}{\ln(9)} = \frac{\ln(317)}{\ln(9)}$$

$$x-2 = \frac{\ln(317)}{\ln(9)}$$

$$x-2 + 2 = \frac{\ln(317)}{\ln(9)} + 2$$

$$x = \frac{\ln(317)}{\ln(9)} + 2$$

OR

$$x = 4.620989147$$

OR

$$x = 4.62$$

Round

formula
 $\ln(A^N) = N \ln(A)$

102. Solve the following logarithmic equation. Be sure to reject any value of x that is not in the domain of the original logarithmic expression. Give the exact answer.

$\log_3 x = 4$

$\log_3 (x) = 4$

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.)
- B. There is no solution.

$3^4 = x$ rewrite
 $3 \cdot 3 \cdot 3 \cdot 3 = x$
 $81 = x$

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

ID: 4.4.49

103. Solve the following logarithmic equation. Be sure to reject any value of x that is not in the domain of the original logarithmic expression. Give the exact answer.

$\log_2(x + 21) = 3$

$\log_2 (x+21) = 3$

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

- A. The solution set is { _____ }. (Type an integer or a simplified fraction.)
- B. There is no solution.

$2^3 = x+21$
 $2 \cdot 2 \cdot 2 = x+21$
 $8 = x+21$

Answer: A. The solution set is { }. (Type an integer or a simplified fraction.)

$8 - 21 = x + 21 - 21$
 $-13 = x$

ID: 4.4.55

104. Solve the logarithmic equation. Be sure to reject any value of x that is not in the domain of the original logarithmic expressions. Give an exact answer.

$\log_5 x + \log_5(4x - 1) = 1$

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

- A. The solution set is { _____ }. (Type an exact answer in simplified form.)
- B. There is no solution.

Answer: A. The solution set is { }. (Type an exact answer in simplified form.)

NEXT PAGE

ID: 4.4.67

$$\textcircled{104} \quad \log_5(x) + \log_5(4x-1) = 1$$

$$\log_5(x)(4x-1) = 1$$

$$5^1 = x(4x-1) \quad \text{rewrite}$$

$$5 = 4x^2 - x$$

$$0 = 4x^2 - x - 5$$

$$0 = (4x-5)(x+1)$$

$$4x-5=0 \quad \text{OR} \quad x+1=0$$

$$4x-5+5=0+5 \quad \text{OR} \quad x+1-1=0-1$$

$$4x=5$$

$$\text{OR } \cancel{x=-1}$$

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

Check

$$\log_5(x) + \log_5(4x-1) = 1$$

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

$$\log_5\left(\frac{5}{4}\right) + \log_5\left(4\left(\frac{5}{4}\right) - 1\right) = 1$$

$$\log_5\left(\frac{5}{4}\right) + \log_5(5-1) = 1$$

$$\log_5\left(\frac{5}{4}\right) + \log_5(4) = 1$$

Good Good

$$\log_5(-1) + \log_5(4(-1)-1) = 1$$

$$\log_5(-1) + \log_5(-4-1) = 1$$

$$\log_5(-1) + \log_5(-5) = 1$$

BAD

BAD

ANSWER

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

Possible

$$\frac{5}{4}$$

$$-1$$

$$\textcircled{105} \quad \log_3(x+24) + \log_3(x+6) = 5$$

$$\log_3(x+24)(x+6) = 5$$

$$3^5 = (x+24)(x+6)$$

$$3 \cdot 3 \cdot 3 \cdot 3 \cdot 3 = x^2 + 6x + 24x + 144$$

$$243 = x^2 + 30x + 144$$

$$0 = x^2 + 30x + 144 - 243$$

$$0 = x^2 + 30x - 99$$

$$0 = (x-3)(x+33)$$

$$\text{let } x-3=0 \quad \text{OR} \quad x+33=0$$

$$x-3+3=0+3 \quad \text{OR} \quad x+33-33=0-33$$

$$\textcircled{x=3} \quad \text{OR} \quad \textcircled{x=-33}$$

$$\text{Check } \log_3(x+24) + \log_3(x+6) = 5$$

$$\log_3(3+24) + \log_3(3+6) = 5$$

$$\log_3(27) + \log_3(9) = 5$$

GOOD GOOD

$$\log_3(-33+24) + \log_3(-33+6) = 5$$

$$\log_3(-9) + \log_3(-27) = 5$$

BAD BAD

ANSWER

$$x = 3$$

$$\text{formula}$$
$$\log_3(A) + \log_3(B) = \log_3(AB) =$$

possible

$$99: 1$$

$$35: 3$$

$$11: 9$$

$$(106) \log_5(x+17) - \log_5(x-7) = 2$$

$$\log_5\left(\frac{x+17}{x-7}\right) = 2$$

$$5^2 = \frac{x+17}{x-7}$$

$$5 \cdot 5 = \frac{x+17}{x-7}$$

$$\frac{25}{1} = \frac{x+17}{x-7}$$

$$25(x-7) = 1(x+17)$$

$$25x - 175 = x + 17$$

$$25x - 175 + 175 = x + 17 + 175$$

$$25x = x + 192$$

$$25x - x = x + 192 - x$$

$$24x = 192$$

$$\frac{24x}{24} = \frac{192}{24}$$

$$(x=8) \text{ Check}$$

$$\log_5(x+17) - \log_5(x-7) = 2$$

$$\log_5(8+17) - \log_5(8-7) = 2$$

$$\log_5(25) - \log_5(1) = 2 \text{ answer}$$

$$\text{Good Good } \boxed{x=8}$$

formula

$$\log_5(A) - \log_5(B) =$$

$$\log_5\left(\frac{A}{B}\right) =$$

$$(107) \log(x+8) = \log(x) + \log(8)$$

$$\log(x+8) = \log(x)(8)$$

$$\log(x+8) = \log(8x)$$

$$x+8 = 8x$$

$$x+8-8 = 8x-8$$

$$x = 8x-8$$

$$1x - 8x = 8x - 8 - 8x$$

$$-7x = -8$$

$$\frac{-7x}{-7} = \frac{-8}{-7}$$

$$x = \frac{8}{7} \text{ Check}$$

$$\log(x+8) = \log(x) + \log(8)$$

$$\log\left(\frac{8}{7}+8\right) = \log\left(\frac{8}{7}\right) + \log(8)$$

Good Good Good

Answer

$$x = \frac{8}{7}$$

Formula

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

$$\textcircled{108} \quad \log(x) + \log(x-2) = \log(15)$$

$$\log(x)(x-2) = \log(15)$$

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

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

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

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

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

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

$$\textcircled{\cancel{x=-3}} \quad \text{OR} \quad \textcircled{x=5}$$

$$\text{Check } \log(x) + \log(x-2) = \log(15)$$

$$\log(-3) + \log(-3-2) = \log(15)$$

$$\log(-3) + \log(-5) = \log(15)$$

BAD BAD

$$\log(5) + \log(5-2) = \log(15)$$

$$\log(5) + \log(3) = \log(15)$$

Good Good Good

ANSWER

$$x = 5$$

formuh

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

$$\textcircled{109} \quad A = P \left(1 + \frac{r}{n}\right)^{nt}$$

$$22000 = 15000 \left(1 + \frac{0.05}{2}\right)^{2t}$$

$$22000 = 15000 (1.025)^{2t}$$

$$22000 = 15000 (1.025)^{2t}$$

$$\frac{22000}{15000} = \frac{15000 (1.025)^{2t}}{15000}$$

$$\frac{22000}{15000} = (1.025)^{2t}$$

$$\ln\left(\frac{22000}{15000}\right) = \ln(1.025)^{2t}$$

$$\ln\left(\frac{22000}{15000}\right) = 2t \ln(1.025)$$

$$\frac{\ln\left(\frac{22000}{15000}\right)}{(2 \ln(1.025))} = \frac{2t \ln(1.025)}{(2 \ln(1.025))}$$

$$\textcircled{7.755199067 = t}$$

OR

$$\textcircled{7.8 = t}$$

Round

$$A = 22000$$

$$P = 15000$$

$$r = 5\% = 0.05$$

$$n = 2$$

$$t = ? ?$$

Formula

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

110

$$A = Pe^{rt}$$

$$1300 = 650 e^{.07t}$$

$$\frac{1300}{650} = \frac{650 e^{.07t}}{650}$$

$$2 = e^{.07t}$$

$$\ln(2) = \ln(e^{.07t})$$

$$\ln(2) = .07t \ln(e)$$

$$\ln(2) = .07t (1)$$

$$\ln(2) = .07t$$

$$\frac{\ln(2)}{.07} = \frac{.07t}{.07}$$

$$9.902102579 = t$$

or

$$9.9 = t$$

Round

$$A = 1300$$

$$P = 650$$

$$r = 7\% = .07$$

$$t = ??$$

formulas

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

$$\ln(e) = 1$$

(111)

$$A = 16e^{-0.000121t}$$

2ND LN

$$t = 7161$$

$$A = 16e^{(-0.000121(7161))}$$

$$A = 6.726859989$$

OR

$$A = 7$$

Round

Use a graphing
Calculator

$$(112) A = A_0 e^{-0.000121t}$$

$$A = 452$$

$$4 = 100 e^{-0.000121t}$$

$$A_0 = 100 \text{ } \rightarrow$$

$$\frac{4}{100} = \frac{100 e^{-0.000121t}}{100}$$

$$.04 = e^{-0.000121t}$$
$$\ln(.04) = \ln(e^{-0.000121t})$$

$$\ln(.04) = -0.000121t \ln(e)$$

$$\ln(.04) = -0.000121t (1)$$

$$\ln(.04) = -0.000121t$$

$$\frac{\ln(.04)}{-0.000121} = \frac{-0.000121t}{-0.000121}$$

$$26602.27954 = t$$

OR

$$26,602 = t$$

Round

formulas

$$\ln(A^N) = N \ln(A)$$
$$\ln(e) = 1$$

113

$$12 = 6e^{0.004t}$$

$$\frac{12}{6} = \frac{6e^{0.004t}}{6}$$

$$2 = e^{0.004t}$$

$$\ln(2) = \ln(e^{0.004t})$$

$$\ln(2) = 0.004t(\ln(e))$$

$$\ln(2) = 0.004t(1)$$

$$\ln(2) = 0.004t$$

$$\frac{\ln(2)}{0.004} = \frac{0.004t}{0.004}$$

$$173.2867951 = t$$

OR

$$173 = t$$

Round

formula

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

$$\ln(e) =$$

$$1 =$$

114. Solve the system by the addition method.

$$\begin{cases} x + 5y = -18 \\ 3x + 2y = -2 \end{cases}$$

$$\begin{array}{r} -2x - 10y = 36 \\ 15x + 10y = -10 \\ \hline 13x + 0 = 26 \end{array}$$

$$\begin{array}{r} 13x = 26 \\ \frac{13x}{13} = \frac{26}{13} \\ 13 \\ \hline 13 \end{array}$$

$$x = 2$$

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

- A. The solution set is { _____ }. (Simplify your answer. Type an ordered pair.)
- B. There are infinitely many solutions.
- C. There is no solution.

Answer: A. The solution set is { }. (Simplify your answer. Type an ordered pair.)

ID: 5.1.23

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

$$\begin{array}{l} \text{Subst } x + 5y = -18 \\ (2) + 5y = -18 \\ 2 + 5y = -18 \\ 2 + 5y - 2 = -18 - 2 \\ 5y = -20 \\ \frac{5y}{5} = \frac{-20}{5} \\ y = -4 \end{array}$$

115. Solve the given system of equations.

$$\begin{cases} x + y + 5z = 10 \\ x + y + 9z = 18 \\ x + 3y + 8z = 22 \end{cases}$$

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

- A. There is one solution. The solution set is { (_____, _____, _____) }. (Simplify your answers.)
- B. There are infinitely many solutions.
- C. There is no solution.

use graphing calculator

Answer: A.

There is one solution. The solution set is { (, ,) }. (Simplify your answers.)

ID: 5.2.5

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

$$[A] = \begin{bmatrix} 1 & 1 & 5 & 10 \\ 1 & 1 & 9 & 18 \\ 1 & 3 & 8 & 22 \end{bmatrix}$$

2nd, Matrix, Math, rref() enter

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

116. Write the first four terms of the sequence whose general term is given.

$$a_n = \frac{2n}{n+5}$$

Use a graphing Calculator

$a_1 =$ (Simplify your answer.)

$a_2 =$ (Simplify your answer.)

$a_3 =$ (Simplify your answer.)

$a_4 =$ (Simplify your answer.)

- Answers $\frac{1}{3}$
- $\frac{4}{7}$
- $\frac{3}{4}$
- $\frac{8}{9}$

$a_1 = \frac{2(1)}{1+5} = \frac{2}{6} = \frac{2(1)}{2(3)} = \frac{1}{3}$ ✓
 $a_2 = \frac{2(2)}{2+5} = \frac{4}{7}$ ✓
 $a_3 = \frac{2(3)}{3+5} = \frac{6}{8} = \frac{2(3)}{2(4)} = \frac{3}{4}$ ✓
 $a_4 = \frac{2(4)}{4+5} = \frac{8}{9}$ ✓

ID: 8.1.9

117. Find the indicated sum.

$$\sum_{i=1}^4 i(i+1)$$

OR USE GRAPHING CALCULATOR
Math, ↓, Summation Σ

$\sum_{i=1}^4 i(i+1) =$ (Simplify your answer.)

Answer: 40

OR

$$1(1+1) + 2(2+1) + 3(3+1) + 4(4+1) =$$

$$1(2) + 2(3) + 3(4) + 4(5) =$$

$$2 + 6 + 12 + 20 =$$

40

ID: 8.1.33

118. Use the binomial theorem to expand the binomial.

$$(2x-3)^3 = \binom{3}{0}(2x)^3(-3)^0 + \binom{3}{1}(2x)^2(-3)^1 + \binom{3}{2}(2x)^1(-3)^2 + \binom{3}{3}(2x)^0(-3)^3 =$$

$(2x-3)^3 =$ (Simplify your answer.)

Answer: $8x^3 - 36x^2 + 54x - 27$

USE GRAPHING CALCULATOR

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

$$(1)(8x^3)(1) + (3)(4x^2)(-3) + (3)(2x)(9) + (1)(1)(-27) =$$

$8x^3 - 36x^2 + 54x - 27 =$

ID: 8.5.13

119. Write the first three terms of the binomial expansion, expressing the result in simplified form.

$$(x+9)^5$$

The first three terms of the binomial expansion are .
(Simplify your answer.)

Answer: $x^5 + 45x^4 + 810x^3$

ID: 8.5.31

$$\begin{aligned} (x+9)^5 &= \binom{5}{5-0} (x)^0 (9)^5 + \binom{5}{5-1} (x)^1 (9)^4 + \binom{5}{5-2} (x)^2 (9)^3 \\ &= (1)(x^0)(1) + (5)(x^1)(9) + (10)(x^2)(81) \\ &= x^5 + 45x^4 + 810x^3 \end{aligned}$$

use graphing calculator

$$5, \text{Math, Prb, NCR, } 0, \text{ enter, } = 1$$

$$5, \text{Math, Prb, NCR, } 1, \text{ enter} = 5$$

$$5, \text{Math, Prb, NCR, } 2, \text{ enter} = 10$$