05-23-19
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Student: _____ **Instructor:** Alfredo Alvarez **Assignment:** MA1314FIESTACOREQ0410N0320MD150
Date: _____ **Course:** Math 1314 Alvarez

1. Evaluate the algebraic expression for the given value.

$x^2 - 3x + 5$, for $x = 4$

When $x = 4$, $x^2 - 3x + 5 =$ _____.
(Simplify your answer.)

Answer: 9

$(4)^2 - 3(4) + 5 =$
$(4)(4) - 3(4) + 5 =$
$16 - 12 + 5 =$
$4 + 5 =$
$9 =$

2. Evaluate the algebraic expression $9 + 9(x - 5)^3$ for $x = 9$.

When $x = 9$, $9 + 9(x - 5)^3 =$ _____.

Answer: 585

$9 + 9((9) - 5)^3 =$
$9 + 9(9 - 5)^3 =$
$9 + 9(4)^3 =$
$9 + 9(4 \cdot 4 \cdot 4) =$
$9 + 9(64) =$
$9 + 576 =$
$585 =$

3. Simplify the exponential expression.

$(-2x^4y)(-5x^8y^6)$

$(-2x^4y)(-5x^8y^6) =$ _____

Answer: $10x^{12}y^7$

$= (-2)(-5)x^{4+8}y^{1+6}$
$10x^{12}y^7 =$

4. Simplify the exponential expression.

$$\frac{-15x^9y^7}{5x^5y^4}$$

$$\frac{-15x^9y^7}{5x^5y^4} =$$ _____ (Simplify your answer. Use positive exponents only.)

Answer: $-3x^4y^3$

$= \frac{(-3)(5)x^{9-5}y^{7-4}}{(5)} = -3x^4y^3 =$

5. Simplify the exponential expression.

$(4x^2)^{-3}$

$(4x^2)^{-3} =$ _____ (Simplify your answer. Use positive exponents only.)

Answer: $\frac{1}{64x^6}$

$= (4^1x^2)^{-3} = 4^{(1)(-3)}x^{(2)(-3)} = 4^{-3}x^{-6}$
$= \frac{1}{4^3x^6}$
$= \frac{1}{4 \cdot 4 \cdot 4x^6}$
$= \frac{1}{64x^6}$

6. Simplify the exponential expression.

$$\left(\frac{-35a^2b^8}{7a^{10}b^{-9}}\right)^3 = \left(\frac{(-5)(7)a^2b^8b^9}{(7)a^{10}}\right)^3 = \left(\frac{(-5)b^{8+9}}{a^{10-2}}\right)^3 = \left(\frac{(-5)^1 b^{17}}{a^8}\right)^3$$

$$= \frac{(-5)^3 b^{17(3)}}{a^{8(3)}} = \frac{(-5)(-5)(-5)b^{51}}{a^{24}} = \frac{-125b^{51}}{a^{24}}$$

$\left(\frac{-35a^2b^8}{7a^{10}b^{-9}}\right)^3 =$ [ ] (Simplify your answer. Use positive exponents only.)

Answer: $-\frac{125b^{51}}{a^{24}}$

7. Simplify.

$\sqrt[3]{81}$

$\sqrt[3]{81} =$ [ ]
(Type an exact answer, using radicals as needed. Simplify your answer.)

Answer: $3\sqrt[3]{3}$

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

$\sqrt[3]{81} = \sqrt[3]{3^4} = \sqrt[3]{3^3 \cdot 3^1} = 3^{3/3}\sqrt[3]{3^1} = 3^1\sqrt[3]{3}$

3 | 81
3 | 27
3 | 9
3 | 3
1

8. Evaluate the expression without using a calculator.

$343^{1/3}$

$343^{1/3} =$ [ ] (Simplify your answer.)

Answer: 7

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

$343^{\frac{1}{3}} = (7^3)^{\frac{1}{3}} = 7^{3(\frac{1}{3})} = 7^{\frac{3}{3}} = 7^1 = 7$

7 | 343
7 | 49
7 | 7
1

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

$1000^{2/3}$

$1000^{2/3} =$ [ ]

Answer: 100

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

$1000^{\frac{2}{3}} = (2^3 \cdot 5^3)^{\frac{2}{3}} = 2^{3(\frac{2}{3})} 5^{3(\frac{2}{3})} = 2^{\frac{6}{3}} 5^{\frac{6}{3}} = 2^2 5^2 = 2 \cdot 2 \cdot 5 \cdot 5 = 100$

2 | 1000
2 | 500
2 | 250
5 | 125
5 | 25
5 | 5
1

10. Perform the indicated operation.

$(-7x^3 + 10x^2 - 6x + 7) + (8x^3 + 8x^2 - 8x - 3)$

Write the polynomial in standard form.

$(-7x^3 + 10x^2 - 6x + 7) + (8x^3 + 8x^2 - 8x - 3) =$ ____

What is the degree of the polynomial?

____

(Type a whole number.)

$-7x^3+10x^2-6x+7+8x^3+8x^2-8x-3=$

$x^3+18x^2-14x+4=$

Answers $x^3 + 18x^2 - 14x + 4$

3

11. Perform the indicated operation.

$(2x^3 - 4x^2 + 10x - 10) - (8x^3 - 8x^2 - 7x + 10)$

Write the polynomial in standard form.

$(2x^3 - 4x^2 + 10x - 10) - (8x^3 - 8x^2 - 7x + 10) =$ ____

What is the degree of the polynomial?

____

(Type a whole number.)

$2x^3-4x^2+10x-10-8x^3+8x^2+7x-10=$

$-6x^3+4x^2+17x-20=$

Answers $-6x^3 + 4x^2 + 17x - 20$

3

12. Find the product.

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

$x^3+3x^2+9x-3x^2-9x-27=$

$(x - 3)(x^2 + 3x + 9) =$ ____ (Simplify your answer.)

$x^3-27=$

Answer: $x^3 - 27$

13. Find the product.

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

$3x^3+18x^2+27x+5x^2+30x+45=$

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

(Simplify your answer.)

$3x^3+23x^2+57x+45=$

Answer: $3x^3 + 23x^2 + 57x + 45$

14. Multiply.

$(x+6)(x+2)$

$(x+6)(x+2) =$ [ ] (Simplify your answer.)

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

$x^2+2x+6x+12 =$

$x^2+8x+12 =$

Answer: $x^2+8x+12$

15. Find the product.

$(x-12)(x+9)$

$(x-12)(x+9) =$ [ ]

$(x-12)(x+9) =$

$x^2+9x-12x-108 =$

$x^2-3x-108 =$

Answer: $x^2-3x-108$

16. Use the FOIL method to multiply the binomials.

$(2x+1)(6x+5)$

$(2x+1)(6x+5) =$ [ ] (Simplify your answer.)

$(2x+1)(6x+5) =$

$12x^2+10x+6x+5 =$

$12x^2+16x+5 =$

Answer: $12x^2+16x+5$

17. Find the product.

$(5x-9)(2x+7)$

$(5x-9)(2x+7) =$ [ ]

$(5x-9)(2x+7) =$

$10x^2+35x-18x-63 =$

$10x^2+17x-63 =$

Answer: $10x^2+17x-63$

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

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

$(8x+5)(8x-5) =$ [ ]

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

$64x^2-40x+40x-25 =$

$64x^2-25 =$

Answer: $64x^2-25$

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

$(x+7)^2$

$(x+7)^2 =$ [ ]

$(x+7)^2 =$

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

$x^2+7x+7x+49 =$

$x^2+14x+49 =$

Answer: $x^2+14x+49$

20. Find the product.

$(2x + 3)^2$

$(2x + 3)^2 =$ [ ] (Simplify your answer.)

Answer: $4x^2 + 12x + 9$

$(2x+3)^2 =$
$(2x+3)(2x+3) =$
$4x^2 + 6x + 6x + 9 =$
$4x^2 + 12x + 9 =$

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

$(x - 10)^2$

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

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

$(x-10)^2 =$
$(x-10)(x-10) =$
$x^2 - 10x - 10x + 100 =$
$x^2 - 20x + 100 =$

22. Find the product.

$(x - 4)^3$

$(x - 4)^3 =$ [ ]

Answer: $x^3 - 12x^2 + 48x - 64$

$(x-4)^3 =$
$(x-4)(x-4)(x-4) =$
$(x-4)(x^2 - 4x - 4x + 16) =$
$(x-4)(x^2 - 8x + 16) =$
$x^3 - 8x^2 + 16x - 4x^2 + 32x - 64 =$
$x^3 - 12x^2 + 48x - 64$

23. Use the FOIL method to multiply the binomials.

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

$(x - 5y)(5x + 3y) =$ [ ] (Simplify your answer.)

Answer: $5x^2 - 22xy - 15y^2$

$(x-5y)(5x+3y) =$
$5x^2 + 3xy - 25xy - 15y^2 =$
$5x^2 - 22xy - 15y^2 =$

24. Find the product.

$(3x + 10y)^2$

$(3x + 10y)^2 =$ [ ]

Answer: $9x^2 + 60xy + 100y^2$

$(3x+10y)^2 =$
$(3x+10y)(3x+10y) =$
$9x^2 + 30xy + 30xy + 100y^2 =$
$9x^2 + 60xy + 100y^2 =$

25. Find the product.

$(x-y)(x^2+13xy+y^2)$ = $x^3+13x^2y+xy^2-x^2y-13xy^2-y^3=$

$(x-y)(x^2+13xy+y^2)$ = [ ]
(Simplify your answer.)

$x^3+12x^2y-12xy^2-y^3=$

Answer: $x^3+12x^2y-12xy^2-y^3$

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

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

$(2x+5y)(2x-5y)=$ [ ]

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

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

$4x^2-25y^2$

Answer: $4x^2-25y^2$

27. Factor the polynomial using the greatest common factor. If there is no common factor other than 1 and the polynomial cannot be factored, so state.

$15x+25$

$15x+25=$

$5(3x+5)=$

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

- A. $15x+25=$ _____
- B. The polynomial is prime.

Answer: A. $15x+25=$ **5(3x + 5)**

28. Factor the greatest common factor from the polynomial.

$18x^2+30x$

$18x^2+30x=$

$6x(3x+5)=$

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

- A. $18x^2+30x=$ _____
- B. The polynomial is prime.

Answer: A. $18x^2+30x=$ **6x(3x + 5)**

29. Factor the given polynomial.

$x^2 + 12x + 35$ =

(x+5)(x+7)

Possible
35.1
7.5

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

○ A. $x^2 + 12x + 35 =$ _____

○ B. The polynomial is prime.

Check
$(x+5)(x+7) =$
$x^2 + 7x + 5x + 35 =$
$x^2 + 12x + 35 =$
GOOD

Answer: A. $x^2 + 12x + 35 =$ **(x + 5)(x + 7)**

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

$x^2 - 3x - 18$ =

(x-6)(x+3) OR (x+3)(x-6)

Possible
18.1
9.2
6.3

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

○ A. $x^2 - 3x - 18 =$ _____

○ B. The polynomial is prime.

Check
$(x+3)(x-6) =$
$x^2 - 6x + 3x - 18 =$
$x^2 - 3x - 18$ Good

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

31. Factor the given polynomial.

$x^2 - 17x + 72$ =

(x-8)(x-9) OR (x-9)(x-8)

Possible
72.1
36.2
18.4
9.8

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

○ A. $x^2 - 17x + 72 =$ _____

○ B. The polynomial is prime.

Check
$(x-8)(x-9) =$
$x^2 - 9x - 8x + 72 =$
$x^2 - 17x + 72 =$
Good

Answer: A. $x^2 - 17x + 72 =$ **(x − 9)(x − 8)**

32. Factor the trinomial completely.

$11x^2 - 21x - 2$ =

(11x + 1)(x − 2)

Possible
11.1
2.1

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

○ A. $11x^2 - 21x - 2 =$ _____ (Factor completely.)

○ B. The polynomial is prime.

Check
$(11x+1)(x-2) =$
$11x^2 - 22x + 1x - 2 =$
$11x^2 - 21x - 2 =$
Good

Answer: A. $11x^2 - 21x - 2 =$ **(11x + 1)(x − 2)** (Factor completely.)

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

$3a^2 - 8a - 28$ =

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

- A. $3a^2 - 8a - 28 =$ _____
- B. The polynomial is prime.

Answer: A. $3a^2 - 8a - 28 =$ **(3a − 14)(a + 2)**

$(3a-14)(a+2) =$

Possibly 3.1 28.1 14.2 4.7

Check

$(3a-14)(a+2) =$

$3a^2 + 6a - 14a - 28 =$

$3a^2 - 8a - 28 =$

Good

34. Factor the difference of two squares.

$x^2 - 81$ =

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

- A. $x^2 - 81 =$ _____
- B. The polynomial is prime.

Answer: A. $x^2 - 81 =$ **(x + 9)(x − 9)**

$x^2 - 81$

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

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

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

35. Factor the difference of two squares.

$9x^2 - 64$ =

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

- A. $9x^2 - 64 =$ _____
- B. The polynomial is prime.

Answer: A. $9x^2 - 64 =$ **(3x + 8)(3x − 8)**

$(3x)^2 - (8)^2$

$(3x+8)(3x-8)$

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

36. Factor the difference of two squares.

$49x^2 - 169y^2$ =

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

- A. $49x^2 - 169y^2 =$ _____
- B. The polynomial is prime.

Answer: A. $49x^2 - 169y^2 =$ **(7x + 13y)(7x − 13y)**

$(7x)^2 - (13y)^2 =$

$(7x+13y)(7x-13y) =$

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

37. Factor the perfect square.

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

Possible
4.1
2.2

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

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

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

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

$x^2 - 4x + 4$ Good

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

38. Factor the perfect square.

$36x^2 - 12x + 1$ $(6x-1)(6x-1) =$ Check

Possible
36.1
18.2
6.6
12.3
4.9

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

- A. $36x^2 - 12x + 1 =$ _____
- B. The polynomial is prime.

$(6x-1)(6x-1) =$

$36x^2 - 6x - 6x + 1 =$

$36x^2 - 12x + 1 =$

Good

Answer: A. $36x^2 - 12x + 1 =$ $(6x-1)^2$

39. Factor the expression completely or state that the polynomial is prime.

$8x^3 - 8x$ $8x^3 - 8x =$ formula $a^2 - b^2$

$8x(x^2 - 1) = (a+b)(a-b)$

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

$8x((x)^2 - (1)^2) =$

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

- A. $8x^3 - 8x =$ _____ (Factor completely.)
- B. The polynomial is prime.

Answer: A. $8x^3 - 8x =$ $8x(x+1)(x-1)$ (Factor completely.)

40. Factor the trinomial completely.

$4x^2 + 32x + 28$ $4x^2 + 32x + 28 =$

Possible
7.1

$4(x^2 + 8x + 7) =$

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

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

- A. $4x^2 + 32x + 28 =$ _____ (Factor completely.)
- B. The polynomial is prime.

Answer: A. $4x^2 + 32x + 28 =$ $4(x+7)(x+1)$ (Factor completely.)

41. Factor the expression completely or state that the polynomial is prime.

$7x^2 - 7x - 84$

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

- A. $7x^2 - 7x - 84 =$ _____ (Factor completely.)
- B. The polynomial is prime.

Answer: A. $7x^2 - 7x - 84 =$ **7(x + 3)(x − 4)** (Factor completely.)

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

$3x^3 - 12x$

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

- A. $3x^3 - 12x =$ _____
- B. The polynomial is prime.

Answer: A. $3x^3 - 12x =$ **3x(x + 2)(x − 2)**

43. Find all numbers that must be excluded from the domain of the rational expression.

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

Type the values for which the rational expression is undefined. Select the correct choice below and fill in any answer boxes within your choice.

- A. _____ (Use a comma to separate answers as needed.)
- B. The rational expression is defined for all real numbers.

Answer: A. **−1, −2** (Use a comma to separate answers as needed.)

44. Divide as indicated.

$$\frac{x+5}{4} \div \frac{5x+25}{3}$$

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

○ **A.** $\frac{x+5}{4} \div \frac{5x+25}{3} =$ _____, $x \neq$ _____

○ **B.** $\frac{x+5}{4} \div \frac{5x+25}{3} =$ _____, no numbers must be excluded.

Answer: A. $\frac{x+5}{4} \div \frac{5x+25}{3} =$ $\frac{3}{20}$, $x \neq$ -5

$$\frac{x+5}{4} \div \frac{5x+25}{3} =$$

$$\frac{x+5}{4} \cdot \frac{3}{5x+25} =$$

$$\frac{(x+5)}{4} \cdot \frac{3}{5(x+5)} =$$

$$\frac{(x+5)}{4} \cdot \frac{3}{5(x+5)} =$$

$$\frac{3}{4.5} =$$

$$\frac{3}{20} =$$

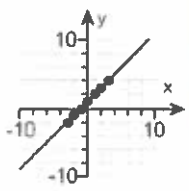
45.

Find seven ordered pairs to the equation $y = x^2 - 3$. Then determine its graph.

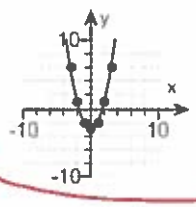
x	y
−3	
−2	
−1	
0	
1	
2	
3	

Choose the graph that connects the points.

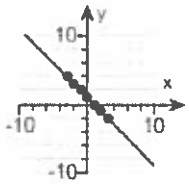
A.



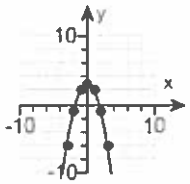
B.



C.



D.



Answers 6

1

−2

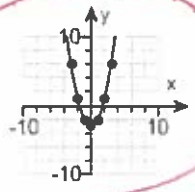
−3

−2

1

6

B.



$y = x^2 - 3$

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

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

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

$y = (0)^2 - 3 = (0)(0) - 3 = 0 - 3 = -3$

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

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

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

x	y
−3	6
−2	1
−1	−2
0	−3
1	−2
2	1
3	6

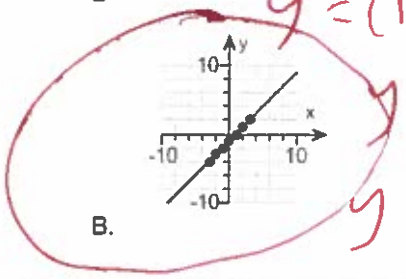
46.

Graph the equation $y = x - 1$. 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.

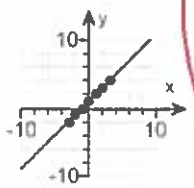
x	y
−3	
−2	
−1	
0	
1	
2	
3	

Answers −4
−3
−2
−1
0
1
2

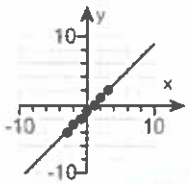


B.

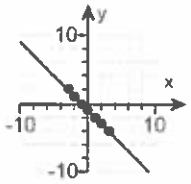
○ A.



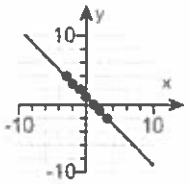
✓ ○ B.



○ C.



○ D.



$y = x - 1$

$y = (-3) - 1 = -3 - 1 = -4$
$y = (-2) - 1 = -2 - 1 = -3$
$y = (-1) - 1 = -1 - 1 = -2$
$y = (0) - 1 = 0 - 1 = -1$
$y = (1) - 1 = 1 - 1 = 0$
$y = (2) - 1 = 2 - 1 = 1$
$y = (3) - 1 = 3 - 1 = 2$

x	y
−3	−4
−2	−3
−1	−2
0	−1
1	0
2	1
3	2

47.

Graph the equation. Let x = −3, −2, −1, 0, 1, 2, and 3.

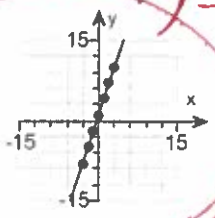
$y = 3x + 1$

x	y
−3	
−2	
−1	
0	
1	
2	
3	

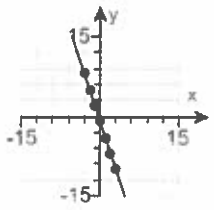
Choose the graph on the right that connects the points.

Answers −8
−5
−2
1
4
7
10

D.



A.



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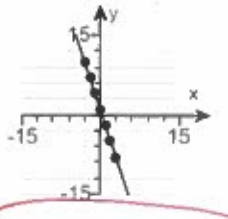
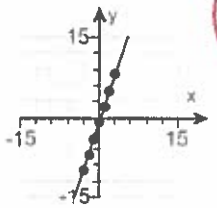
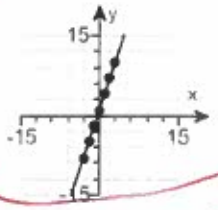


C.



D.



$y = 3x + 1$

$y = 3(-3) + 1 = -9 + 1 = -8$

$y = 3(-2) + 1 = -6 + 1 = -5$

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

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

$y = 3(1) + 1 = 3 + 1 = 4$

$y = 3(2) + 1 = 6 + 1 = 7$

$y = 3(3) + 1 = 9 + 1 = 10$

x	y
−3	−8
−2	−5
−1	−2
0	1
1	4
2	7
3	10

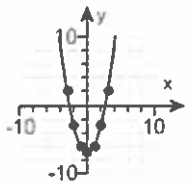
48.

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

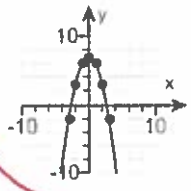
x	y
−3	
−2	
−1	
0	
1	
2	
3	

Choose the graph that connects the points.

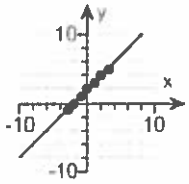
○ A.



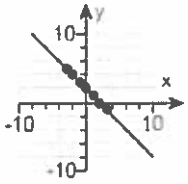
● B.



○ C.



○ D.



$y = 7 - x^2$

$y = 7 - (-3)^2 = 7 - (-3)(-3) = 7 - (9) = 7 - 9 = -2$

$y = 7 - (-2)^2 = 7 - (-2)(-2) = 7 - (4) = 7 - 4 = 3$

$y = 7 - (-1)^2 = 7 - (-1)(-1) = 7 - (1) = 7 - 1 = 6$

$y = 7 - (0)^2 = 7 - (0)(0) = 7 - (0) = 7 - 0 = 7$

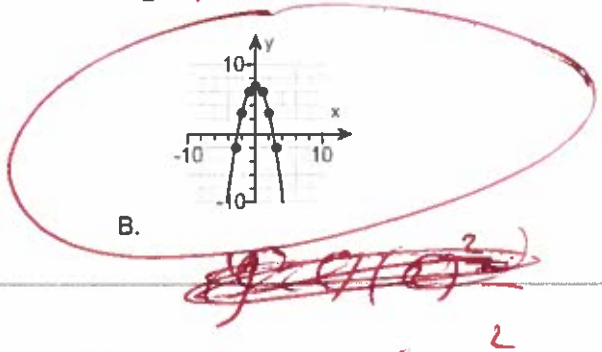
$y = 7 - (1)^2 = 7 - (1)(1) = 7 - (1) = 7 - 1 = 6$

$y = 7 - (2)^2 = 7 - (2)(2) = 7 - (4) = 7 - 4 = 3$

$y = 7 - (3)^2 = 7 - (3)(3) = 7 - (9) = 7 - 9 = -2$

x	y
−3	−2
−2	3
−1	6
0	7
1	6
2	3
3	−2

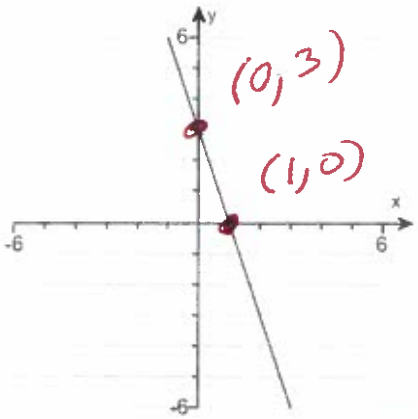
Answers −2
3
6
7
6
3
−2



B.

49.

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 = 1 OR (1, 0) point

y-intercept = 3 OR point (0, 3)

Answers A. The x-intercept(s) is/are 1.
(Type an integer or a simplified fraction. Use a comma to separate answers as needed.)

A. The y-intercept(s) is/are 3.
(Type an integer or a simplified fraction. Use a comma to separate answers as needed.)

50. Graph the equation. Let x = −3, −2, −1, 0, 1, 2, or 3.

y = 1

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=1

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

Answers 1

1

1

1

1

1

1

B.

○ A.

● B.

○ C.

○ D.

51. 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.

5x − 4 = 16

5x − 4 + 4 = 16 + 4

5x = 20

$\frac{5x}{5} = \frac{20}{5}$

x = 4

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 | x is a real number}.

○ C. The solution set is ∅.

Answer: A. The solution set is { 4 }.

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

$9x - (7x - 3) = 17$

$9x - 7x + 3 = 17$

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

$2x + 3 = 17$

$2x + 3 - 3 = 17 - 3$

$2x = 14$

$\frac{2x}{2} = \frac{14}{2}$

$x = 7$

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

Answer: A. The solution set is {7}.

53. Solve the linear equation.

$5x + 9 = 2x + 42$

$5x + 9 - 9 = 2x + 42 - 9$

$5x = 2x + 33$

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

$5x - 2x = 2x + 33 - 2x$

$3x = 33$

$\frac{3x}{3} = \frac{33}{3}$

$x = 11$

- A. The solution set is { }.
- B. The solution set is {x | x is a real number}.
- C. The solution set is ∅.

Answer: A. The solution set is {11}.

54. Solve and check the linear equation.

$4(x - 3) + 19 = 3(x + 4)$

$4x - 12 + 19 = 3x + 12$

$4x + 7 = 3x + 12$

$4x + 7 - 7 = 3x + 12 - 7$

$4x = 3x + 5$

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

$4x - 3x = 3x + 5 - 3x$

$1x = 5$

$x = 5$

- A. The solution set is { }.
- B. The solution set is {x | x is a real number}.
- C. The solution set is ∅.

Answer: A. The solution set is {5}.

55. Solve and check the linear equation.

$10 - \frac{x}{2} = \frac{x}{3}$

$\frac{10}{1}(6) - \frac{x}{2}(6) = \frac{x}{3}(6)$ Mult by LCD = 6

$10(6) - x(3) = x(2)$

$60 - 3x = 2x$

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

$60 - 3x - 60 = 2x - 60$

$-3x = 2x - 60$

$-3x - 2x = 2x - 60 - 2x$

$-5x = -60$

$\frac{-5x}{-5} = \frac{-60}{-5}$

$x = 12$

- A. The solution set is { }.
- B. The solution set is {x | x is a real number}.
- C. The solution set is ∅.

Answer: A. The solution set is {12}.

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

$4x + 14 = 7(x + 2) - 3x$

$4x+14 = 7x+14-3x$

$4x+14 = 4x+14$

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 | x is a real number}.
- C. The solution set is ∅.

$4x+14-14 = 4x+14-14$

$4x = 4x$

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

$0 = 0$

the solution set is $\{x \mid x \text{ is a real number}\}$

What type of equation is this?

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

Answers B. The solution set is {x | x is a real number}.

A. an identity

Identity

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

$5(x + 3) = 9 + 5x$

$5x+15 = 9+5x$

$5x+15-15 = 9+5x-15$

$5x = 5x-6$

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 | x is a real number}.
- C. The solution set is ∅.

$5x-5x = 5x-6-5x$

$0 \neq -6$

No Solution

Inconsistent

What type of equation is this?

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

Answers C. The solution set is ∅.

C. an inconsistent equation

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

$8x + 8 = 2x + 8$

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

$8x = 2x$

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 | x is a real number}.
- C. The solution set is ∅.

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

$6x = 0$

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

$x = 0$

What type of equation is this?

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

Answers A. The equation has a single solution. The solution set is {0}.

C. a conditional equation

59. Solve the equation.

$0.3x + 0.3(10) = 0.1(x + 20)$

$0.3x + 3 = 0.1x + 2$

$0.3x + 3 - 3 = 0.1x + 2 - 3$

$0.3x = 0.1x - 1$

$0.3x - 0.1x = 0.1x - 1 - 0.1x$

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

- A. The solution set is { }. (Type an integer or a simplified fraction.)
- B. The solution set is {x| x is a real number}.
- C. The solution set is ∅.

$0.2x = -1$

$\frac{0.2x}{0.2} = \frac{-1}{0.2}$

$x = -5$

Answer: A. The solution set is {−5}. (Type an integer or a simplified fraction.)

60. Write the expression in the standard form a + b *i*.

$(3 - 5i) + (4 + 9i)$

$3 - 5i + 4 + 9i =$

$7 + 4i =$

$(3 - 5i) + (4 + 9i) =$ (Simplify your answer.)

Answer: $7 + 4i$

61. Write the expression in the standard form a + b *i*.

$(7 + 5i) - (9 - 7i)$

$7 + 5i - 9 + 7i =$

$-2 + 12i =$

$(7 + 5i) - (9 - 7i) =$ (Simplify your answer.)

Answer: $-2 + 12i$

62. Find the following product and write the result in standard form, a + b *i*.

$(-5+i)(4+i)$

$(-5+i)(4+i) =$ [ ]

Answer: $-21+(-1)i$

$-20-5i+4i+i^2 = -20-1i+i^2 = -20-i-1 = -21-i$

$-20-1i+(-1) =$

63. Divide the following complex numbers and express the result in standard form, a + b *i*, where a and b are fractions in lowest terms.

$\left(\frac{2+7i}{3+3i}\right)\left(\frac{3-3i}{3-3i}\right) = \frac{6-6i+21i-21i^2}{9-9i+9i-9i^2} = \frac{6+15i+21}{9+9} = \frac{27+15i}{18} = \frac{9(3)}{9(2)} + \frac{3(5i)}{3(6)}$

$\frac{2+7i}{3+3i} =$ [ ]

$= \frac{6+15i-21i^2}{9-9i^2} = \frac{6+15i-21(-1)}{9-9(-1)} = \frac{27}{18} + \frac{15i}{18} = \frac{3}{2} + \frac{5}{6}i$

Answer: $\frac{3}{2}+\frac{5}{6}i$

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

$x^2 - x - 56 = 0$

$(x+7)(x-8) = 0$

$x+7=0$ OR $x-8=0$

$x+7-7=0-7$ OR $x-8+8=0+8$

The solution set is { [ ] }.

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

$x=-7$ OR $x=8$

Answer: $-7,8$

Possibly: 56, 1; 28, 2; 14, 4; 7, 8

65. Solve the equation by factoring.

$x^2 = 7x + 18$

$x^2-7x-18=0$

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

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

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

The solution set is { [ ] }.

(Use a comma to separate answers as needed.)

$x=-2$ OR $x=9$

Answer: $9,-2$

Possibly: 18, 1; 9, 2; 6, 3

66. Solve the equation by factoring.

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

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

$3x-1=0$ OR $3x+8=0$

$3x-1+1=0+1$ OR $3x+8-8=0-8$

The solution set is { [ ] }.

(Use a comma to separate answers as needed.)

$3x=1$ OR $3x=-8$

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

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

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

Possibly: 9, 1; 8, 1; 3, 3; 2, 4

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

$4x^2 + 12x = 0$

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

Answer: 0, −3

$4x(x+3)=0$
$4x=0$ OR $x+3=0$
$\frac{4x}{4}=\frac{0}{4}$ OR $x+3-3=0-3$
$x=0$ OR $x=-3$

68. Solve the equation by factoring.

$45 - 45x = (7x + 4)(x - 1)$

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

Answer: 1, −7

$45-45x=7x^2-7x+4x-4$
$45-45x=7x^2-3x-4$
$0=7x^2-3x-4-45+45x$
$0=7x^2+42x-49$
$0=7(x^2+6x-7)$
$0=7(x-1)(x+7)$
$x-1=0$ OR $x+7=0$
$x-1+1=0+1$ OR $x+7-7=0-7$
$x=1$ OR $x=-7$

69. Solve the equation by the square root property.

$(x - 9)^2 = 81$

What is the solution set?

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

Answer: 0, 18

$\sqrt{(x-9)^2}=\pm\sqrt{81}$
$x-9=\pm 9$
$x-9=-9$ OR $x-9=9$
$x-9+9=-9+9$ OR $x-9+9=9+9$
$x=0$ OR $x=18$

70. Solve the quadratic equation by completing the square.

$x^2 + 2x = 35$

What is the solution set?

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

Answer: 5, −7

$x^2+2x+\left(\frac{1}{2}(2)\right)^2=35+\left(\frac{1}{2}(2)\right)^2$
$x^2+2x+(1)^2=35+(1)^2$
$x^2+2x+1=35+1$
$x^2+2x+1=36$
$(x+1)^2=36$
$\sqrt{(x+1)^2}=\pm\sqrt{36}$
$x+1=-6$ OR $x+1=6$
$x+1-1=-6-1$ OR $x+1-1=6-1$
$x=-7$ OR $x=5$

71. Solve the following equation using the quadratic formula.

$x^2 + 8x + 15 = 0$

The solution set is { }.
(Type an exact answer, using radicals as needed. Use a comma to separate answers as needed.)

Answer: −5, −3

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

$a=1, b=8, c=15$
$x=\frac{-(8)\pm\sqrt{(8)^2-4(1)(15)}}{2(1)}$
$x=\frac{-8\pm\sqrt{64-60}}{2}$
$x=\frac{-8\pm\sqrt{4}}{2}$
$x=\frac{-8\pm 2}{2}$
$x=-4\pm 1$
$x=-4-1$ OR $x=-4+1$
$x=-5$ OR $x=-3$

(72) $x^2 - 8x + 41 = 0$

$1x^2 - 8x + 41 = 0$

$a = 1, \quad b = -8 \quad c = 41$

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

$$x = -\frac{(-8) \pm \sqrt{(-8)^2 - 4(1)(41)}}{2(1)}$$

$$x = \frac{8 \pm \sqrt{64 - 164}}{2}$$

$$x = \frac{8 \pm \sqrt{-100}}{2}$$

$$x = \frac{8 \pm 10i}{2}$$

$$x = \frac{8}{2} \pm \frac{10i}{2}$$

$$x = 4 \pm 5i$$

$x = 4 - 5i$ OR $x = 4 + 5i$

(73) $2x^2 - 11x = 6$

$2x^2 - 11x - 6 = 0$

$a = 2,\ b = -11,\ c = -6$

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

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

$$x = \frac{11 \pm \sqrt{121 + 48}}{4}$$

$$x = \frac{11 \pm \sqrt{169}}{4}$$

$$x = \frac{11 \pm 13}{4}$$

$x = \frac{11+13}{4}$ or $x = \frac{11-13}{4}$

$x = \frac{24}{4}$ or $x = \frac{-2}{4}$

or $x = \frac{-1(2)}{2(4)}$

$x = 6$

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

(74) $4x^2 - 24x + 36 = 0$

$4(x^2 - 6x + 9) = 0$

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

Let ~~$4 \neq 0$~~ or $x-3=0$ or $x-3=0$

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

$x=3$ or $x=3$

answer

3

(75) $36x^2 - 9 = 0$

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

$9(4x^2 - 1) = 0$

$9((2x)^2 - (1)^2) = 0$

$9(2x+1)(2x-1) = 0$

let $9 \neq 0$ or $2x+1=0$ or $2x-1=0$

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

$2x = -1$ or $2x = 1$

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

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

76. Solve the quadratic equation using the method of your choice.

$4x^2 - 3x = 0$

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

The solution set is { }.
(Type an exact answer, using radicals as needed. Express complex numbers in terms of i. Use a comma to separate answers as needed.)

$\frac{4x}{4}=\frac{3}{4}$
$x=3/4$

Answer: $0, \frac{3}{4}$

77. 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.

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

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

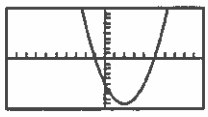
- A. There are no x-intercepts.
- B. The x-intercept(s) is/are x = _____.
  (Type an integer or a fraction. Use a comma to separate answers as needed.)

Choose the correct graph below.

A. B. C. D.

Answers B. The x-intercept(s) is/are x = −1,5.
(Type an integer or a fraction. Use a comma to separate answers as needed.)

B.



use graphing calculator

$y_1 = x^2 - 4x - 5$

Xmin = −12
Xmax = 12
Xscl = 1
Ymin = −10
Ymax = 10
Yscl = 1

78. 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, 10 games were played. How many players entered the tournament?

$N = \frac{t^2 - t}{2}$ → $10 = \frac{t^2 - t}{2}$

How many players entered the tournament?

$\frac{10}{1} = \frac{t^2 - t}{2}$

$10(2) = 1(t^2 - t)$

$20 = t^2 - t$

$0 = t^2 - t - 20$

$0 = (t+4)(t-5)$

$t + 4 = 0$ OR $t - 5 = 0$

$t + 4 - 4 = 0 - 4$ OR $t - 5 + 5 = 0 + 5$

$t = -4$ or $t = 5$

ANSWER $t = 5$

[ ] players (Simplify your answer.)

Answer: 5

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

$\sqrt{5x + 46} = x + 8$ → $(\sqrt{5x+46})^2 = (x+8)^2$

$5x + 46 = (x+8)(x+8)$

$5x + 46 = x^2 + 8x + 8x + 64$

$5x + 46 = x^2 + 16x + 64$

$0 = x^2 + 16x + 64 - 5x - 46$

$0 = x^2 + 11x + 18$

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

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

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

$x = -2$ OR $x = -9$

Check

$\sqrt{5(-2) + 46} = -2 + 8$

$\sqrt{-10 + 46} \; 6$

$\sqrt{36} = 6$

$6 = 6$ good

$\sqrt{5(-9) + 46} = -9 + 8$

$\sqrt{-45 + 46} = -1$

$\sqrt{1} = -1$

$1 \neq -1$ BAD

ANSWER -2

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.

Answer: A. The solution set is {−2}. (Use a comma to separate answers as needed.)

80. Find the solution(s) of the equation.

$|2x - 3| = 5$

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.

Answer: A. The solution set is {−1,4}. (Use a comma to separate answers as needed.)

formula

$|x| = a$

$x = -a$ or $x = a$

$|2x - 3| = 5$

$2x - 3 = -5$ OR $2x - 3 = 5$

$2x - 3 + 3 = -5 + 3$ OR $2x - 3 + 3 = 5 + 3$

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

$\frac{2x}{2} = \frac{-2}{2}$ OR $\frac{2x}{2} = \frac{8}{2}$

$x = -1$ OR $x = 4$

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

$2x + 4 < 10$ → $2x+4-4 < 10-4$

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

$2x < 6$

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

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

Choose the correct graph below.

- A. 

- B. 

- C. 

- D. The solution set is ∅.

$x < 3$

Answers A. The solution set is $(-\infty, 3)$. (Type your answer using interval notation.)

$(-\infty, 3)$

A. 

82. Other than ∅, use interval notation to express the solution set and graph the solution set on a number line.

$4x - 5 \geq 27$ → $4x-5+5 \geq 27+5$

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

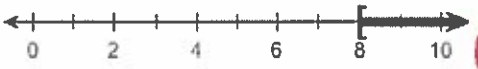
$4x \geq 32$

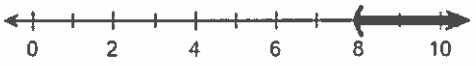
- A. The solution set in interval notation is _____.
(Simplify your answer. Use integers or fractions for any numbers in the expression. Type your answer in interval notation.)
- B. The solution set is ∅.

$\frac{4x}{4} \geq \frac{32}{4}$

Graph the solution set on a number line. Choose the correct graph below.

- A. 

- B. 

- C. 

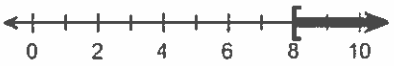
- D. 

- E. The solution set is ∅.
- F. 

$x \geq 8$

Answers A. The solution set in interval notation is $[8, \infty)$.
(Simplify your answer. Use integers or fractions for any numbers in the expression. Type your answer in interval notation.)

$[8, \infty)$

B. 

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

$-6x \geq 42$

$\frac{-6x}{-6} \leq \frac{42}{-6}$

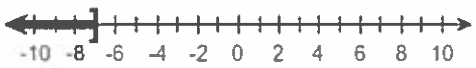
Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

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

$x \leq -7$

Choose the correct graph of the inequality.

A.



B.

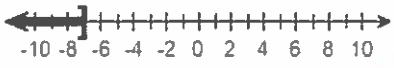
C.

D. The solution set is ∅.

$(-\infty, -7]$

Answers A. The solution set is $(-\infty, -7]$. (Type your answer using interval notation.)

A.



84. Other than ∅, use interval notation to express the solution set and graph each solution set on a number line.

$5(6-2x) \leq 35-5x$

$30-10x \leq 35-5x$

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

$30-10x-30 \leq 35-5x-30$

$-10x \leq -5x+5$

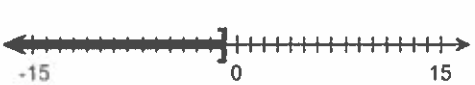
$-10x+5x \leq -5x+5+5x$

$-5x \leq 5$

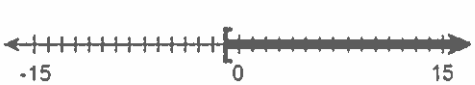
- A. The solution set expressed in interval notation is _____.
  (Simplify your answer. Use integers or fractions for any numbers in the expression.)
- B. The solution set is ∅.

Choose the correct graph of the inequality below.

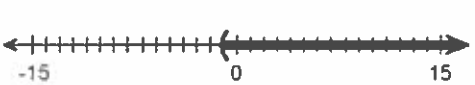
A.



B.



C.



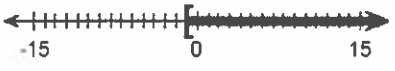
D.

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

$x \geq -1$

Answers A. The solution set expressed in interval notation is $[-1, \infty)$.
(Simplify your answer. Use integers or fractions for any numbers in the expression.)

B.



$[-1, \infty)$

formula $|x|<a$ $-a<x<a$

85. Solve the inequality, then graph the solution set.

$|x+1| \leq 4$

$|x+1| \leq 4$

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

$-4 \leq x+1 \leq 4$

$-4-1 \leq x+1-1 \leq 4-1$

$-5 \leq x \leq 3$

○ A. The solution set is _____. (Type your answer in interval notation.)

○ B. The solution set is ∅.

Choose the correct graph below.

○ A.

○ B.

○ C.

○ D. The graph contains no points.

Answers A. The solution set is [−5,3]. (Type your answer in interval notation.)

$[-5, 3]$

C.

86. Evaluate the function $f(x) = 5x - 7$ at the given values of the independent variable and simplify.

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

$f(x) = 5x-7$

a. $f(-1) =$ _____ (Simplify your answer.)

$f(-1) = 5(-1)-7$

$f(-1) = -5-7$

b. $f(x+1) =$ _____ (Simplify your answer.)

$f(-1) = -12$

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

$f(x+1) = 5(x+1)-7$

Answers -12

$5x-2$

$-5x-7$

$f(x+1) = 5x+5-7$

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

$f(-x) = 5(-x)-7$

$f(-x) = -5x-7$

87. Evaluate the function $f(x) = x^2 - 6x + 7$ at the given values of the independent variable and simplify.

a. $f(5)$ **b.** $f(x+7)$ **c.** $f(-x)$

a. $f(5) =$ [ ] (Simplify your answer.)

b. $f(x+7) =$ [ ] (Simplify your answer.)

c. $f(-x) =$ [ ] (Simplify your answer.)

Answers 2

$x^2 + 8x + 14$

$x^2 + 6x + 7$

$f(x) = x^2 - 6x + 7$

$f(5) = (5)^2 - 6(5) + 7$

$f(5) = (5)(5) - 6(5) + 7$

$f(5) = 25 - 30 + 7$

$f(5) = -5 + 7$

$f(5) = 2$

$f(x+7) = (x+7)^2 - 6(x+7) + 7$

$f(x+7) = (x+7)(x+7) - 6(x+7) + 7$

$f(x+7) = x^2 + 7x + 7x + 49 - 6x - 42 + 7$

$f(x+7) = x^2 + 8x + 14$

$f(-x) = (-x)^2 - 6(-x) + 7$

$f(-x) = (-x)(-x) - 6(-x) + 7$

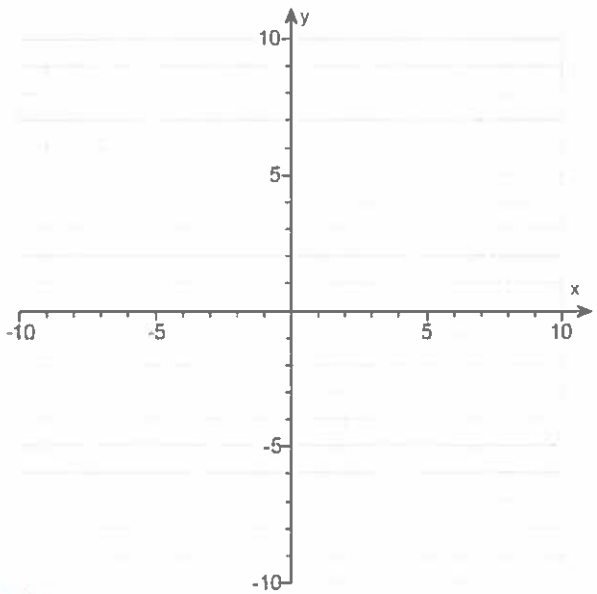
$f(-x) = x^2 + 6x + 7$

88.

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.

$f(x) = x$

$g(x) = x - 4$



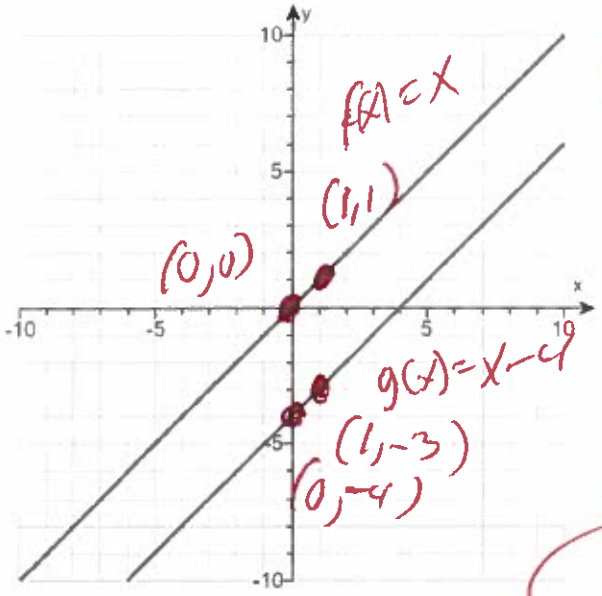
Use the graphing tool to graph the functions.

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) ○ down
○ up

Answers



(1) down

4

$f(x) = x$

$f(0) = 0$

$f(1) = 1$

x	f(x)
0	0
1	1

$g(x) = x - 4$

$g(0) = (0) - 4$

$g(0) = 0 - 4$

$g(0) = -4$

$g(0) = -4$

x	g(x)
0	-4
1	-3

$g(1) = (1) - 4$

$g(1) = 1 - 4$

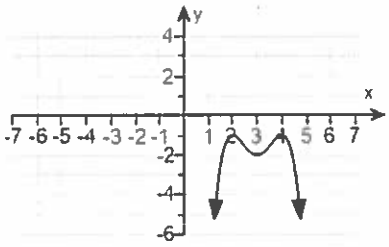
$g(1) = -3$

89. 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) _____.
  (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) _____.
  (Type your answer in interval notation. Use a comma to separate answers as needed.)
- B. The function is never decreasing.

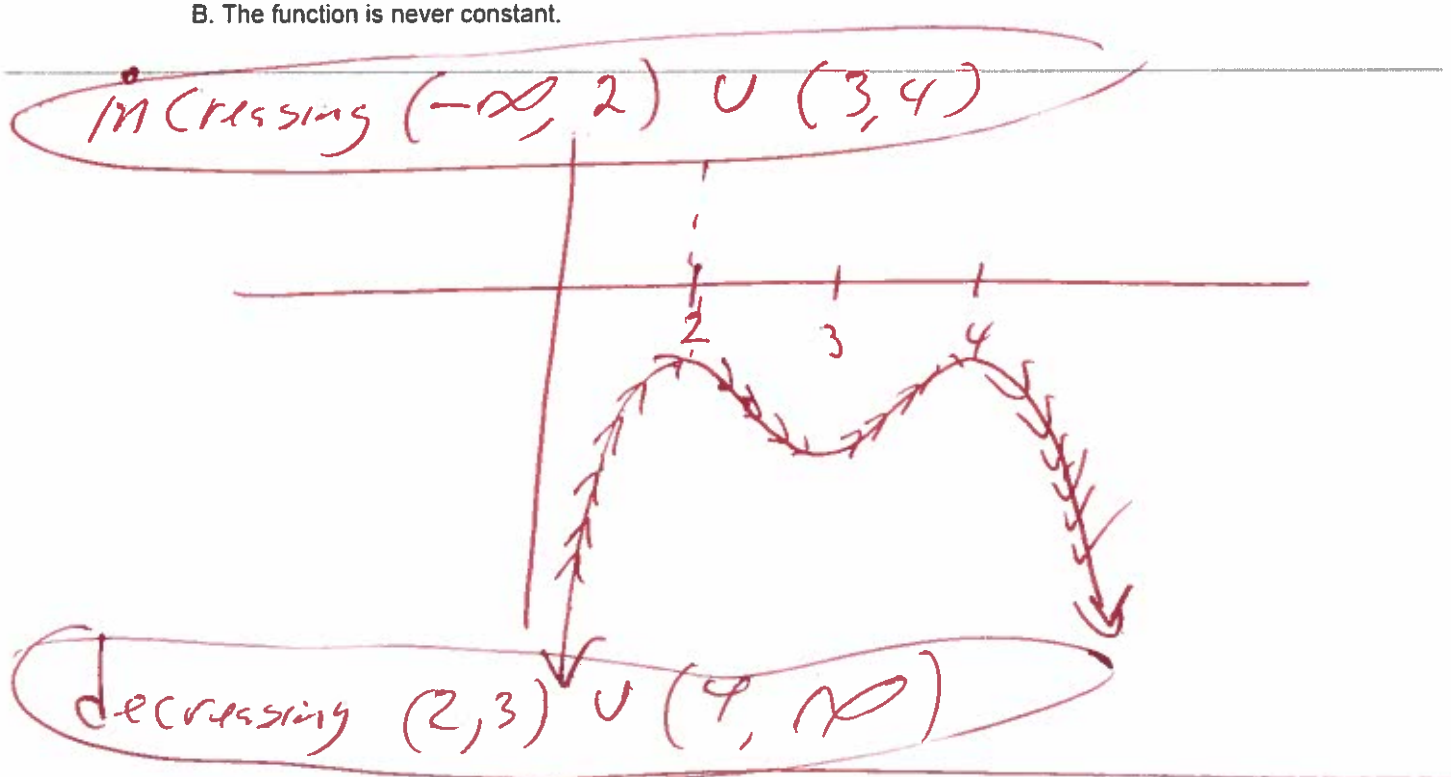
(c) Select the correct choice below and, if necessary, fill in the answer box to complete your choice.

- 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) $(-\infty, 2),(3, 4)$.
(Type your answer in interval notation. Use a comma to separate answers as needed.)

A. The function is decreasing on the interval(s) $(2, 3),(4, \infty)$.
(Type your answer in interval notation. Use a comma to separate answers as needed.)

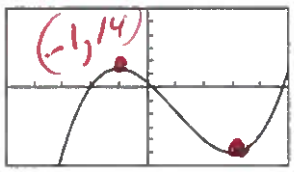
B. The function is never constant.



90.

The graph and equation of the function f are given.
a. 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.
b. 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.

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



[-5,5,1] by [-60,60,10]

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 **-1** and the relative maxima(maximum) are(is) **14**.
(Use a comma to separate answers as needed.)

A.

The function f has (a) relative minima(minimum) at **3** and the relative minima(minimum) are(is) **-50**.
(Use a comma to separate answers as needed.)

Use graphing Calculator

$y_1 = 2x^3 - 6x^2 - 18x + 4$

$x_{min} = -5$

$x_{max} = 5$

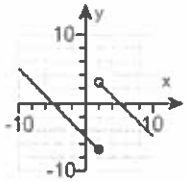
$y_{min} = -60$

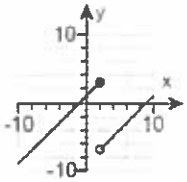
$y_{max} = 60$

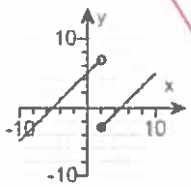
91. The domain of the piecewise function is $(-\infty,\infty)$.
a. Graph the function.
b. Use your graph to determine the function's range.

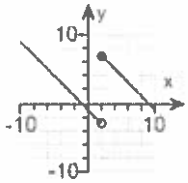
$$f(x)=\begin{cases} x+5 & \text{if } x<2 \\ x-5 & \text{if } x\geq 2 \end{cases}$$

a. Choose the correct graph below.

○ A. 

○ B. 

● C. 

○ D. 

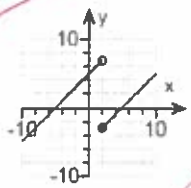
use graphing calculator

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

$y_1 = x+5 \div (x<2)$ open

$y_2 = x-5 \div (x\geq 2)$ close

Answers



C.

$(-\infty,\infty)$

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

$f(x)=7x+6$

$\frac{f(x+h)-f(x)}{h}=$ ____ (Simplify your answer.)

$\frac{(7(x+h)+6)-(7x+6)}{h}=$

$\frac{7x+7h+6-7x-6}{h}=$

$\frac{7h}{h}=$

$7=$

Answer: 7

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

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

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

$\frac{f(x+h)-f(x)}{h}=$ ____ (Simplify your answer.)

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

Answer: $2x+h-8$

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

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

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

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

(8,5) and (9,8)

$x_1\ y_1\ x_2\ y_2$

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

$m = \frac{(5)-(8)}{(8)-(9)}$

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

$m = \frac{5-8}{8-9}$

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

$m = 3$

- A. The slope is _____.
- B. The slope is undefined.

Indicate whether the line through the points rises, falls, is horizontal, or is vertical. Choose the correct answer below.

- A. The line is vertical.
- B. The line rises from left to right.
- C. The line falls from left to right.
- D. The line is horizontal.

Answers A. The slope is 3.

B. The line rises from left to right.

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

Slope = −2, passing through (−8, −5)

$y - y_1 = m(x - x_1)$

$m \quad x_1\ y_1$

Type the point-slope form of the line.

$y - (-5) = -2(x - (-8))$

$y + 5 = -2(x + 8)$

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

Type the slope-intercept form of the line.

$y + 5 = -2x - 16$

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

$y + 5 - 5 = -2x - 16 - 5$

Answers $y + 5 = -2(x + 8)$

$y = -2x - 21$

$y = -2x - 21$

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

Passing through $(-4,7)$ and $(1,2)$

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

$y=-x+3$

$(-4, 7)$ and $(1, 2)$

$x_1\ y_1 \qquad x_2\ y_2$

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

$y-(7)=\frac{(7)-(2)}{(-4)-(1)}(x-(-4))$

$y-7=\frac{7-2}{-4-1}(x+4)$

$y-7=\frac{5}{-5}(x+4)$

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

$y-7=-1x-4$

$y-7+7=-1x-4+7$

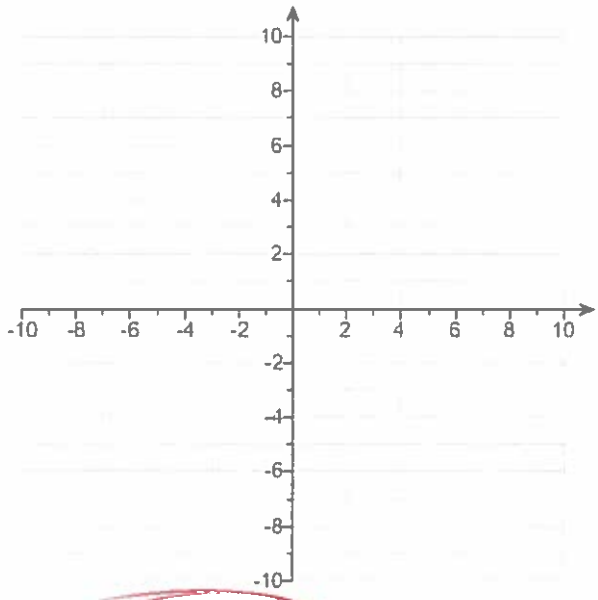
$y=-1x+3$

97.

Graph the following equation in a rectangular coordinate system.

$x = 7$

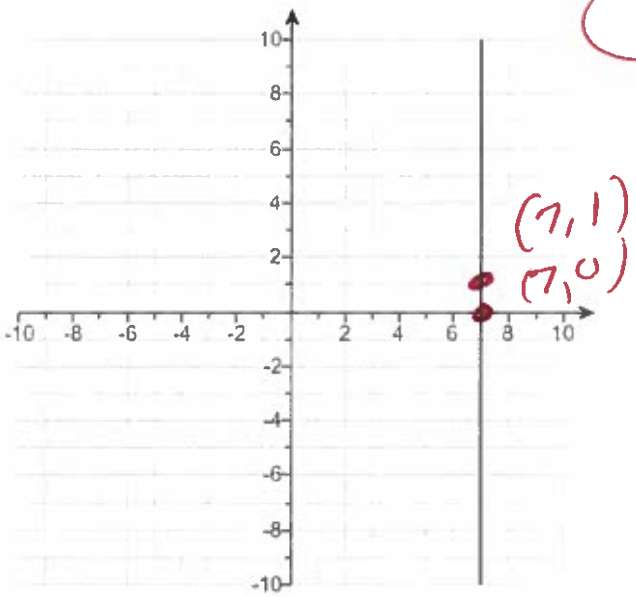
Use the graphing tool to graph the line.



$x = 7$

x	y
7	0
7	1

Answer:

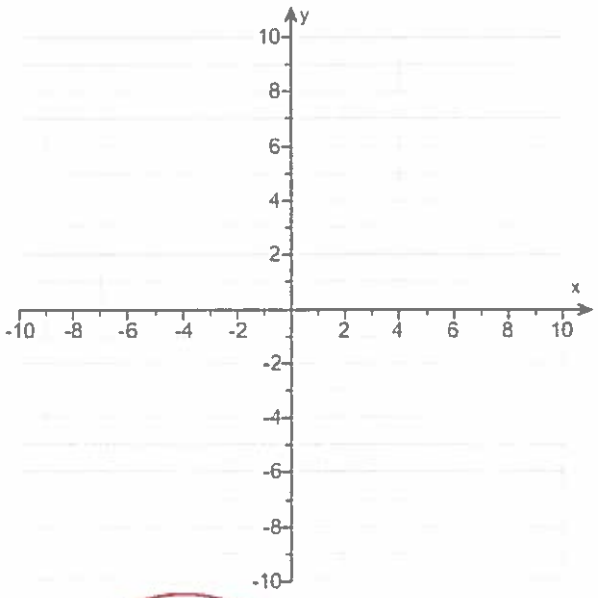


98.

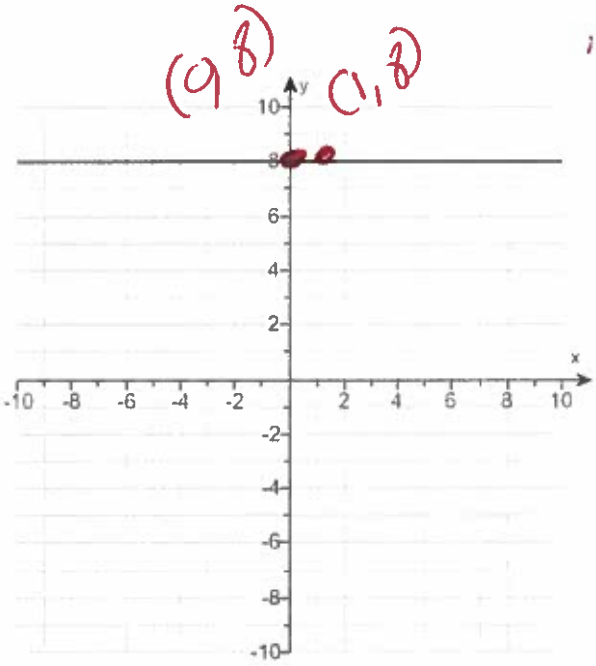
Graph the linear equation.

$y = 8$

Use the graphing tool to graph the linear equation.



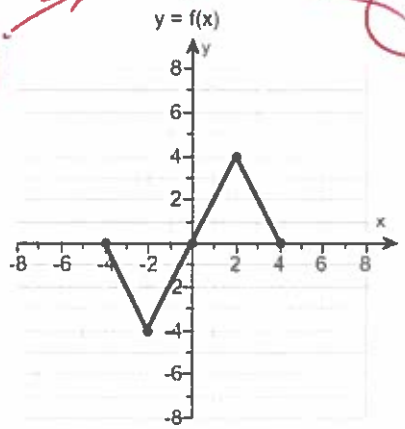
Answer:



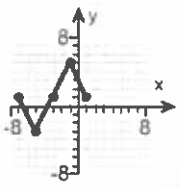
$y = 8$

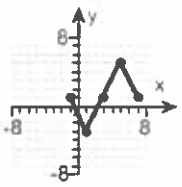
x	y
0	8
1	8

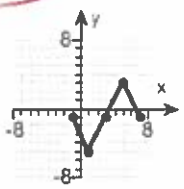
99. Use the graph of y = f(x) to graph the function g(x) = f(x + 3) + 1.

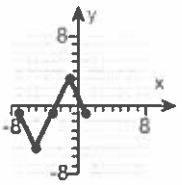


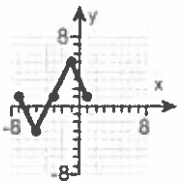
Choose the correct graph of g below.

A. 

B. 

C. 

D. 

Answer: 

A.

100. Find the domain of the function.

$f(x) = \sqrt{16 - 4x}$

What is the domain of f?

[ ] (Type your answer in interval notation.)

Answer: $(-\infty, 4]$

Answers $4x^2 + 24x - 28$

$(-\infty, \infty)$

$4x^2 + 22x - 42$

$(-\infty, \infty)$

$4x^3 + 51x^2 + 126x - 245$

$(-\infty, \infty)$

$4x - 5$

$(-\infty, -7) \cup (-7, \infty)$

---

102. For $f(x) = 6x$ and $g(x) = x + 1$, 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.)

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

c. $(f \circ g)(3) =$ ☐

d. $(g \circ f)(3) =$ ☐

Answers $6x + 6$

$6x + 1$

24

19

---

103. For $f(x) = x + 4$ and $g(x) = 3x + 4$, find the following functions.

a. $(f \circ g)(x)$; **b.** $(g \circ f)(x)$; **c.** $(f \circ g)(0)$; **d.** $(g \circ f)(0)$

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

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

c. $(f \circ g)(0) =$ ☐

d. $(g \circ f)(0) =$ ☐

Answers $3x + 8$

$3x + 16$

8

16

---

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

$f(x) = 4x^2 + 23x - 35,\ g(x) = x + 7$

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

What is the domain of $f+g$?

- ○ $(-\infty,\infty)$
- ○ $\left(\frac{7}{6},\infty\right)$
- ○ $[0,\infty)$
- ○ $\left(-\infty,\frac{7}{6}\right)\cup\left(\frac{7}{6},\infty\right)$

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

What is the domain of $f-g$?

- ○ $\left(-\infty,\frac{35}{23}\right)\cup\left(\frac{35}{23},\infty\right)$
- ○ $(-\infty,\infty)$
- ○ $[0,\infty)$
- ○ $\left(\frac{7}{6},\infty\right)$

$(fg)(x) =$ [ ]

What is the domain of fg?

- ○ $(-\infty,-7)\cup(-7,\infty)$
- ○ $(-\infty,\infty)$
- ○ $\left(-\infty,\frac{21}{11}\right)\cup\left(\frac{21}{11},\infty\right)$
- ○ $\left(\frac{21}{11},\infty\right)$

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

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

- ○ $(-\infty,\infty)$
- ○ $(-\infty,-7)\cup(-7,\infty)$
- ○ $[0,\infty)$
- ○ $(-7,\infty)$

104. For $f(x) = 1 - x$ and $g(x) = 4x^2 + x + 3$, 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.)

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

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

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

Answers $-4x^2 - x - 2$

$4x^2 - 9x + 8$

-41

17

105. Find the distance between the pair of points.

(1,7) and (9,1)

$x_1\ y_1$ $x_2\ y_2$

The distance between the points is [ ] units.
(Round to two decimal places as needed.)

Answer: 10

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

$d = \sqrt{((1) - (9))^2 + ((7) - (1))^2}$

$d = \sqrt{(1-9)^2 + (7-1)^2}$

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

$d = \sqrt{64 + 36}$

$d = \sqrt{100}$

$= 10$

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

(8,6) and (10,2)

$x_1\ y_1$ $x_2\ y_2$

The midpoint of the segment is [ ].
(Type an ordered pair.)

Answer: (9,4)

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

$= \left(\frac{(8)+(10)}{2}, \frac{(6)+(2)}{2}\right)$

$= \left(\frac{8+10}{2}, \frac{6+2}{2}\right)$

$= \left(\frac{18}{2}, \frac{8}{2}\right)$

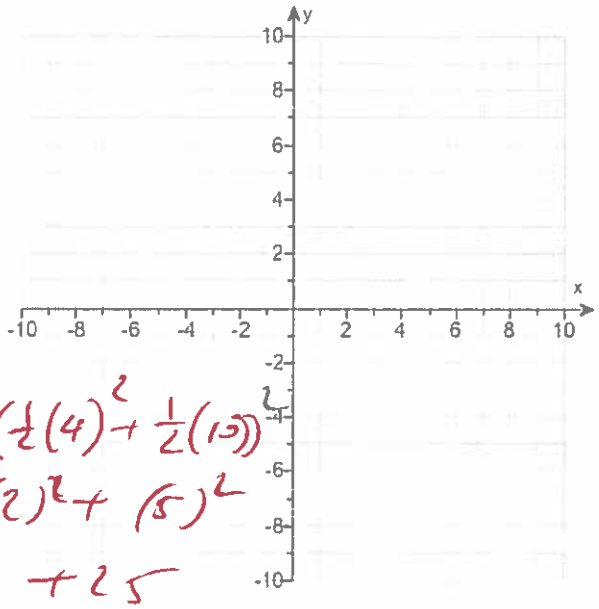
$= (9, 4)$

107. 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.

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

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

Use the graphing tool to graph the circle.



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

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

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

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

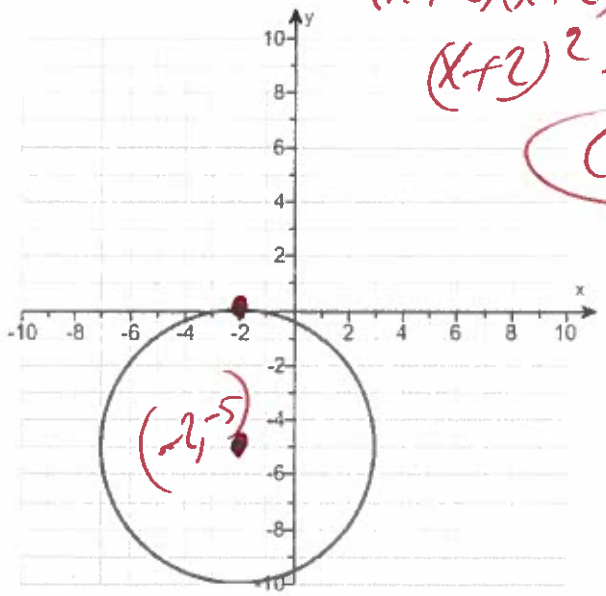
Answers $(x+2)^2+(y+5)^2 = 25$

$(x+2)(x+2)+(y+5)(y+5) = 25$

$(x+2)^2+(y+5)^2 = 25$

CENTER $= (-2,-5)$

Radius $= \sqrt{25} = 5$



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

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

$a=4 \quad b=-16 \quad c=6$

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

The vertex is _____. (Type an ordered pair.)

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

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

$= (2, f(2))$

$= (2, 4(2)^2-16(2)+6)$

$(2, 4(2)(2)-16(2)+6) =$

$(2, 16-32+6) =$

$(2, -10) =$

Answer: (2, − 10)

109. Find the coordinates of the vertex for the parabola defined by the given quadratic function.

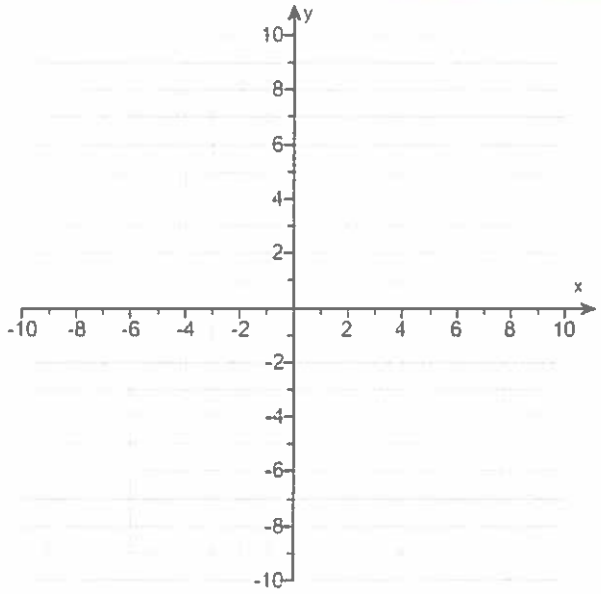
$f(x) = -x^2 + 8x + 7$

The vertex is [ ]. (Type an ordered pair.)

Answer: (4,23)

110. 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.

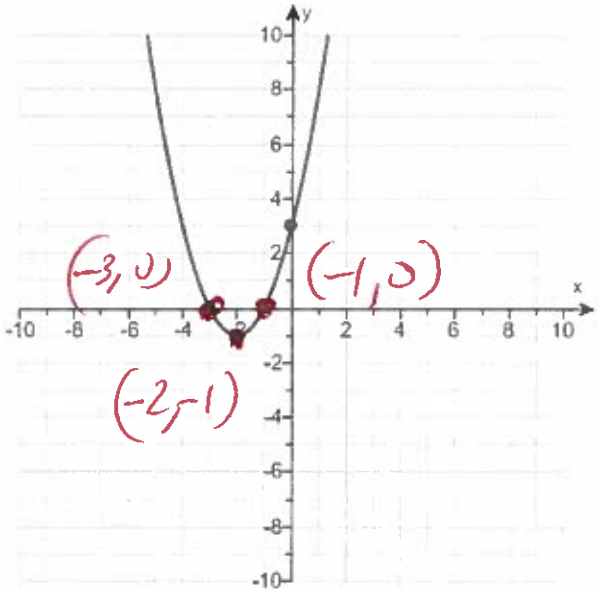
$f(x) = (x+2)^2 - 1$



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)
-3	0
-2	-1
-1	0

$x = -2$

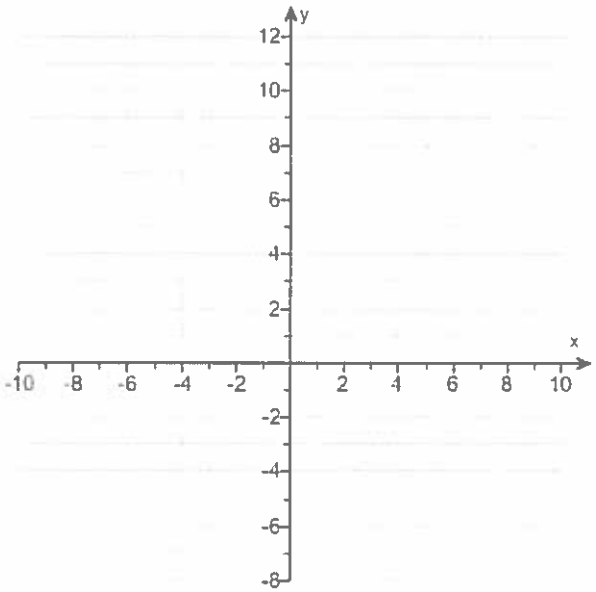
$(-\infty, \infty)$

$[-1, \infty)$

111.

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

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



Use the graphing tool to graph the equation. Use the vertex and the y-intercept when drawing the graph.

The axis of symmetry is [ ].
(Simplify your answer. Type an equation.)

Identify the function's domain.

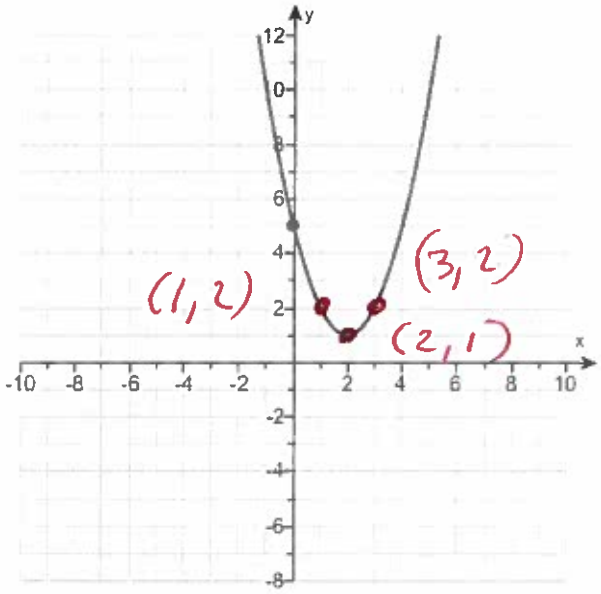
The domain is [ ].
(Type the answer in interval notation.)

Identify the function's range.

The range is [ ].
(Type the answer in interval notation.)

x	f(x)
1	2
2	1
3	2

Answers



$x = 2$

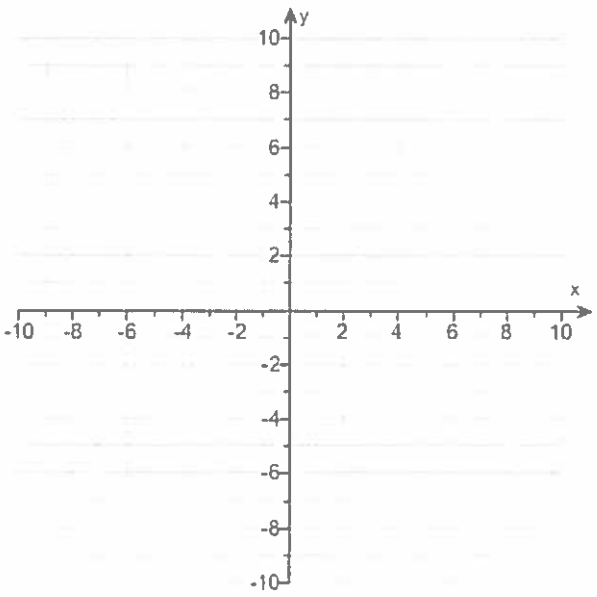
$(-\infty, \infty)$

$[1, \infty)$

112.

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.

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



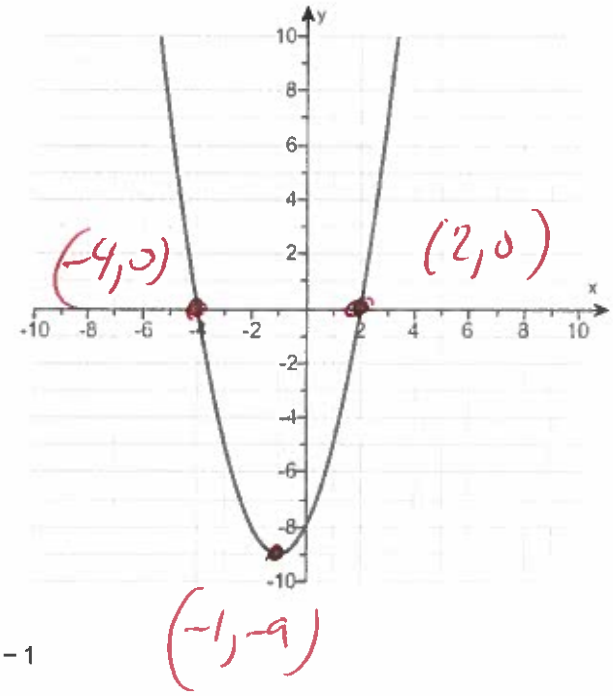
Use the graphing tool to graph the equation. Use the vertex and one of the intercepts when drawing the graph.

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)
-4	0
-1	-9
2	0

$x = -1$

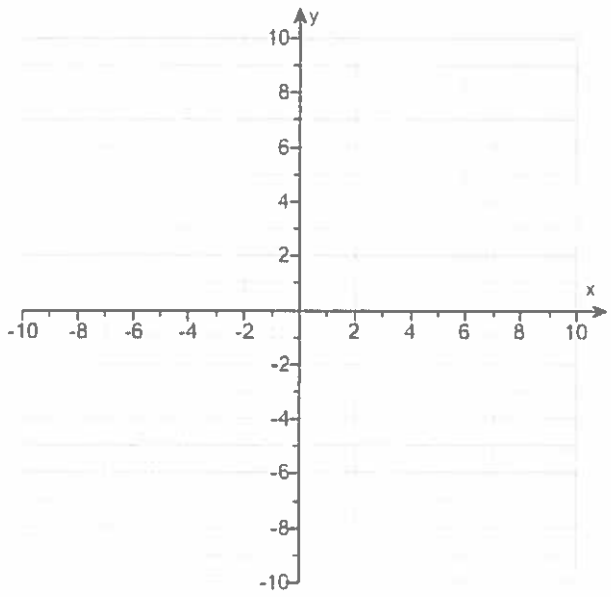
$(-\infty, \infty)$

$[-9, \infty)$

113.

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.

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



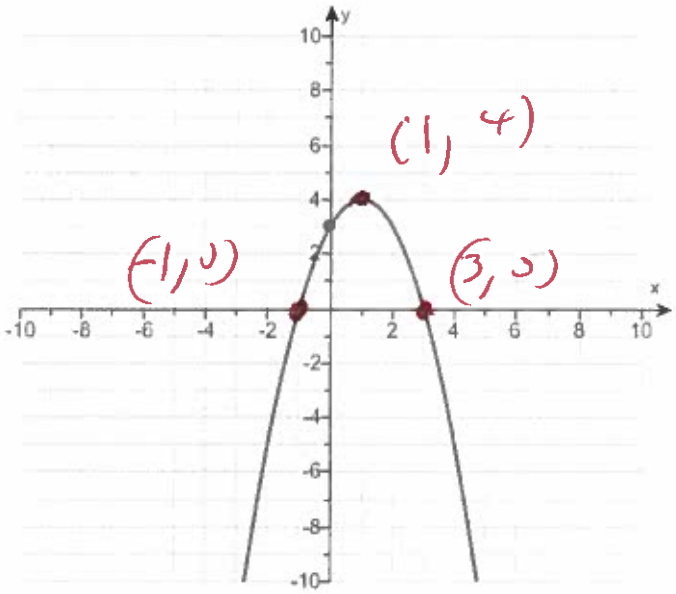
Use the graphing tool to graph the equation. Use the vertex and one of the intercepts to draw the graph.

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)
-1	0
1	4
3	0

$x = 1$

$(-\infty, \infty)$

$(-\infty, 4]$

114. Divide using synthetic division.

$(3x^2 - 4x - 8) \div (x - 4)$

$(3x^2 - 4x - 8) \div (x - 4) = \square + \frac{\square}{x-4}$

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

Answers $3x + 8$

24

$4 \mid 3 \quad -4 \quad -8$
$\quad\quad\quad 12 \quad 32$
$3 \quad 8 \quad 24$ rem

$3x + 8 + \frac{24}{x-4}$

115. Divide using synthetic division.

$(2x^2 + 7x - 10) \div (x + 5)$

$(2x^2 + 7x - 10) \div (x + 5) = \square + \frac{\square}{x+5}$

(Simplify your answers. Do not factor.)

Answers $2x - 3$

5

$-5 \mid 2 \quad 7 \quad -10$
$\quad\quad\quad -10 \quad 15$
$2 \quad -3 \quad 5$ rem

$2x - 3 + \frac{5}{x+5}$

116. Divide using synthetic division.

$(2x^3 + 8x^2 - 9x + 9) \div (x - 4)$

$(2x^3 + 8x^2 - 9x + 9) \div (x - 4) = \square + \frac{\square}{x-4}$

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

Answers $2x^2 + 16x + 55$

229

$4 \mid 2 \quad 8 \quad -9 \quad 9$
$\quad\quad\quad 8 \quad 64 \quad 220$
$2 \quad 16 \quad 55 \quad 229$ rem

$2x^2 + 16x + 55 + \frac{229}{x-4}$

117. Solve the equation $x^3 - 13x^2 + 47x - 35 = 0$ given that 1 is a zero of $f(x) = x^3 - 13x^2 + 47x - 35$.

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

Answer: 1,7,5

$1 \mid 1 \quad -13 \quad 47 \quad -35$
$\quad\quad\quad 1 \quad -12 \quad 35$
$1 \quad -12 \quad 35 \quad 0$

another

1, 5, 7

$x^2 - 12x + 35 = 0$
$(x-5)(x-7) = 0$
$x - 5 = 0$ OR $x - 7 = 0$
$x - 5 + 5 = 0 + 5$ OR $x - 7 + 7 = 0 + 7$
$x = 5$ OR $x = 7$

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

b. 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.)

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

$\frac{7}{3}$

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

5	3	−7	−75	175
		15	40	−175
	3	8	−35	0

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

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

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

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

$3x = 7$ OR $x = -5$

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

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

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

119. The following equation is given.

$x^3 - 2x^2 - 25x + 50 = 0$

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 $x^3 - 2x^2 - 25x + 50 = 0$ 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, − 1,5, − 5,50, − 50,2, − 2,10, − 10,25, − 25

2

2,5, − 5

2 | 1 −2 −25 50
2 0 −50
1 0 −25 0 r 0

$x^2 + 0x - 25 = 0$

$x^2 - 25 = 0$

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

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

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

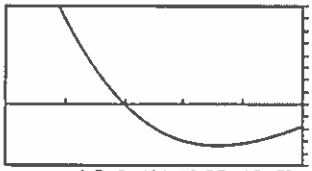
$x+5-5 = 0-5$ OR $x-5+5 = 0+5$

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

Answers

2, −5, 5

120. An incomplete graph of the polynomial function $f(x) = -x^3 + x^2 + 9x - 9$ is shown on the right.



a. Find all zeros of the function.

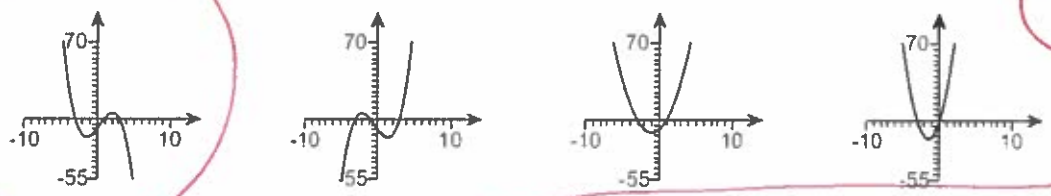
b. Without using a graphing utility, draw a complete graph of the function.

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 [-55, 70, 5].

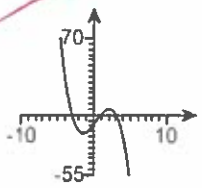
Use Graphing Calculator

○ A. ○ B. ○ C. ○ D.



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

Answers -3,1,3



A.

Xmin = -10
Xmax = 10
ymin = -55
ymax = 70

121. Fill in the blank so that the resulting statement is true.

Based on the synthetic division shown below, the equation of the slant asymptote of $f(x) = \frac{4x^2 - 5x + 5}{x - 7}$ is _____.

7	4	-5	5
		28	161
	4	23	166

Based on the synthetic division shown, the equation of the slant asymptote of $f(x) = \frac{4x^2 - 5x + 5}{x - 7}$ is [ ].

(Type an equation.)

Answer: $y = 4x + 23$

7 | 4 -5 5
28 161
4 23 166 Rem

Slant
$y = 4x + 23$

$4x + 23 + \frac{166}{x - 7}$

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

$f(x) = \frac{x}{x-8}$

Set $x-8=0$

$x-8+8=0+8$

$x=8$

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

- A. There are no vertical asymptotes but there is(are) hole(s) corresponding to _____.
- B. The vertical asymptote(s) is(are) _____. There are no holes.
- C. The vertical asymptote(s) is(are) _____ and hole(s) corresponding to _____.
- D. There are no discontinuities.

Answer: B. The vertical asymptote(s) is(are) x = 8. There are no holes.

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

$f(x) = \frac{x-7}{x^2-13x+42} = \frac{x-7}{(x-6)(x-7)} = \frac{1(x-7)}{(x-6)(x-7)} = \frac{1}{x-6}$

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

- A. Vertical asymptote(s) at x = _____ and hole(s) at x = _____
- B. Hole(s) at x = _____
- C. Vertical asymptote(s) at x = _____
- D. There are no discontinuities.

Set $x-6=0$

$x-6+6=0+6$

$x=6$

only Vertical Asymptote

Answer: A. Vertical asymptote(s) at x = 6 and hole(s) at x = 7

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

$f(x) = \frac{12x}{7x^2+3}$

$\lim_{x\to\infty} \frac{12x}{7x^2+3} \cdot \frac{\frac{1}{x^2}}{\frac{1}{x^2}} = \lim_{x\to\infty} \frac{\frac{12x}{x^2}}{\frac{7x^2}{x^2}+\frac{3}{x^2}} =$

$\lim_{x\to\infty} \frac{\frac{12}{x}}{7+\frac{3}{x^2}} =$

$\frac{0}{7+0} =$

$\frac{0}{7} =$

$0 =$

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 y = 0. (Type an equation.)

formula

$\lim_{x\to\infty} \frac{1}{x^n} = 0$

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

$$g(x) = \frac{28x^2}{7x^2 + 6}$$

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 $y = 4$. (Type an equation.)

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

$f(x) = 3^x$

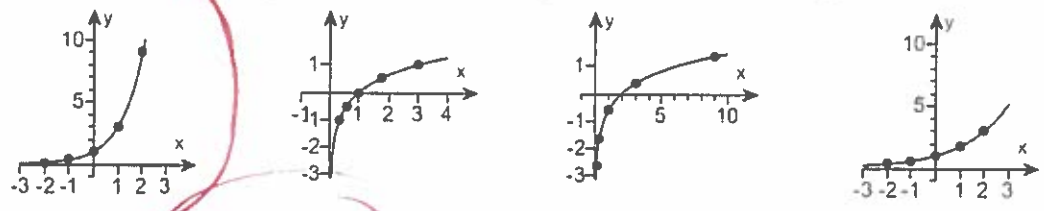
Complete the table of coordinates.

x	−2	−1	0	1	2
y					

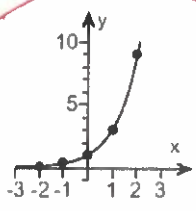
(Type integers or fractions. Simplify your answers.)

Choose the correct graph below.

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



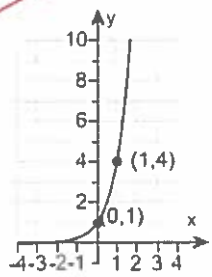
Answers $\frac{1}{9}$, $\frac{1}{3}$, 1, 3, 9



A.

127.

Give the equation of the exponential function whose graph is shown.



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

Identify the correct function.

- A. $f(x) = 4^x$
- B. $f(x) = 4^{-x}$
- C. $f(x) = 4^x + 1$
- D. $f(x) = 4^{x+1}$

$f(x) = 4^x$

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

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

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

Answer: A. $f(x) = 4^x$

128. Find the domain of the logarithmic function.

$f(x) = \log(14 - x)$

The domain of $f(x) = \log(14 - x)$ is _____.
(Type your answer in interval notation.)

Answer: $(-\infty, 14)$

$14 - x > 0$

$14 - x - 14 > 0 - 14$

$-x > -14$

$\frac{-x}{-1} < \frac{-14}{-1}$

$x < 14$

$(-\infty, 14)$

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

$\log_b\left(\frac{x^2y}{z^8}\right) =$

$\log_b\left(\frac{x^2y}{z^8}\right) =$ _____

$\log_b(x^2y) - \log_b(z^8) =$

$\log_b(x^2) + \log_b(y) - \log_b(z^8) =$

Answer: $2\log_b x + \log_b y - 8\log_b z$

$2\log_b(x) + \log_b(y) - 8\log_b(z) =$

formula

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

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

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

$$\ln\left[\frac{x^4\sqrt{x^2+6}}{(x+6)^5}\right] = \ln(x^4\sqrt{x^2+6}) - \ln(x+6)^5 =$$

$$\ln(x^4) + \ln\sqrt{x^2+6} - \ln(x+6)^5 =$$

$$\ln\left[\frac{x^4\sqrt{x^2+6}}{(x+6)^5}\right] = \ln(x^4) + \ln(x^2+6)^{\frac{1}{2}} - \ln(x+6)^5 =$$

$$4\ln(x) + \frac{1}{2}\ln(x^2+6) - 5\ln(x+6) =$$

Answer: $4\ln x + \frac{1}{2}\ln\left(x^2+6\right) - 5\ln(x+6)$

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

$4^{x+8} = 16^{x-4}$

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

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

$2x+16 = 4x-16$

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

$2x = 4x-32$

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

$-2x = -32$

$\frac{-2x}{-2} = \frac{-32}{-2}$

$x = 16$

The solution set is {2}.

Answer: 16

132. 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.

$2e^{3x} = 248$

$\frac{2e^{3x}}{2} = \frac{248}{2}$

$e^{3x} = 124$

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.)

$\ln(e^{3x}) = \ln(124)$

$3x\ln(e) = \ln(124)$

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.)

$3x(1) = \ln(124)$

$3x = \ln(124)$

$\frac{3x}{3} = \frac{\ln(124)}{3}$

$x = \frac{\ln(124)}{3}$ OR

$x = 1.606760522$ OR

$x = 1.61$

Answers $\frac{\ln 124}{3}$

1.61

Round

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

$7^{(x-2)} = 486$

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 $\frac{\ln 486}{\ln 7} + 2$

5.18

134. 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.

$\log_2(x+18) = 2$

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.

Answer: A. The solution set is { −14 }. (Type an integer or a simplified fraction.)

135. 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.

$\log_7 x + \log_7(6x-1) = 1$

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 { $\frac{7}{6}$ }. (Type an exact answer in simplified form.)

136. Solve the logarithmic equation. Be sure to reject any value of x that is not in the domain of the original logarithmic expressions. Give the exact answer.

$\log_5(x-4) + \log_5(x+120) = 3$

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

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

○ **B.** There is no solution.

Answer: A. The solution set is {5} .
(Simplify your answer. Use a comma to separate answers as needed.)

---

137. Solve the logarithmic equation. Be sure to reject any value of x that is not in the domain of the original logarithmic expressions. Give the exact answer.

$\log_4(x+9) - \log_4(x-6) = 2$

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

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

○ **B.** There is no solution.

Answer: A. The solution set is {7} .
(Simplify your answer. Use a comma to separate answers as needed.)

---

138. Solve the logarithmic equation. Be sure to reject any value of x that is not in the domain of the original logarithmic expressions. Give the exact answer.

$\log x + \log(x-7) = \log 18$

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 {9} .
(Simplify your answer. Use a comma to separate answers as needed.)

---

139. The formula $A = 15.7\,e^{0.0426t}$ models the population of a US state, A, in millions, t years after 2000.

a. What was the population of the state in 2000?
b. When will the population of the state reach 18.7 million?

a. In 2000, the population of the state was _____ million.

b. The population of the state will reach 18.7 million in the year _____.
(Round down to the nearest year.)

Answers 15.7

2004

---

140. Complete the table for a savings account subject to 2 compoundings yearly.

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

Amounted Invested	Number of Compounding Periods	Annual Interest Rate	Accumulated Amount	Time t in Years
$14,500	2	5.5%	$23,000	?

Let A represent the accumulated amount, P the amount invested, n the number of compounding periods, r the annual interest rate, and t the time. Find the time, t.

t = _____ years
(Do not round until the final answer. Then round to one decimal place as needed.)

Answer: 8.5

---

141. An artifact originally had 16 grams of carbon-14 present. The decay model $A = 16\,e^{-0.000121t}$ describes the amount of carbon-14 present after t years. Use the model to determine how many grams of carbon-14 will be present in 9515 years.

The amount of carbon-14 present in 9515 years will be approximately _____ grams.
(Round to the nearest whole number.)

Answer: 5

---

142. Prehistoric cave paintings were discovered in a cave in France. The paint contained 29% of the original carbon-14. Use the exponential decay model for carbon-14, $A = A_0\,e^{-0.000121t}$, to estimate the age of the paintings.

The paintings are approximately _____ years old. (Round to the nearest integer.)

Answer: 10,230

---

143. Use the formula $t = \frac{\ln 2}{k}$ that gives the time for a population, with a growth rate k, to double, to answer the following questions.

The growth model $A = 7e^{0.005t}$ describes the population, A, of a country in millions, t years after 2003.

a. What is the country's growth rate?

[ ] %

b. How long will it take the country to double its population?

[ ] years (Round to the nearest whole number.)

Answers 0.5

139

144. Solve the system by the addition method.

$x + y = -5$
$x - y = -3$

$x+y=-5$
$x-y=-3$
$2x+0=-8$

$-4+y=-5$
$-4+y+4=-5+4$
$y=-1$

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

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.

$(x, y) = (-4, -1)$

Answer: A. The solution set is { (−4, −1) }. (Simplify your answer. Type an ordered pair.)

145. Solve the system by the addition method.

$x + 5y = -9$
$3x + 2y = -14$

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 { (−4, −1) }. (Simplify your answer. Type an ordered pair.)

146. Solve the given system of equations.

$$x + y + 9z = -40$$
$$x + y + 4z = -20$$
$$x - 7y + 4z = -4$$

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.

Answer: A.
There is one solution. The solution set is {(−2 , −2 , −4)}. (Simplify your answers.)

147. Write the first four terms of the sequence whose general term is given.

$$a_n = \frac{2n}{n+3}$$

$a_1 =$ ____ (Simplify your answer.)

$a_2 =$ ____ (Simplify your answer.)

$a_3 =$ ____ (Simplify your answer.)

$a_4 =$ ____ (Simplify your answer.)

Answers $\frac{1}{2}$, $\frac{4}{5}$, 1, $\frac{8}{7}$

148. Find the indicated sum. $\sum_{i=1}^{3} i(i+5)$

$\sum_{i=1}^{3} i(i+5) =$ ____ (Simplify your answer.)

Answer: 44

149. Use the binomial theorem to expand the binomial.

$(3x-1)^3$

$(3x-1)^3 =$ ☐ (Simplify your answer.)

Answer: $27x^3 - 27x^2 + 9x - 1$

---

150. Write the first three terms of the binomial expansion, expressing the result in simplified form.

$(x+5)^9$

The first three terms of the binomial expansion are ☐.
(Simplify your answer.)

Answer: $x^9 + 45x^8 + 900x^7$