



Intermediate

Alg- ebra

Intermediate Algebra
Ch 2: Solving Linear Equations

Section 2.1

1. Simplify: $\frac{3}{2}(12x + 20)$.

Answer: $18x + 30$

2. Simplify: $5 - 2(n + 1)$.

Answer: $3 - 2n$

3. Find the LCD of $\frac{5}{6}$ and $\frac{1}{4}$.

Answer: 12

Section 2.2

1. Translate “six less than twice x ” into an algebraic expression.

Answer: $2x - 6$

2. Convert 4.5% to a decimal.

Answer: 0.045

3. Convert 0.6 to a percent.

Answer: 60%

Section 2.3

1. Evaluate $2(x + 3)$ when $x = 5$.

Answer: 16

2. The length of a rectangle is three less than the width. Let w represent the width. Write an expression for the length of the rectangle.

Answer: $w^2 - 3w$

3. Evaluate $\frac{1}{2}bh$ when $b = 14$ and $h = 9$.

Answer: 63

Section 2.4

1. Simplify: $0.25x + 0.10(x + 4) = 2.5$.

Answer: $x = 6$

2. The number of adult tickets is three more than twice the number of children tickets. Let c represent the number of children tickets. Write an expression for the number of adult tickets.

Answer: $2c + 3$

3. Convert 4.2% to a decimal.

Answer: 0.0042

Section 2.5

1. Translate from algebra to English: $15 > x$.

Answer: 15 is greater than x .

2. Translate to an algebraic expression: 15 is less than x .

Answer: $x - 15$

Section 2.6

1. Simplify: $\frac{2}{5}(x + 10)$.

Answer: $\frac{2}{5}x + 4$

2. Simplify: $-(x - 4)$.

Answer: $-x + 4$

Section 2.7

1. Evaluate: $-|7|$.

Answer: -7

2. Fill in $<$, $>$, or $=$ for each of the following pairs of numbers.

(a) $|-8|$ ___ $-|-8|$ (b) 12 ___ $-|-12|$ (c) $|-6|$ ___ -6 (d) $-(-15)$ ___ $-|-15|$

Answer: a. $>$; b. $>$; c. $>$; d. $>$

3. Simplify: $14 - 2|8 - 3(4 - 1)|$.

Answer: 12

Ch 3: Graphs and Functions

Section 3.1

1. Evaluate $5x - 4$ when $x = -1$.

Answer: -9

2. Evaluate $3x - 2y$ when $x = 4$, $y = -3$.

Answer: 18

3. Solve for y : $8 - 3y = 20$.

Answer: $y = -4$

Section 3.2

1. Simplify: $\frac{(1-4)}{(8-2)}$.

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

2. Divide: $\frac{0}{4}, \frac{4}{0}$.

Answer: 0 ; undefined

3. Simplify: $\frac{15}{-3}, \frac{-15}{3}, \frac{-15}{-3}$.

Answer: $-5; -5; 5$

Section 3.3

1. Solve: $\frac{2}{5}(x+15)$.

Answer: $\frac{2}{5}x + 6$

2. Simplify: $-3x(x - (-2))$.

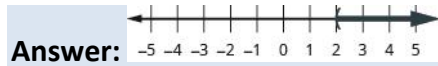
Answer: $-3x - 6$

3. Solve for y : $y - 3 = -2(x + 1)$.

Answer: $y = -2x + 1$

Section 3.4

1. Graph $x > 2$ on a number line.



2. Solve: $4x + 3 > 23$.

Answer: $x > 5$

3. Translate eight less than x is greater than 3.

Answer: $x > 5$

Section 3.5

1. Evaluate: $3x - 5$ when $x = -2$.

Answer: -11

2. Evaluate: $2x^2 - x - 3$ when $x = a$.

Answer: $2a^2 - a - 3$

3. Simplify: $7x - 1 - 4x + 5$.

Answer: $3x + 4$

Section 3.6

1. Evaluate: (a) 2^3 ; (b) 3^2 .

Answer: (a) 8; (b) 9

2. Evaluate: (a) $|7|$; (b) $|-3|$.

Answer: (a) 7; (b) 3

3. Evaluate: (a) $\sqrt{4}$; (b) $\sqrt{16}$.

Answer: (a) 2; (b) 4

Ch 4: System of Linear Equations

Section 4.1

1. For the equation $y = \frac{2}{3}x - 4$,

(a) Is $(6, 0)$ a solution? (b) Is $(-3, -2)$ a solution?

Answer: (a) yes; (b) no

2. Find the slope and y-intercept of the line $3x - y = 12$.

Answer: $m = 3; b = -12$

3. Find the x- and y-intercepts of the line $2x - 3y = 12$.

Answer: $(6, 0), (0, -4)$

Section 4.2

1. The sum of twice a number and nine is 31. Find the number.

Answer: 11

2. Twins Jon and Ron together earned \$96,000 last year. Ron earned \$8000 more than three times what Jon earned. How much did each of the twins earn?

Answer: Jon earned \$22,000 and Ron earned \$74,000.

3. An express train and a local train leave Pittsburgh to travel to Washington, D.C. The express train can make the trip in four hours and the local train takes five hours for the trip. The speed of the express train is 12 miles per hour faster than the speed of the local train. Find the speed of both trains.

Answer: The speed of the local train is 48 mph and the speed of the express train is 60 mph.

Section 4.3

1. Multiply: $4.025(1,562)$.

Answer: 6,287.05

2. Write 8.2% as a decimal.

Answer: 0.082

3. Earl's dinner bill came to \$32.50 and he wanted to leave an 18% tip. How much should the tip be?

Answer: \$5.85

Section 4.4

1. Evaluate $5x - 2y + 3z$ when $x = -2$, $y = -4$, and $z = 3$.

Answer: 7

2. Classify the equations as a conditional equation, an identity, or a contradiction and then state the solution.

Answer: identity; all real numbers

3. Classify the equations as a conditional equation, an identity, or a contradiction and then state the solution.

Answer: contradiction; no solution

Section 4.5

1. Name the coefficient of each variable and the constant in the equation $3x - 4y - 2z = -6$.

Answer: coefficient of x , 3. coefficient of y , -4 ; coefficient of z , -2 ; constant -6

2. Multiply both sides of the equation $4x - 3y = 2$ by -3 .

Answer: $-12x + 9y = -6$

3. Evaluate when $x = -2$ and $y = 3$: $2x^2 - xy + 3y^2$.

Answer: 41

Section 4.6

1. Simplify: $5(-2) - (-4)(1)$.

Answer: -6

2. Simplify: $-3(8 - 10) + (-2)(6 - 3) - 4(-3 - (-4))$.

Answer: -4

3. Simplify: $\frac{-12}{-8}$.

Answer: $\frac{3}{2}$

Section 4.7

1. Solve the inequality $2a < 5a + 12$.

Answer: $-4 < a$

2. Determine whether the ordered pair $(3, \frac{1}{2})$ is a solution to the system: $y > 2x + 3$.

Answer: no

Chapter 5: Polynomials and Polynomial Functions

Section 5.1

1. Simplify: $3x^2 + 3x + 1 + 8^2 + 5 + 5$.

Answer: $11x^2 + 8x + 6$

2. Subtract: $(5n + 8) - (2n - 1)$.

Answer: $3n + 9$

3. Evaluate: $4xy^2$ when $x = -2$ and $y = 5$.

Answer: -200

Section 5.2

1. Simplify: $(-2)(-2)(-2)$.

Answer: -8

2. Simplify: $\frac{8x}{24y}$.

Answer: $\frac{x}{3y}$

3. Name the decimal $(-2.6)(4.21)$.

Answer: -10.946

Section 5.3

1. Distribute: $2(x + 3)$.

Answer: $2x + 6$

2. Simplify: (a) 9^2 ; (b) $(-9)^2$; (c) -9^2 .

Answer: (a) 81; (b) 81; (c) -81

3. Evaluate: $2x^2 - 5x + 3$ for $x = -2$.

Answer: 21

Section 5.4

1. Add: $\frac{3}{d} + \frac{x}{d}$.

Answer: $\frac{3+x}{d}$

2. Simplify: $\frac{30xy^3}{5xy}$.

Answer: $6y^2$

3. Combine like terms: $8a^2 + 12a + 1 + 3a^2 - 5a + 4$.

Answer: $11a^2 + 7a + 5$

Chapter 6: Factoring

Section 6.1

1. Factor 56 into primes.

Answer: $2 \cdot 2 \cdot 2 \cdot 7$

2. Find the least common multiple (LCM) of 18 and 24.

Answer: 72

3. Multiply: $-3a(7a + 8b)$.

Answer: $-21a^2 - 24ab$

Section 6.2

1. Find all the factors of 72.

Answer: 1, 2, 3, 4, 6, 8, 9, 12, 18, 24, 36, 72

2. Find the product: $(3y + 4)(2y + 5)$.

Answer: $6y^2 + 23y + 20$

3. Simplify: $-9(6)$; $-9(-6)$.

Answer: -54 , 54

Section 6.3

1. Simplify: $(3x^2)^3$.

Answer: $27x^6$

2. Multiply: $(m+4)^2$.

Answer: $m^2 + 8m + 16$

3. Multiply: $(x-3)(x+3)$.

Answer: $x^2 - 9$

No Be Prepared for Section 6.4

Section 6.5

1. Solve: $5y - 3 = 0$.

Answer: $y = \frac{3}{5}$

2. Factor completely: $n^3 - 9n^2 - 22n$.

Answer: $n(n-11)(n+2)$

3. If $f(x) = 8x - 16$, find $f(3)$ and solve $f(x) = 0$.

Answer: 8; $x = 2$

Chapter 7: Rational Expressions and Functions

Section 7.1

1. Simplify: $\frac{90y}{15y^2}$.

Answer: $\frac{6}{y}$

2. Multiply: $\frac{14}{15} \cdot \frac{6}{35}$.

Answer: $\frac{4}{25}$

3. Divide: $\frac{14}{15} \div \frac{6}{35}$.

Answer: $\frac{15}{4}$

Section 7.2

1. Add: $\frac{7}{10} + \frac{8}{15}$

Answer: $\frac{37}{30}$

2. Subtract: $\frac{3x}{4} - \frac{8}{9}$.

Answer: $27x - \frac{32}{36}$

3. Subtract: $6(2x+1) - 4(x-5)$

Answer: $8x + 26$

Section 7.3

1. Simplify: $\frac{\frac{3}{5}}{\frac{9}{10}}$.

Answer: $\frac{2}{3}$

2. Simplify: $\frac{1 - \frac{1}{3}}{4^2 + 4 \cdot 5}$.

Answer: $\frac{1}{54}$

3. Solve: $\frac{1}{2}x + \frac{1}{4} = \frac{1}{8}$.

Answer: $x = -\frac{1}{4}$

Section 7.4

1. Solve: $\frac{1}{6}x + \frac{1}{2} = \frac{1}{3}$.

Answer: $x = -1$

2. Solve: $n^2 - 5n - 36 = 0$.

Answer: $n = 9, n = -4$

3. Solve the formula: $5x + 2y = 10$ for y .

Answer: $y = \frac{10 - 5x}{2}$

Section 7.5

1. Solve: $\frac{n}{3} = 30$.

Answer: $n = 90$

2. An express train and a charter bus leave Chicago to travel to Champaign. The express train can make the trip in two hours and the bus takes five hours for the trip. The speed of the express train is 42 miles per hour faster than the speed of the bus. Find the speed of the bus.

Answer: The speed of the bus is 28 mph.

3. Solve $\frac{1}{3}x + \frac{1}{4}x = \frac{5}{6}$.

Answer: $x = \frac{10}{7}$

Section 7.6

1. Find the value of $x - 5$ when (a) $x = 6$; (b) $x = -3$; (c) $x = 5$.

Answer: (a) 1; (b) -8 ; (c) 0

2. Solve: $8 - 2x < 12$.

Answer: $x > -2$

3. Write in interval notation: $-3 \leq x < 5$.

Answer: $[-3, 5)$

Chapter 8: Roots and Radicals

Section 8.1

1. Simplify: (a) $(-9)^2$; (b) -9^2 ; (c) $(-9)^3$.

Answer: (a) 1; (b) -8 ; (c) 0

2. Round 3.846 to the nearest hundredth.

Answer: 3.85

3. Simplify: (a) $x^3 \cdot x^3$; (b) $y^2 \cdot y^2 \cdot y^2$; (c) $z^3 \cdot z^3 \cdot z^3 \cdot z^3$.

Answer: (a) x^6 ; (b) y^6 ; (c) z^{12}

Section 8.2

1. Simplify: $\frac{x^9}{x^4}$.

Answer: x^5

2. Simplify: $\frac{y^3}{y^{11}}$.

Answer: $\frac{1}{y^8}$

3. Simplify: $(n^2)^6$.

Answer: n^{12}

Section 8.3

1. Add: $\frac{7}{15} + \frac{5}{12}$.

Answer: $\frac{53}{60}$

2. Simplify: $(4x^2y^5)^3$.

Answer: $64x^6y^{15}$

3. Simplify: 5^{-3} .

Answer: $\frac{1}{125}$

Section 8.4

1. Add: $3x^2 + 9x - 5 - (x^2 - 2x + 3)$.

Answer: $2x^2 + 11x - 8$

2. Simplify: $(2+a)(4-a)$.

Answer: $8 + 2a - a^2$

2. Simplify: $(9-5y)^2$.

Answer: $81 - 90y + 25y^2$

Section 8.5

1. Simplify: $\frac{30}{48}$.

Answer: $\frac{15}{16}$

2. Simplify: $x^2 \cdot x^4$.

Answer: x^6

3. Multiply: $(7+3x)(7-3x)$.

Answer: $49 - 9x^2$

Section 8.6

1. Simplify: $(y-3)^2$

Answer: $y^2 - 6y + 9$

2. Solve: $2x - 5 = 0$

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

3. Solve $n^2 - 6n + 8 = 0$.

Answer: $n = 2$ or $n = 4$

Section 8.7

1. Solve: $1 - 2x \geq 0$.

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

2. For $f(x) = 3x - 4$, evaluate $f(2)$, $f(-1)$, $f(0)$.

Answer: $f(2) = 2$, $f(-1) = -7$, $f(0) = -4$

3. Graph $f(x) = \sqrt{x}$. State the domain and range of the function in interval notation.

Answer: domain: $[0, \infty)$; range: $[0, \infty)$

Section 8.8

1. Given the numbers: -4 , $-\sqrt{7}$, $0\bar{5}$, $\frac{7}{3}$, 3 , $\sqrt{81}$, list the (a) rational numbers, (b) irrational numbers, (c) real numbers.

Answer: (a) $-4, 0\bar{5}, \frac{7}{3}, 3, \sqrt{81}$; (b) $\sqrt{7}$; (c) $-4, \sqrt{7}, 0\bar{5}, \frac{7}{3}, 3, \sqrt{81}$;

2. Multiply: $(x - 3)(2x + 5)$

Answer: $2x^2 - x - 15$

3. Rationalize the denominator: $\frac{\sqrt{5}}{\sqrt{5} - \sqrt{3}}$.

Answer: $\frac{\sqrt{5}(\sqrt{15})}{2}$

Chapter 9: Quadratic Equations and Functions

Section 9.1

1. Simplify: $\sqrt{128}$.

Answer: $8\sqrt{2}$

2. Simplify: $\sqrt{\frac{32}{5}}$.

Answer: $\frac{4\sqrt{10}}{5}$

3. Factor: $9x^2 - 12x + 4$.

Answer: $(3x - 2)^2$

Section 9.2

1. Expand: $(x + 9)^2$.

Answer: $x^2 + 18x + 81$

1. Factor $y^2 - 14y + 49$.

Answer: $(y - 7)^2$

3. Factor $5n^2 + 40n + 80$.

Answer: $5(n + 4)^2$

Section 9.3

1. Evaluate $b^2 - 4ab$ when $a = 3$ and $b = -2$.

Answer: 28

2. $\sqrt{108}$

Answer: $6\sqrt{3}$

3. $\sqrt{50}$

Answer: $5\sqrt{2}i$

Section 9.4

1. Factor by substitution: $y^4 - y^2 - 20$.

Answer: $(y^2 + 4)(y^2 - 5)$

2. Factor by substitution: $(y - 4)^2 + 8(y - 4) + 15$.

Answer: $(y - 1)(y + 1)$

3. Simplify: (a) $x^{\frac{1}{2}} \cdot x^{\frac{1}{4}}$; (b) $\left(x^{\frac{1}{3}}\right)^2$; (c) $(x^{-1})^2$.

Answer: (a) $x^{\frac{3}{4}}$; (b) $x^{\frac{2}{3}}$; (c) x^{-2}

Section 9.5

1. The sum of two consecutive odd numbers is -100 . Find the numbers.

Answer: $-51, -49$

2. Solve: $\frac{2}{x+1} + \frac{1}{x-1} = \frac{1}{x^2-1}$.

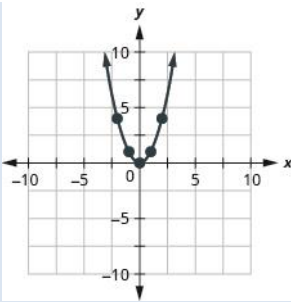
Answer: $x = \frac{2}{3}$

3. Find the length of the hypotenuse of a right triangle with legs 5 inches and 12 inches.

Answer: 13 inches

Section 9.6

1. Graph the function $f(x) = x^2$ by plotting points.



Answer:

2. Solve: $2x^2 + 3x - 2 = 0$.

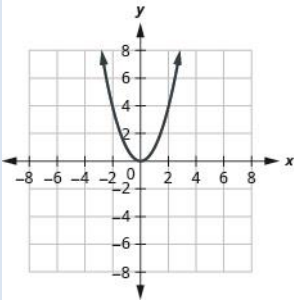
Answer: $x = \frac{1}{2}, x = -2$

3. Evaluate $-\frac{b}{2a}$ when $a = 3$ and $b = -6$.

Answer: 1

Section 9.7

1. Graph the function $f(x) = x^2$ by plotting points.



Answer:

2. Factor completely: $y^2 - 14y + 49$.

Answer: $(y-7)^2$

3. Factor completely: $2x^2 - 16x + 32$.

Answer: $2(x-4)^2$

Section 9.8

1. Solve: $2x - 3 = 0$.

Answer: $x = \frac{3}{2}$

2. Solve: $2y^2 + y = 15$.

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

3. Solve $\frac{1}{x^2 + 2x - 8} > 0$

Answer: $(-\infty, -4) \cup (2, \infty)$

Chapter 10: Exponential and Logarithmic Functions

Section 10.1

1. If $f(x) = 2x - 3$ and $g(x) = x^2 + 2x - 3$, find (a) $f(4)$ and (b) $g(f(4))$.

Answer: (a) $f(4) = 5$; (b) $g(f(4)) = 32$

2. Solve for x , $3x + 2y = 12$.

Answer: $x = -\frac{2}{3}y + 4$

3. Simplify: $5\frac{(x+4)}{5} - 4$.

Answer: x

Section 10.2

1. Simplify: $\frac{x^3}{x^2}$.

Answer: x

2. Evaluate: (a) 2^0 ; (b) $\frac{1^0}{3}$

Answer: (a) 1; (b) 1

3. Evaluate: (a) 2^{-1} (b) $\frac{1^{-1}}{3}$

Answer: (a) $\frac{1}{2}$; (b) 3

Section 10.3

1. Solve: $x^2 = 81$.

Answer: $x = 9, x = -9$

2. Evaluate: 3^{-2} .

Answer: $\frac{1}{9}$

3. Solve: $2^4 = 3x - 5$.

Answer: $x = 7$

Section 10.4

1. Evaluate: (a) a^0 ; (b) a^1

Answer: (a) 1; (b) a

2. Write with a rational exponent: $\sqrt[3]{x^2y}$.

Answer: $(x^2y)^{\frac{1}{3}}$

3. Round to three decimal places: 2.5646415.

Answer: 2.565

Section 10.5

1. Solve: $x^2 = 16$.

Answer: $x = 4, x = -4$

2. Solve: $x^2 - 5x + 6 = 0$.

Answer: $x = 2, x = 3$

3. Solve: $x(x+6) = 2x+5$.

Answer: $x = -5, x = 1$

Chapter 11: Conics

Section 11.1

1. Find the length of the hypotenuse of a right triangle whose legs are 12 and 16 inches.

Answer: 20 inches

2. Factor: $x^2 - 18x + 81$.

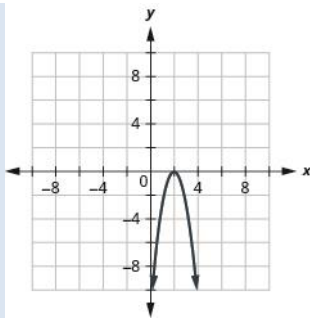
Answer: $(x-9)^2$

3. Solve by completing the square: $x^2 - 12x - 12 = 0$.

Answer: $x = 6 \pm 4\sqrt{3}$

Section 11.2

1. Graph: $y = -3x^2 + 12x - 12$.



Answer:

2. Solve by completing the square: $x^2 - 6x + 6 = 0$.

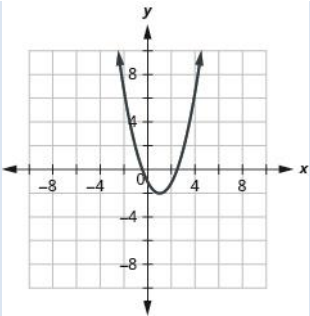
Answer: $x = 3 \pm \sqrt{3}$

3. Write in standard form: $y = 3x^2 - 6x + 5$.

Answer: $y = 3(x-1)^2 + 2$

Section 11.3

1. Graph $y = (x-1)^2 - 2$ using transformations.



Answer:

2. Complete the square: $x^2 - 8x = 8$.

Answer: $(x-4)^2 = 8$

3. Write in standard form. $y = 2x^2 - 12x + 14$.

Answer: $y = 2(x-3)^2 - 4$

Section 11.4

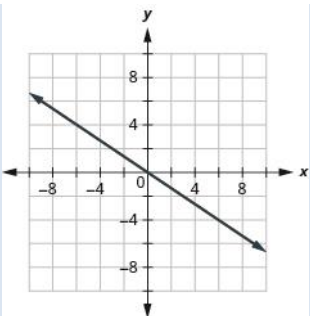
1. Solve: $x^2 = 12$.

Answer: $x = \pm 2\sqrt{3}$

2. Expand: $(x-4)^2$.

Answer: $x^2 - 8x + 16$

3. Graph $y = -\frac{2}{3}x$.



Answer:

Section 11.5

1. Solve the system by graphing: $\begin{cases} x - 3y = -3 \\ x + y = 5 \end{cases}$

Answer: (3, 2)

2. Solve the system by substitution: $\begin{cases} x - 4y = -4 \\ -3x + 4y = 0 \end{cases}$

Answer: $\left(2, \frac{3}{2}\right)$

3. Solve the system by elimination: $\begin{cases} 3x - 4y = -9 \\ 5x + 3y = 14 \end{cases}$

Answer: (1, 3)

Chapter 12: Sequences, Series, and Binomial Theorem

Section 12.1

1. Evaluate $2n+3$ for the integers 1, 2, 3, and 4.

Answer: 5, 7, 9, 11

2. Evaluate $(-1)^n$ for the integers 1, 2, 3, and 4.

Answer: -1, 1, -1, 1

3. If $f(n) = n^2 + 2$, find $f(1) + f(2) + f(3)$.

Answer: 20

Section 12.2

1. If $f(n) = n^2 + 2$, find $f(1) + f(2) + f(3)$.

Answer: 3, 7, 11, 15

2. Solve the system of equations: $\begin{cases} x + y = 7 \\ 3x + 4y = 23 \end{cases}$

Answer: (5, 2)

3. If $f(n) = \frac{n}{2}(3n+5)$, find $f(1) + f(20)$.

Answer: 654

Section 12.3

1. Simplify: $\frac{24}{32}$.

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

2. Evaluate: (a) 3^4 ; (b) $\left(\frac{1}{2}\right)^4$.

Answer: (a) 81; (b) $\frac{1}{16}$

3. If $f(x) = 4 \cdot 3^x$, find (a) $f(1)$; (b) $f(2)$; (c) $f(3)$.

Answer: (a) 12; (b) 36; (c) 108

Section 12.4

1. Simplify: $\frac{7 \cdot 6 \cdot 5 \cdot 4}{4 \cdot 3 \cdot 2 \cdot 1}$.

Answer: 35

2. Expand: $(3x + 5)^2$.

Answer: $9x^2 + 30x + 25$

3. Expand: $(x - y)^2$.

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