

1-1 Skills Practice***Variables and Expressions***

Write a verbal expression for each algebraic expression.

1. $9a^2$

2. 5^2

3. $c + 2d$

4. $4 - 5h$

5. $2b^2$

6. $7x^3 - 1$

7. $p^4 + 6r$

8. $3n^2 - x$

Write an algebraic expression for each verbal expression.

9. the sum of a number and 10

10. 15 less than k 11. the product of 18 and q 12. 6 more than twice m

13. 8 increased by three times a number

14. the difference of 17 and 5 times a number

15. the product of 2 and the second power of y 16. 9 less than g to the fourth power

2-1 Skills Practice**Writing Equations****Translate each sentence into an equation.**

- Two added to three times a number m is the same as 18.
- Twice a increased by the cube of a equals b .
- Seven less than the sum of p and t is as much as 6.
- The sum of x and its square is equal to y times z .
- Four times the sum of f and g is identical to six times g .

Translate each sentence into a formula.

- The perimeter P of a square equals four times the length of a side ℓ .
- The area A of a square is the length of a side ℓ squared.
- The perimeter P of a triangle is equal to the sum of the lengths of sides a , b , and c .
- The area A of a circle is pi times the radius r squared.
- The volume V of a rectangular prism equals the product of the length ℓ , the width w , and the height h .

Translate each equation into a sentence.

- | | |
|----------------------------------|-----------------------|
| 11. $g + 10 = 3g$ | 12. $2p + 4t = 20$ |
| 13. $4(a + b) = 9a$ | 14. $8 - 6x = 4 + 2x$ |
| 15. $\frac{1}{2}(f + y) = f - 5$ | 16. $k^2 - n^2 = 2b$ |

Write a problem based on the given information.

- | | |
|--|---|
| 17. c = cost per pound of plain coffee beans
$c + 3$ = cost per pound of flavored coffee beans
$2c + (c + 3) = 21$ | 18. p = cost of dinner
$0.15p$ = cost of a 15% tip
$p + 0.15p = 23$ |
|--|---|

2-3 Practice**Solving Multi-Step Equations**

Solve each problem by working backward.

- Three is added to a number, and then the sum is multiplied by 4. The result is 16. Find the number.
- A number is divided by 4, and the quotient is added to 3. The result is 24. What is the number?
- Two is subtracted from a number, and then the difference is multiplied by 5. The result is 30. Find the number.
- BIRD WATCHING** While Michelle sat observing birds at a bird feeder, one fourth of the birds flew away when they were startled by a noise. Two birds left the feeder to go to another stationed a few feet away. Three more birds flew into the branches of a nearby tree. Four birds remained at the feeder. How many birds were at the feeder initially?

Solve each equation. Check your solution.

5. $-12n - 19 = 77$

6. $17 + 3f = 14$

7. $15t + 4 = 49$

8. $\frac{u}{5} + 6 = 2$

9. $\frac{d}{-4} + 3 = 15$

10. $\frac{b}{3} - 6 = -2$

11. $\frac{1}{2}y - \frac{1}{8} = \frac{7}{8}$

12. $-32 - \frac{3}{5}f = -17$

13. $8 - \frac{3}{8}k = -4$

14. $\frac{r + 13}{12} = 1$

15. $\frac{15 - a}{3} = -9$

16. $\frac{3k - 7}{5} = 16$

17. $\frac{x}{7} - 0.5 = 2.5$

18. $2.5g + 0.45 = 0.95$

19. $0.4m - 0.7 = 0.22$

Write an equation and solve each problem.

- Seven less than four times a number equals 13. What is the number?
- Find two consecutive odd integers whose sum is 116.
- Find two consecutive even integers whose sum is 126.
- Find three consecutive odd integers whose sum is 117.
- COIN COLLECTING** Jung has a total of 92 coins in his coin collection. This is 8 more than three times the number of quarters in the collection. How many quarters does Jung have in his collection?

2-4 Practice**Solving Equations with the Variable on Each Side**

Solve each equation. Check your solution.

1. $5x - 3 = 13 - 3x$

2. $-4r - 11 = 4r + 21$

3. $1 - m = 6 - 6m$

4. $14 + 5n = -4n + 17$

5. $\frac{1}{2}k - 3 = 2 - \frac{3}{4}k$

6. $\frac{1}{2}(6 - y) = y$

7. $3(-2 - 3x) = -9x - 4$

8. $4(4 - w) = 3(2w + 2)$

9. $9(4b - 1) = 2(9b + 3)$

10. $3(6 + 5y) = 2(-5 + 4y)$

11. $-5x - 10 = 2 - (x + 4)$

12. $6 + 2(3j - 2) = 4(1 + j)$

13. $\frac{5}{2}t - t = 3 + \frac{3}{2}t$

14. $1.4f + 1.1 = 8.3 - f$

15. $\frac{2}{3}x - \frac{1}{6} = \frac{1}{2}x + \frac{5}{6}$

16. $2 - \frac{3}{4}k = \frac{1}{8}k + 9$

17. $\frac{1}{2}(3g - 2) = \frac{g}{2}$

18. $\frac{1}{3}(n + 1) = \frac{1}{6}(3n - 5)$

19. $\frac{1}{2}(5 - 2h) = \frac{h}{2}$

20. $\frac{1}{9}(2m - 16) = \frac{1}{3}(2m + 4)$

21. $3(d - 8) - 5 = 9(d + 2) + 1$

22. $2(a - 8) + 7 = 5(a + 2) - 3a - 19$

23. NUMBERS Two thirds of a number reduced by 11 is equal to 4 more than the number. Find the number.

24. NUMBERS Five times the sum of a number and 3 is the same as 3 multiplied by 1 less than twice the number. What is the number?

25. NUMBER THEORY Tripling the greater of two consecutive even integers gives the same result as subtracting 10 from the lesser even integer. What are the integers?

26. GEOMETRY The formula for the perimeter of a rectangle is $P = 2\ell + 2w$, where ℓ is the length and w is the width. A rectangle has a perimeter of 24 inches. Find its dimensions if its length is 3 inches greater than its width.

2-6 Practice**Ratios and Proportions**

Determine whether each pair of ratios are equivalent ratios. Write *yes* or *no*.

1. $\frac{7}{6}, \frac{52}{48}$

2. $\frac{3}{11}, \frac{15}{66}$

3. $\frac{18}{24}, \frac{36}{48}$

4. $\frac{12}{11}, \frac{108}{99}$

5. $\frac{8}{9}, \frac{72}{81}$

6. $\frac{1.5}{9}, \frac{1}{6}$

7. $\frac{3.4}{5.2}, \frac{7.14}{10.92}$

8. $\frac{1.7}{1.2}, \frac{2.9}{2.4}$

9. $\frac{7.6}{1.8}, \frac{3.9}{0.9}$

Solve each proportion. If necessary, round to the nearest hundredth.

10. $\frac{5}{a} = \frac{30}{54}$

11. $\frac{v}{46} = \frac{34}{23}$

12. $\frac{40}{56} = \frac{k}{7}$

13. $\frac{28}{49} = \frac{4}{w}$

14. $\frac{3}{u} = \frac{27}{162}$

15. $\frac{y}{3} = \frac{48}{9}$

16. $\frac{2}{y} = \frac{10}{60}$

17. $\frac{5}{11} = \frac{35}{x}$

18. $\frac{3}{51} = \frac{z}{17}$

19. $\frac{6}{61} = \frac{12}{h}$

20. $\frac{g}{16} = \frac{6}{4}$

21. $\frac{14}{49} = \frac{2}{a}$

22. $\frac{7}{9} = \frac{8}{t}$

23. $\frac{3}{q} = \frac{5}{6}$

24. $\frac{m}{6} = \frac{5}{8}$

25. $\frac{v}{0.23} = \frac{7}{1.61}$

26. $\frac{3}{0.72} = \frac{12}{b}$

27. $\frac{6}{n} = \frac{3}{0.51}$

28. $\frac{7}{a-4} = \frac{14}{6}$

29. $\frac{3}{12} = \frac{2}{y+6}$

30. $\frac{m-1}{8} = \frac{2}{4}$

31. $\frac{5}{12} = \frac{x+1}{4}$

32. $\frac{r+2}{7} = \frac{5}{7}$

33. $\frac{3}{7} = \frac{x-2}{6}$

34. PAINTING Ysidra paints a room that has 400 square feet of wall space in $2\frac{1}{2}$ hours.

At this rate, how long will it take her to paint a room that has 720 square feet of wall space?

35. VACATION PLANS Walker is planning a summer vacation. He wants to visit Petrified National Forest and Meteor Crater, Arizona, the 50,000-year-old impact site of a large meteor. On a map with a scale where 2 inches equals 75 miles, the two areas are about $1\frac{1}{2}$ inches apart. What is the distance between Petrified National Forest and Meteor Crater?

2-7 Practice**Percent of Change**

State whether each percent of change is a percent of *increase* or a percent of *decrease*. Then find each percent of change. Round to the nearest whole percent.

1. original: 18
new: 10

2. original: 140
new: 160

3. original: 200
new: 320

4. original: 10
new: 25

5. original: 76
new: 60

6. original: 128
new: 120

7. original: 15
new: 35.5

8. original: 98.6
new: 64

9. original: 58.8
new: 65.7

Find the total price of each item.

10. concrete blocks: \$95.00
tax: 6%

11. crib: \$240.00
tax: 6.5%

12. jacket: \$125.00
tax: 5.5%

13. class ring: \$325.00
tax: 6%

14. blanket: \$24.99
tax: 7%

15. kite: \$18.90
tax: 5%

Find the discounted price of each item.

16. dry cleaning: \$25.00
discount: 15%

17. computer game: \$49.99
discount: 25%

18. luggage: \$185.00
discount: 30%

19. stationery: \$12.95
discount: 10%

20. prescription glasses: \$149
discount: 20%

21. pair of shorts: \$24.99
discount: 45%

Find the final price of each item.

22. television: \$375.00
discount: 25%
tax: 6%

23. DVD player: \$269.00
discount: 20%
tax: 7%

24. printer: \$255.00
discount: 30%
tax: 5.5%

25. INVESTMENTS The price per share of a stock decreased from \$90 per share to \$36 per share early in 2009. By what percent did the price of the stock decrease?

26. HEATING COSTS Customers of a utility company received notices in their monthly bills that heating costs for the average customer had increased 125% over last year because of an unusually severe winter. In January of last year, the Garcia's paid \$120 for heating. What should they expect to pay this January if their bill increased by 125%?

2-8 Skills Practice***Literal Equations and Dimensional Analysis***

Solve each equation or formula for the variable indicated.

1. $7t = x$, for t

2. $r = wp$, for p

3. $q - r = r$, for r

4. $4m - t = m$, for m

5. $7a - b = 15a$, for a

6. $-5c + d = 2c$, for c

7. $x - 2y = 1$, for y

8. $d + 3n = 1$, for n

9. $7f + g = 5$, for f

10. $ax - c = b$, for x

11. $rt - 2n = y$, for t

12. $bc + 3g = 2k$, for c

13. $kn + 4f = 9v$, for n

14. $8c + 6j = 5p$, for c

15. $\frac{x - c}{2} = d$, for x

16. $\frac{x - c}{2} = d$, for c

17. $\frac{p + 9}{5} = r$, for p

18. $\frac{b - 4z}{7} = a$, for b

19. The volume of a box V is given by the formula $V = \ell wh$, where ℓ is the length, w is the width, and h is the height.

a. Solve the formula for h .

b. What is the height of a box with a volume of 50 cubic meters, length of 10 meters, and width of 2 meters?

20. Trent purchases 44 euros worth of souvenirs while on vacation in France.

If \$1 U.S. = 0.678 euros, find the cost of the souvenirs in United States dollars.

Round to the nearest cent.

2-8 Practice***Literal Equations and Dimensional Analysis***

Solve each equation or formula for the variable indicated.

1. $d = rt$, for r

2. $6w - y = 2z$, for w

3. $mx + 4y = 3t$, for x

4. $9s - 5g = -4u$, for s

5. $ab + 3c = 2x$, for b

6. $2p = kx - t$, for x

7. $\frac{2}{3}m + a = a + r$, for m

8. $\frac{2}{5}h + g = d$, for h

9. $\frac{2}{3}y + v = x$, for y

10. $\frac{3}{4}a - q = k$, for a

11. $\frac{rx + 9}{5} = h$, for x

12. $\frac{3b - 4}{2} = c$, for b

13. $2w - y = 7w - 2$, for w

14. $3\ell + y = 5 + 5\ell$, for ℓ

15. ELECTRICITY The formula for Ohm's Law is $E = IR$, where E represents voltage measured in volts, I represents current measured in amperes, and R represents resistance measured in ohms.

a. Solve the formula for R .

b. Suppose a current of 0.25 ampere flows through a resistor connected to a 12-volt battery. What is the resistance in the circuit?

16. MOTION In *uniform circular motion*, the speed v of a point on the edge of a spinning disk is $v = \frac{2\pi}{t}r$, where r is the radius of the disk and t is the time it takes the point to travel once around the circle.

a. Solve the formula for r .

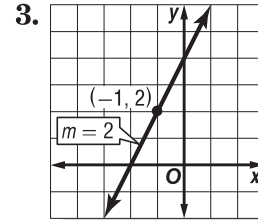
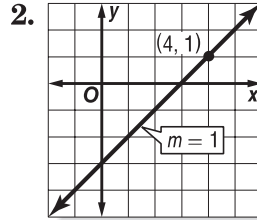
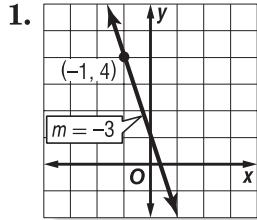
b. Suppose a merry-go-round is spinning once every 3 seconds. If a point on the outside edge has a speed of 12.56 feet per second, what is the radius of the merry-go-round? (Use 3.14 for π .)

17. HIGHWAYS Interstate 90 is the longest interstate highway in the United States, connecting the cities of Seattle, Washington and Boston, Massachusetts. The interstate is 4,987,000 meters in length. If 1 mile = 1.609 kilometers, how many miles long is Interstate 90?

4-2 Skills Practice

Writing Equations in Slope-Intercept Form

Write an equation of the line that passes through the given point with the given slope.



4. (1, 9); slope 4

5. (4, 2); slope -2

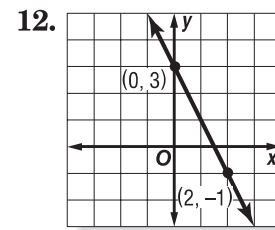
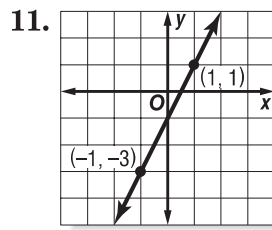
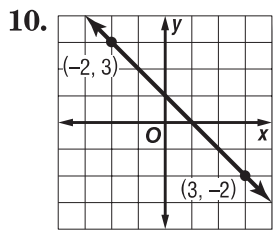
6. (2, -2); slope 3

7. (3, 0); slope 5

8. (-3, -2); slope 2

9. (-5, 4); slope -4

Write an equation of the line that passes through each pair of points.



13. (1, 3), (-3, -5)

14. (1, 4), (6, -1)

15. (1, -1), (3, 5)

16. (-2, 4), (0, 6)

17. (3, 3), (1, -3)

18. (-1, 6), (3, -2)

19. **INVESTING** The price of a share of stock in XYZ Corporation was \$74 two weeks ago. Seven weeks ago, the price was \$59 a share.

a. Write a linear equation to find the price p of a share of XYZ Corporation stock w weeks from now.

b. Estimate the price of a share of stock five weeks ago.

5-3 Skills Practice**Solving Multi-Step Inequalities****Justify each indicated step.**

1. $\frac{3}{4}t - 3 \geq -15$

$\frac{3}{4}t - 3 + 3 \geq -15 + 3$ a. ?

$\frac{3}{4}t \geq -12$

$\frac{4}{3}\left(\frac{3}{4}\right)t \geq \frac{4}{3}(-12)$ b. ?

$t \geq -16$

2. $5(k + 8) - 7 \leq 23$

$5k + 40 - 7 \leq 23$ a. ?

$5k + 33 \leq 23$

$5k + 33 - 33 \leq 23 - 33$ b. ?

$5k \leq -10$

$\frac{5k}{5} \leq \frac{-10}{5}$ c. ?

$k \leq -2$

a. Add 3 to each side.**b. Multiply each side by $\frac{4}{3}$.****a. Distributive Property****b. Subtract 33 from each side.****c. Divide each side by 5.****Solve each inequality. Check your solution.**

3. $-2b + 4 > -6$

4. $3x + 15 \leq 21$

5. $\frac{d}{2} - 1 \geq 3$

6. $\frac{2}{5}a - 4 < 2$

7. $-\frac{t}{5} + 7 > -4$

8. $\frac{3}{4}j - 10 \geq 5$

9. $-\frac{2}{3}f + 3 < -9$

10. $2p + 5 \geq 3p - 10$

11. $4k + 15 > -2k + 3$

12. $2(-3m - 5) \geq -28$

13. $-6(w + 1) < 2(w + 5)$

14. $2(q - 3) + 6 \leq -10$

Define a variable, write an inequality, and solve each problem.**Check your solution.**

15. Four more than the quotient of a number and three is at least nine.

16. The sum of a number and fourteen is less than or equal to three times the number.

17. Negative three times a number increased by seven is less than negative eleven.

18. Five times a number decreased by eight is at most ten more than twice the number.

19. Seven more than five sixths of a number is more than negative three.

20. Four times the sum of a number and two increased by three is at least twenty-seven.

7-1 Practice

Multiplying Monomials

Determine whether each expression is a monomial. Write *yes* or *no*. Explain your reasoning.

1. $\frac{21a^2}{7b}$

2. $\frac{b^3c^2}{2}$

Simplify each expression.

3. $(-5x^2y)(3x^4)$

4. $(2ab^2f^2)(4a^3b^2f^2)$

5. $(3ad^4)(-2a^2)$

6. $(4g^3h)(-2g^5)$

7. $(-15xy^4)\left(-\frac{1}{3}xy^3\right)$

8. $(-xy)^3(xz)$

9. $(-18m^2n)^2\left(-\frac{1}{6}mn^2\right)$

10. $(0.2a^2b^3)^2$

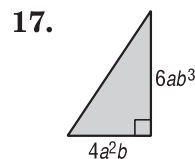
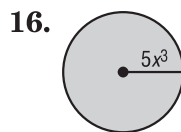
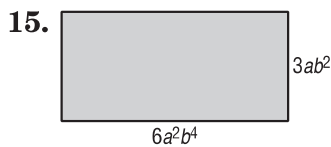
11. $\left(\frac{2}{3}p\right)^2$

12. $\left(\frac{1}{4}ad^3\right)^2$

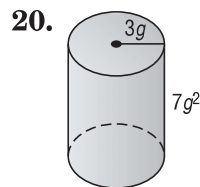
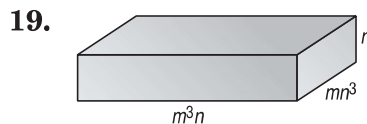
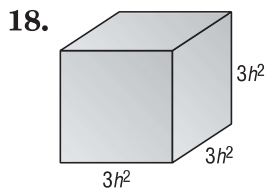
13. $(0.4k^3)^3$

14. $[(4^2)^2]^2$

GEOMETRY Express the area of each figure as a monomial.



GEOMETRY Express the volume of each solid as a monomial.



21. COUNTING A panel of four light switches can be set in 2^4 ways. A panel of five light switches can set in twice this many ways. In how many ways can five light switches be set?

22. HOBBIES Tawa wants to increase her rock collection by a power of three this year and then increase it again by a power of two next year. If she has 2 rocks now, how many rocks will she have after the second year?

7-2 Practice**Dividing Monomials**

Simplify each expression. Assume that no denominator equals zero.

1. $\frac{8^8}{8^4}$

2. $\frac{a^4b^6}{ab^3}$

3. $\frac{xy^2}{xy}$

4. $\frac{m^5np}{m^4p}$

5. $\frac{5c^2d^3}{-4c^2d}$

6. $\frac{8y^7z^6}{4y^6z^5}$

7. $\left(\frac{4f^3g}{3h^6}\right)^3$

8. $\left(\frac{6w^5}{7p^6r^3}\right)^2$

9. $\frac{-4x^2}{24x^5}$

10. $x^3(y^{-5})(x^{-8})$

11. $p(q^{-2})(r^{-3})$

12. 12^{-2}

13. $\left(\frac{3}{7}\right)^{-2}$

14. $\left(\frac{4}{3}\right)^{-4}$

15. $\frac{22r^3s^2}{11r^2s^{-3}}$

16. $\frac{-15w^0u^{-1}}{5u^3}$

17. $\frac{8c^3d^2f^4}{4c^{-1}d^2f^{-3}}$

18. $\left(\frac{x^{-3}y^5}{4^{-3}}\right)^0$

19. $\frac{6f^{-2}g^3h^5}{54f^{-2}g^{-5}h^3}$

20. $\frac{-12t^{-1}u^5x^{-4}}{2t^{-3}ux^5}$

21. $\frac{r^4}{(3r)^3}$

22. $\frac{m^{-2}n^{-5}}{(m^4n^3)^{-1}}$

23. $\frac{(j^{-1}k^3)^{-4}}{j^3k^3}$

24. $\frac{(2a^{-2}b)^{-3}}{5a^2b^4}$

25. $\left(\frac{q^{-1}r^3}{qr^{-2}}\right)^{-5}$

26. $\left(\frac{7c^{-3}d^3}{c^5dh^{-4}}\right)^{-1}$

27. $\left(\frac{2x^3y^2z}{3x^4yz^{-2}}\right)^{-2}$

28. BIOLOGY A lab technician draws a sample of blood. A cubic millimeter of the blood contains 22^3 white blood cells and 22^5 red blood cells. What is the ratio of white blood cells to red blood cells?

29. COUNTING The number of three-letter “words” that can be formed with the English alphabet is 26^3 . The number of five-letter “words” that can be formed is 26^5 . How many times more five-letter “words” can be formed than three-letter “words”?

7-3 Practice**Scientific Notation****Express each number in scientific notation.**

1. 1,900,000

2. 0.000704

3. 50,040,000,000

4. 0.0000000661

Express each number in standard form.

5. 5.3×10^7

6. 1.09×10^{-4}

7. 9.13×10^3

8. 7.902×10^{-6}

Evaluate each product. Express the results in both scientific notation and standard form.

9. $(4.8 \times 10^4)(6 \times 10^6)$

10. $(7.5 \times 10^{-5})(3.2 \times 10^7)$

11. $(2.06 \times 10^4)(5.5 \times 10^{-9})$

12. $(8.1 \times 10^{-6})(1.96 \times 10^{11})$

13. $(5.29 \times 10^8)(9.7 \times 10^4)$

14. $(1.45 \times 10^{-6})(7.2 \times 10^{-5})$

Evaluate each quotient. Express the results in both scientific notation and standard form.

15. $\frac{4.2 \times 10^5}{3 \times 10^{-3}}$

16. $\frac{1.76 \times 10^{-11}}{2.2 \times 10^{-5}}$

17. $\frac{7.05 \times 10^{12}}{9.4 \times 10^7}$

18. $\frac{2.04 \times 10^{-4}}{3.4 \times 10^5}$

19. GRAVITATION Issac Newton's theory of universal gravitation states that the equation

$F = G \frac{m_1 m_2}{r^2}$ can be used to calculate the amount of gravitational force in newtons between two point masses m_1 and m_2 separated by a distance r . G is a constant equal to 6.67×10^{-11} N m² kg⁻². The mass of the earth m_1 is equal to 5.97×10^{24} kg, the mass of the moon m_2 is equal to 7.36×10^{22} kg, and the distance r between the two is 384,000,000 m.

a. Express the distance r in scientific notation.

b. Compute the amount of gravitational force between the earth and the moon. Express your answer in scientific notation.

7-5 Practice**Adding and Subtracting Polynomials**

Find each sum or difference.

1. $(4y + 5) + (-7y - 1)$

2. $(-x^2 + 3x) - (5x + 2x^2)$

3. $(4k^2 + 8k + 2) - (2k + 3)$

4. $(2m^2 + 6m) + (m^2 - 5m + 7)$

5. $(5a^2 + 6a + 2) - (7a^2 - 7a + 5)$

6. $(-4p^2 - p + 9) + (p^2 + 3p - 1)$

7. $(x^3 - 3x + 1) - (x^3 + 7 - 12x)$

8. $(6x^2 - x + 1) - (-4 + 2x^2 + 8x)$

9. $(4y^2 + 2y - 8) - (7y^2 + 4 - y)$

10. $(w^2 - 4w - 1) + (-5 + 5w^2 - 3w)$

11. $(4u^2 - 2u - 3) + (3u^2 - u + 4)$

12. $(5b^2 - 8 + 2b) - (b + 9b^2 + 5)$

13. $(4d^2 + 2d + 2) + (5d^2 - 2 - d)$

14. $(8x^2 + x - 6) - (-x^2 + 2x - 3)$

15. $(3h^2 + 7h - 1) - (4h + 8h^2 + 1)$

16. $(4m^2 - 3m + 10) + (m^2 + m - 2)$

17. $(x^2 + y^2 - 6) - (5x^2 - y^2 - 5)$

18. $(7t^2 + 2 - t) + (t^2 - 7 - 2t)$

19. $(k^3 - 2k^2 + 4k + 6) - (-4k + k^2 - 3)$

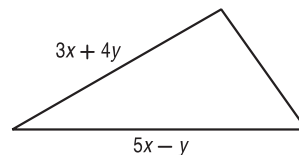
20. $(9j^2 + j + jk) + (-3j^2 - jk - 4j)$

21. $(2x + 6y - 3z) + (4x + 6z - 8y) + (x - 3y + z)$

22. $(6f^2 - 7f - 3) - (5f^2 - 1 + 2f) - (2f^2 - 3 + f)$

23. BUSINESS The polynomial $s^3 - 70s^2 + 1500s - 10,800$ models the profit a company makes on selling an item at a price s . A second item sold at the same price brings in a profit of $s^3 - 30s^2 + 450s - 5000$. Write a polynomial that expresses the total profit from the sale of both items.

24. GEOMETRY The measures of two sides of a triangle are given. If P is the perimeter, and $P = 10x + 5y$, find the measure of the third side.



7-6 Practice***Multiplying a Polynomial by a Monomial*****Find each product.**

1. $2h(-7h^2 - 4h)$

2. $6pq(3p^2 + 4q)$

3. $5jk(3jk + 2k)$

4. $-3rt(-2t^2 + 3r)$

5. $-\frac{1}{4}m(8m^2 + m - 7)$

6. $-\frac{2}{3}n^2(-9n^2 + 3n + 6)$

Simplify each expression.

7. $-2\ell(3\ell - 4) + 7\ell$

8. $5w(-7w + 3) + 2w(-2w^2 + 19w + 2)$

9. $6t(2t - 3) - 5(2t^2 + 9t - 3)$

10. $-2(3m^3 + 5m + 6) + 3m(2m^2 + 3m + 1)$

11. $-3g(7g - 2) + 3(g^2 + 2g + 1) - 3g(-5g + 3)$

Solve each equation.

12. $5(2t - 1) + 3 = 3(3t + 2)$

13. $3(3u + 2) + 5 = 2(2u - 2)$

14. $4(8n + 3) - 5 = 2(6n + 8) + 1$

15. $8(3b + 1) = 4(b + 3) - 9$

16. $t(t + 4) - 1 = t(t + 2) + 2$

17. $u(u - 5) + 8u = u(u + 2) - 4$

18. NUMBER THEORY Let x be an integer. What is the product of twice the integer added to three times the next consecutive integer?

19. INVESTMENTS Kent invested \$5000 in a retirement plan. He allocated x dollars of the money to a bond account that earns 4% interest per year and the rest to a traditional account that earns 5% interest per year.

- Write an expression that represents the amount of money invested in the traditional account.
- Write a polynomial model in simplest form for the total amount of money T Kent has invested after one year. (*Hint:* Each account has $A + IA$ dollars, where A is the original amount in the account and I is its interest rate.)
- If Kent put \$500 in the bond account, how much money does he have in his retirement plan after one year?

7-7 Practice**Multiplying Polynomials**

Find each product.

1. $(q + 6)(q + 5)$

2. $(x + 7)(x + 4)$

3. $(n - 4)(n - 6)$

4. $(a + 5)(a - 6)$

5. $(4b + 6)(b - 4)$

6. $(2x - 9)(2x + 4)$

7. $(6a - 3)(7a - 4)$

8. $(2x - 2)(5x - 4)$

9. $(3a - b)(2a - b)$

10. $(4g + 3h)(2g + 3h)$

11. $(m + 5)(m^2 + 4m - 8)$

12. $(t + 3)(t^2 + 4t + 7)$

13. $(2h + 3)(2h^2 + 3h + 4)$

14. $(3d + 3)(2d^2 + 5d - 2)$

15. $(3q + 2)(9q^2 - 12q + 4)$

16. $(3r + 2)(9r^2 + 6r + 4)$

17. $(3n^2 + 2n - 1)(2n^2 + n + 9)$

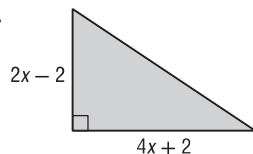
18. $(2t^2 + t + 3)(4t^2 + 2t - 2)$

19. $(2x^2 - 2x - 3)(2x^2 - 4x + 3)$

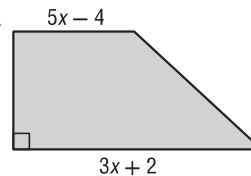
20. $(3y^2 + 2y + 2)(3y^2 - 4y - 5)$

GEOMETRY Write an expression to represent the area of each figure.

21.



22.



23. NUMBER THEORY Let x be an even integer. What is the product of the next two consecutive even integers?

24. GEOMETRY The volume of a rectangular pyramid is one third the product of the area of its base and its height. Find an expression for the volume of a rectangular pyramid whose base has an area of $3x^2 + 12x + 9$ square feet and whose height is $x + 3$ feet.

8-4 Practice**Quadratic Equations: $ax^2 + bx + c = 0$**

Factor each polynomial, if possible. If the polynomial cannot be factored using integers, write *prime*.

1. $2b^2 + 10b + 12$

2. $3g^2 + 8g + 4$

3. $4x^2 + 4x - 3$

4. $8b^2 - 5b - 10$

5. $6m^2 + 7m - 3$

6. $10d^2 + 17d - 20$

7. $6a^2 - 17a + 12$

8. $8w^2 - 18w + 9$

9. $10x^2 - 9x + 6$

10. $15n^2 - n - 28$

11. $10x^2 + 21x - 10$

12. $9r^2 + 15r + 6$

13. $12y^2 - 4y - 5$

14. $14k^2 - 9k - 18$

15. $8z^2 + 20z - 48$

16. $12q^2 + 34q - 28$

17. $18h^2 + 15h - 18$

18. $12p^2 - 22p - 20$

Solve each equation. Check the solutions.

19. $3h^2 + 2h - 16 = 0$

20. $15n^2 - n = 2$

21. $8q^2 - 10q + 3 = 0$

22. $6b^2 - 5b = 4$

23. $10r^2 - 21r = -4r + 6$

24. $10g^2 + 10 = 29g$

25. $6y^2 = -7y - 2$

26. $9z^2 = -6z + 15$

27. $12k^2 + 15k = 16k + 20$

28. $12x^2 - 1 = -x$

29. $8a^2 - 16a = 6a - 12$

30. $18a^2 + 10a = -11a + 4$

31. DIVING Lauren dove into a swimming pool from a 15-foot-high diving board with an initial upward velocity of 8 feet per second. Find the time t in seconds it took Lauren to enter the water. Use the model for vertical motion given by the equation $h = -16t^2 + vt + s$, where h is height in feet, t is time in seconds, v is the initial upward velocity in feet per second, and s is the initial height in feet. (*Hint:* Let $h = 0$ represent the surface of the pool.)

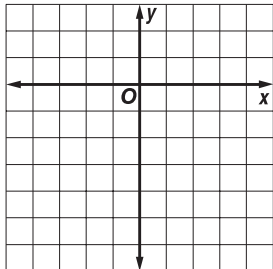
32. BASEBALL Brad tossed a baseball in the air from a height of 6 feet with an initial upward velocity of 14 feet per second. Enrique caught the ball on its way down at a point 4 feet above the ground. How long was the ball in the air before Enrique caught it? Use the model of vertical motion from Exercise 31.

9-1 Practice

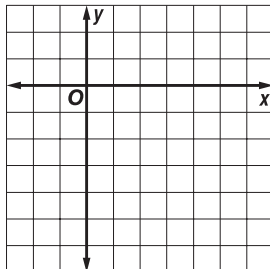
Graphing Quadratic Functions

Use a table of values to graph each function. Determine the domain and range.

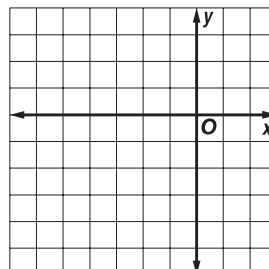
1. $y = -x^2 + 2$



2. $y = x^2 - 6x + 3$



3. $y = -2x^2 - 8x - 5$



Find the vertex, the equation of the axis of symmetry, and the y-intercept.

4. $y = x^2 - 9$

5. $y = -2x^2 + 8x - 5$

6. $4x^2 - 4x + 1$

Consider each equation. Determine whether the function has *maximum* or *minimum* value. State the maximum or minimum value. What are the domain and range of the function?

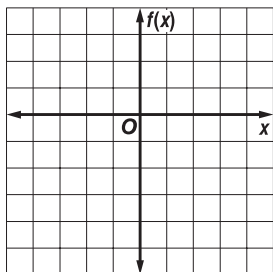
7. $y = 5x^2 - 2x + 2$

8. $y = -x^2 + 5x - 10$

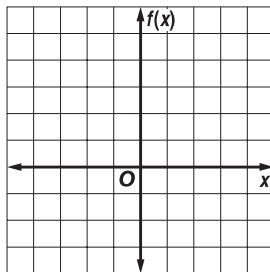
9. $y = \frac{3}{2}x^2 + 4x - 9$

Graph each function.

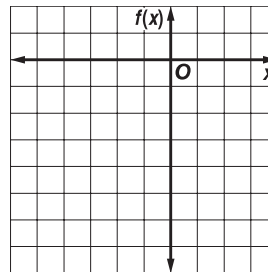
10. $f(x) = -x^2 + 3$



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



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



13. **BASEBALL** A player hits a baseball into the outfield. The equation $h = -0.005x^2 + x + 3$ gives the path of the ball, where h is the height and x is the horizontal distance the ball travels.

- What is the equation of the axis of symmetry?
- What is the maximum height reached by the baseball?
- An outfielder catches the ball three feet above the ground. How far has the ball traveled horizontally when the outfielder catches it?

10-4 Skills Practice**Radical Equations**

Solve each equation. Check your solution.

1. $\sqrt{f} = 7$

2. $\sqrt{-x} = 5$

3. $\sqrt{5p} = 10$

4. $\sqrt{4y} = 6$

5. $2\sqrt{2} = \sqrt{u}$

6. $3\sqrt{5} = \sqrt{-n}$

7. $\sqrt{g} - 6 = 3$

8. $\sqrt{5a} + 2 = 0$

9. $\sqrt{2t - 1} = 5$

10. $\sqrt{3k - 2} = 4$

11. $\sqrt{x + 4} - 2 = 1$

12. $\sqrt{4x - 4} - 4 = 0$

13. $\frac{\sqrt{d}}{3} = 4$

14. $\sqrt{\frac{m}{3}} = 3$

15. $x = \sqrt{x + 2}$

16. $d = \sqrt{12 - d}$

17. $\sqrt{6x - 9} = x$

18. $\sqrt{6p - 8} = p$

19. $\sqrt{x + 5} = x - 1$

20. $\sqrt{8 - d} = d - 8$

21. $\sqrt{r - 3} + 5 = r$

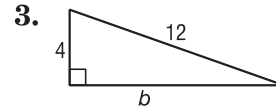
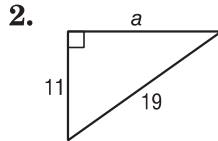
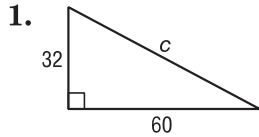
22. $\sqrt{y - 1} + 3 = y$

23. $\sqrt{5n + 4} = n + 2$

24. $\sqrt{3z - 6} = z - 2$

10-5 Practice**The Pythagorean Theorem**

Find the length of each missing side. If necessary, round to the nearest hundredth.



Determine whether each set of measures can be sides of right triangle. Then determine whether they form a Pythagorean triple.

4. 11, 18, 21

5. 21, 72, 75

6. 7, 8, 11

7. 9, 10, $\sqrt{161}$

8. 9, $2\sqrt{10}$, 11

9. $\sqrt{7}$, $2\sqrt{2}$, $\sqrt{15}$

10. STORAGE The shed in Stephan's back yard has a door that measures 6 feet high and 3 feet wide. Stephan would like to store a square theater prop that is 7 feet on a side. Will it fit through the door diagonally? Explain.

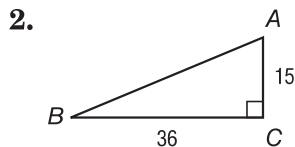
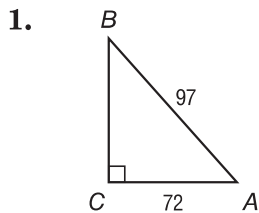
11. SCREEN SIZES The size of a television is measured by the length of the screen's diagonal.

- If a television screen measures 24 inches high and 18 inches wide, what size television is it?
- Darla told Tri that she has a 35-inch television. The height of the screen is 21 inches. What is its width?
- Tri told Darla that he has a 5-inch handheld television and that the screen measures 2 inches by 3 inches. Is this a reasonable measure for the screen size? Explain.

10-8 Practice

Trigonometric Ratios

Find the values of the three trigonometric ratios for angle A.



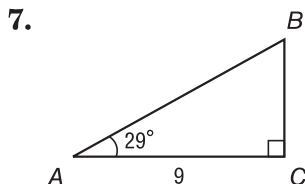
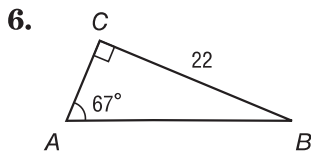
Use a calculator to find the value of each trigonometric ratio to the nearest ten-thousandth.

3. $\tan 26^\circ$

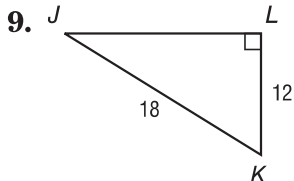
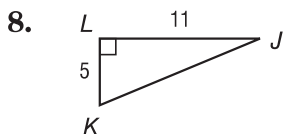
4. $\sin 53^\circ$

5. $\cos 81^\circ$

Solve each right triangle. Round each side length to the nearest tenth.



Find $m\angle J$ for each right triangle to the nearest degree.



10. **SURVEYING** If point A is 54 feet from the tree, and the angle between the ground at point A and the top of the tree is 25° , find the height h of the tree.

