Lesson 6-5 1–9. See Student Handbook Answer Appendix. (pages 322–327)

Solve each open sentence. Then graph the solution set.

1. $|c - 5| = 4$
2. $|e + 3| = 7$
3. $|4 - g| = 6$
4. $|10 - k| = 8$
5. $|2j + 4| = 12$
6. $|2r - 6| = 10$
7. $|6 - 3w| = 8$
8. $|7 + 2x| = 14$
9. $|4z + 6| = 12$

Lesson 6-6 1–12. See Student Handbook Answer Appendix. (pages 329–333)

Solve each open sentence. Then graph the solution set.

1. $|y - 9| < 19$
2. $|g + 6| > 8$
3. $|t - 5| \le 3$
4. $|a + 5| \le 0$
5. $|2m - 5| > 13$
6. $|14 - w| \ge 20$
7. $|3p + 5| \le 23$
8. $|6b - 12| \le 36$
9. $|25 - 3x| < 5$
10. $|4 - 5s| > 46$
11. $|4 - (1 - x)| \ge 10$
12. $\left|\frac{7 - 2b}{2}\right| \le 3$

Lesson 6-7 (pages 334–339)

Determine which ordered pairs are part of the solution set for each inequality.

1. $x + y \ge 0$, $\{(0, 0), (1, -3), (2, 2), (3, -3)\}$ **$\{(0, 0), (2, 2), (3, -3)\}$**
2. $2x + y \le 8$, $\{(0, 0), (-1, -1), (3, -2), (8, 0)\}$ **$\{(0, 0), (-1, -1), (3, -2)\}$**

Graph each inequality. **3–8. See Student Handbook Answer Appendix.**

3. $y \le -2$
4. $x < 4$
5. $x + y < -2$
6. $x + y \ge -4$
7. $y > 4x - 1$
8. $3x + y > 1$

Lesson 6-8 1–9. See Student Handbook Answer Appendix. (pages 341–345)

Solve each system of inequalities by graphing.

1. $x > 3$, $y < 6$
2. $y > 2$, $y > -x + 2$
3. $x \le 2$, $y + 3 \ge 5$
4. $x + y \le -1$, $2x + y \le 2$
5. $y \ge 2x + 2$, $y \ge -x - 1$
6. $y \le x + 3$, $y \ge x + 2$
7. $y - x \ge 0$, $y \le 3$, $x \ge 0$
8. $y > 2x$, $x > -3$, $y < 4$
9. $y \le x$, $x + y < 4$, $y \ge -3$

Lesson 7-1 (pages 358–364)

Determine whether each expression is a monomial. Write *yes* or *no*. Explain. **1–4. See Student Handbook Answer Appendix for explanations.**

1. $n^2 - 3$ **no**
2. 53 **yes**
3. $9a^2b^3$ **yes**
4. $15 - x^2y$ **no**

Simplify.

5. $a^5(a)(a^7)$ **a^{13}**
6. $(r^3t^4)(r^4t^4)$ **r^7t^8**
7. $(x^3y^4)(xy^3)$ **x^4y^7**
8. $(bc^3)(b^4c^3)$ **b^5c^6**
9. $(-3mn^2)(5m^3n^2)$ **$-15m^4n^4$**
10. $[(3^3)^2]^2$ **531,441**
11. $(3s^3t^2)(-4s^3t^2)$ **$-12s^6t^4$**
12. $x^3(x^4y^3)$ **x^7y^3**
13. $(1.1g^2h^4)^3$ **$1.331g^6h^{12}$**
14. $-\frac{3}{4}a(a^2b^3c^4)$ **$-\frac{3}{4}a^3b^3c^4$**
15. $\left(\frac{1}{2}w^3\right)^2(w^4)^2$ **$\frac{1}{4}w^{14}$**
16. $[(-2^3)^3]^2$ **262,144**

Lesson 7-2 (pages 366–373)

Simplify. Assume that no denominator is equal to zero.

1. $\frac{6^{10}}{6^7}$ **6^3 or 216**
2. $\frac{b^6c^5}{b^3c^2}$ **b^3c^3**
3. $\frac{(-a)^4b^8}{a^4b^7}$ **b**
4. $\frac{(-x)^3y^3}{x^3y^6}$ **$-\frac{1}{y^3}$**
5. $\frac{12ab^5}{4a^4b^3}$ **$\frac{3b^2}{a^3}$**
6. $\frac{24x^5}{-8x^2}$ **$-3x^3$**
7. $\frac{-9h^2k^4}{18h^5j^3k^4}$ **$-\frac{1}{2h^3j^3}$**
8. $\left(\frac{2a^2b^4}{3a^3b}\right)^2$ **$\frac{4b^6}{9a^2}$**
9. $a^5b^0a^{-7}$ **$\frac{1}{a^2}$**
10. $\frac{(-u^{-3}v^3)^2}{(u^3v)^{-3}}$ **u^3v^9**
11. $\left(\frac{a^3}{b^2}\right)^{-3}$ **$\frac{b^6}{a^9}$**
12. $\left(\frac{2x}{y^{-3}}\right)^{-2}$ **$\frac{1}{4x^2y^6}$**
13. $\frac{(-r)s^5}{r^{-3}s^{-4}}$ **$-r^4s^9$**
14. $\frac{28a^{-4}b^0}{14a^3b^{-1}}$ **$\frac{2b}{a^7}$**
15. $\frac{(j^2k^3m)^4}{(jk^4)^{-1}}$ **$j^9k^{16}m^4$**
16. $\left(\frac{-2x^4y}{4y^2}\right)^0$ **1**
17. $\left(\frac{-18x^0a^{-3}}{-6x^{-2}a^{-3}}\right)$ **$3x^2$**
18. $\left(\frac{2a^3b^{-2}}{2^{-1}a^{-5}b^3}\right)^{-1}$ **$\frac{b^5}{4a^8}$**
19. $\left(\frac{5n^{-1}m^2}{2nm^{-2}}\right)^0$ **1**
20. $\frac{(3ab^2c)^{-3}}{(2a^2bc^2)^2}$ **$\frac{1}{108a^7b^8c^7}$**

Lesson 7-3 (pages 376–381)

State whether each expression is a polynomial. If the expression is a polynomial, identify it as a *monomial*, a *binomial*, or a *trinomial*.

1. $5x^2y + 3xy - 7$ **yes; trinomial**
2. 0 **yes; monomial**
3. $\frac{5}{k} - k^2y$ **no**
4. $3a^2x - 5a$ **yes; binomial**

Find the degree of each polynomial.

5. $a + 5c$ **1**
6. $14abcd - 6d^3$ **4**
7. $\frac{a^3}{4}$ **3**
8. 10 **0**
9. $-4h^5$ **5**
10. $\frac{x^2}{3} - \frac{x}{2} + \frac{1}{5}$ **2**
11. -6 **0**
12. $a^2b^3 - a^3b^2$ **5**

Arrange the terms of each polynomial so that the powers of x are in ascending order. **13–18. See Student Handbook Answer Appendix.**

13. $2x^2 - 3x + 4x^3 - x^5$
14. $x^3 - x^2 + x - 1$
15. $2a + 3ax^2 - 4ax$
16. $-5bx^3 - 2bx + 4x^2 - b^3$
17. $x^8 + 2x^2 - x^6 + 1$
18. $cdx^2 - c^2d^2x + d^3$

Arrange the terms of each polynomial so that the powers of x are in descending order. **19–24. See Student Handbook Answer Appendix.**

19. $5x^2 - 3x^3 + 7 + 2x$
20. $-6x + x^5 + 4x^3 - 20$
21. $5b + b^3x^2 + \frac{2}{3}bx$
22. $21p^2x + 3px^3 + p^4$
23. $3ax^2 - 6a^2x^3 + 7a^3 - 8x$
24. $\frac{1}{3}s^2x^3 + 4x^4 - \frac{2}{5}s^4x^2$

Lesson 7-4 (pages 384–388)

Find each sum or difference. **5–12. See Student Handbook Answer Appendix.**

1. $(3a^2 + 5) + (4a^2 - 1)$ **$7a^2 + 4$**
2. $(5x - 3) + (-2x + 1)$ **$3x - 2$**
3. $(6z + 2) - (9z + 3)$ **$-3z - 1$**
4. $(-4n + 7) - (-7n - 8)$ **$3n + 15$**
5. $(-7t^2 + 4ts - 6s^2) + (-5t^2 - 12ts + 3s^2)$
6. $(6a^2 - 7ab - 4b^2) - (2a^2 + 5ab + 6b^2)$
7. $(4a^2 - 10b^2 + 7c^2) + (-5a^2 + 2c^2 + 2b)$
8. $(z^2 + 6z - 8) - (4z^2 - 7z - 5)$
9. $(4d + 3e - 8f) - (-3d + 10e - 5f + 6)$
10. $(7g + 8h - 9) + (-g - 3h - 6k)$
11. $(9x^2 - 11xy - 3y^2) - (x^2 - 16xy + 12y^2)$
12. $(-3m + 9mn - 5n) + (14m - 5mn - 2n)$
13. $(6 - 7y + 3y^2) + (3 - 5y - 2y^2) + (-12 - 8y + y^2)$ **$2y^2 - 20y - 3$**
14. $(-7c^2 - 2c - 5) + (9c - 6) + (16c^2 + 3) + (-9c^2 - 7c + 7)$ **-1**

Lesson 7-5 (pages 390–395)

Find each product. 6. $5y^3 - 15y^2 + 30y$ 7–9. See Student Handbook Answer Appendix.

1. $-3(8x + 5)$ $-24x - 15$
2. $3b(5b + 8)$ $15b^2 + 24b$
3. $1.1a(2a + 7)$ $2.2a^2 + 7.7a$
4. $\frac{1}{2}x(8x - 6)$ $4x^2 - 3x$
5. $7xy(5x^2 - y^2)$ $35x^3y - 7xy^3$
6. $5y(y^2 - 3y + 6)$
7. $-ab(3b^2 + 4ab - 6a^2)$
8. $4m^2(9m^2n + mn - 5n^2)$
9. $4st^2(-4s^2t^3 + 7s^5 - 3st^3)$

Simplify. 10–15. See Student Handbook Answer Appendix.

10. $-3a(2a - 12) + 5a$
11. $6(12b^2 - 2b) + 7(-2 - 3b)$
12. $x(x - 6) + x(x - 2) + 2x$
13. $11(n - 3) + 2(n^2 + 22n)$
14. $-2x(x + 3) + 3(x + 3)$
15. $4m(n - 1) - 5n(n + 1)$

Solve each equation. 23. -1.5

16. $-6(11 - 2x) = 7(-2 - 2x)$ 2
17. $11(n - 3) + 5 = 2n + 44$ 8
18. $a(a - 6) + 2a = 3 + a(a - 2)$ -1.5
19. $q(2q + 3) + 20 = 2q(q - 3)$ $-\frac{20}{3}$
20. $w(w + 12) = w(w + 14) + 12$ -6
21. $x(x - 3) + 4x - 3 = 8x + x(3 + x)$ $-\frac{3}{5}$
22. $-3(x + 5) + x(x - 1) = x(x + 2) - 3$ -2
23. $n(n - 5) + n(n + 2) = 2n(n - 1) + 1.5$

Lesson 7-6 (pages 398–403)

Find each product. 1–27. See Student Handbook Answer Appendix.

1. $(d + 2)(d + 5)$
2. $(z + 7)(z - 4)$
3. $(m - 8)(m - 5)$
4. $(a + 2)(a - 19)$
5. $(c + 15)(c - 3)$
6. $(x + y)(x - 2y)$
7. $(2x - 5)(x + 6)$
8. $(7a - 4)(2a - 5)$
9. $(4x + y)(2x - 3y)$
10. $(7v + 3)(v + 4)$
11. $(7s - 8)(3s - 2)$
12. $(4g + 3h)(2g - 5h)$
13. $(4a + 3)(2a - 1)$
14. $(7y - 1)(2y - 3)$
15. $(2x + 3y)(4x + 2y)$
16. $(12r - 4s)(5r + 8s)$
17. $(-a + 1)(-3a - 2)$
18. $(2n - 4)(-3n - 2)$
19. $(x - 2)(x^2 + 2x + 4)$
20. $(3x + 5)(2x^2 - 5x + 11)$
21. $(4s + 5)(3s^2 + 8s - 9)$
22. $(5x - 2)(-5x^2 + 2x + 7)$
23. $(-n + 2)(-2n^2 + n - 1)$
24. $(x^2 - 7x + 4)(2x^2 - 3x - 6)$
25. $(x^2 + x + 1)(x^2 - x - 1)$
26. $(a^2 + 2a + 5)(a^2 - 3a - 7)$
27. $(5x^4 - 2x^2 + 1)(x^2 - 5x + 3)$

Lesson 7-7 4. $100x^2 - 121y^2$ 6. $4b^2 - 16d^2$ 9. $36m^2 + 24mn + 4n^2$ (pages 404–409)

Find each product. 16–21. See Student Handbook Answer Appendix.

1. $(t + 7)^2$ $t^2 + 14t + 49$
2. $(w - 12)(w + 12)$ $w^2 - 144$
3. $(q - 4h)^2$ $q^2 - 8qh + 16h^2$
4. $(10x + 11y)(10x - 11y)$
5. $(4p + 3)^2$ $16p^2 + 24p + 9$
6. $(2b - 4d)(2b + 4d)$
7. $(a + 2b)^2$ $a^2 + 4ab + 4b^2$
8. $(3x + y)^2$ $9x^2 + 6xy + y^2$
9. $(6m + 2n)^2$
10. $(3m - 7d)^2$ $9m^2 - 42md + 49d^2$
11. $(5b - 6)(5b + 6)$ $25b^2 - 36$
12. $(1 + x)^2$ $1 + 2x + x^2$
13. $(5x - 9y)^2$ $25x^2 - 90xy + 81y^2$
14. $(8a - 2b)(8a + 2b)$ $64a^2 - 4b^2$
15. $\left(\frac{1}{4}x + 4\right)^2$ $\frac{1}{16}x^2 + 2x + 16$
16. $\left(\frac{1}{2}x - 10\right)\left(\frac{1}{2}x + 10\right)$
17. $\left(\frac{1}{3}n - m\right)\left(\frac{1}{3}n + m\right)$
18. $(a - 1)(a - 1)(a - 1)$
19. $(x + 2)(x - 2)(2x + 5)$
20. $(4x - 1)(4x + 1)(x - 4)$
21. $(x - 5)(x + 5)(x + 4)(x - 4)$
22. $(a + 1)(a + 1)(a - 1)(a - 1)$ $a^4 - 2a^2 + 1$
23. $(n - 1)(n + 1)(n - 1)$ $n^3 - n^2 - n + 1$
24. $(2c + 3)(2c + 3)(2c - 3)(2c - 3)$ $16c^4 - 72c^2 + 81$
25. $(4d + 5g)(4d + 5g)(4d - 5g)(4d - 5g)$ $256d^4 - 800g^2d^2 + 625g^4$

Lesson 8-1 (pages 420–423)

Factor each monomial completely. 1–6. See Student Handbook Answer Appendix.

1. $240mn$
2. $-64a^3b$
3. $-26xy^2$
4. $-231xy^2z$
5. $44rs^2t^3$
6. $-756m^2n^2$

Find the GCF of each set of monomials. 17. $4pq$

7. 16, 60 4
8. 15, 50 5
9. 45, 80 5
10. 29, 58 29
11. 55, 305 5
12. 126, 252 126
13. 128, 245 1
14. $7y^2$, $14y^2$ $7y^2$
15. $4xy$, $-6x$ $2x$
16. $35t^2$, $7t$ $7t$
17. $16pq^2$, $12p^2q$, $4pq$
18. 5, 15, 10 5
19. $12mn$, $10mn$, $15mn$ mn
20. $14xy$, $12y$, $20x$ 2
21. $26jk^4$, $16jk^3$, $8j^2$ $2j$

Lesson 8-2 (pages 426–431)

Factor each polynomial. 1–15. See Student Handbook Answer Appendix.

1. $10a^2 + 40a$
2. $15wx - 35wx^2$
3. $27a^2b + 9b^3$
4. $11x + 44x^2y$
5. $16y^2 + 8y$
6. $14mn^2 + 2mn$
7. $25a^2b^2 + 30ab^3$
8. $2m^3n^2 - 16mn^2 + 8mn$
9. $2ax + 6xc + ba + 3bc$
10. $6mx - 4m + 3rx - 2r$
11. $3ax - 6bx + 8b - 4a$
12. $a^2 - 2ab + a - 2b$
13. $8ac - 2ad + 4bc - bd$
14. $2e^2g + 2fg + 4e^2h + 4fh$
15. $x^2 - xy - xy + y^2$

Solve each equation. Check your solutions. 19. {−3, 1} 20. $\left\{-\frac{2}{3}, \frac{7}{4}\right\}$

16. $a(a - 9) = 0$ {0, 9}
17. $d(d + 11) = 0$ {−11, 0}
18. $z(z - 2.5) = 0$ {0, 2.5}
19. $(2y + 6)(y - 1) = 0$
20. $(4n - 7)(3n + 2)$
21. $(a - 1)(a + 1) = 0$ {−1, 1}
22. $10x^2 - 20x = 0$ {0, 2}
23. $8b^2 - 12b = 0$ {0, 1.5}
24. $14d^2 + 49d = 0$ {0, −3.5}
25. $15a^2 = 60a$ {0, 4}
26. $33x^2 = -22x$ $\left\{-\frac{2}{3}, 0\right\}$
27. $32x^2 = 16x$ $\left\{0, \frac{1}{2}\right\}$

Lesson 8-3 (pages 434–439)

Factor each trinomial. 1–18. See Student Handbook Answer Appendix.

1. $x^2 - 9x + 14$
2. $a^2 - 9a - 36$
3. $x^2 + 2x - 15$
4. $n^2 - 8n + 15$
5. $b^2 + 22b + 21$
6. $c^2 + 2c - 3$
7. $x^2 - 5x - 24$
8. $n^2 - 8n + 7$
9. $m^2 - 10m - 39$
10. $z^2 + 15z + 36$
11. $s^2 - 13st - 30t^2$
12. $y^2 + 2y - 35$
13. $r^2 + 3r - 40$
14. $x^2 + 5x - 6$
15. $x^2 - 4xy - 5y^2$
16. $r^2 + 16r + 63$
17. $v^2 + 24v - 52$
18. $k^2 - 27kj - 90j^2$

Solve each equation. Check your solutions. 21. {−8, −3} 24. {−3, 16} 30. {−11, −3}

19. $a^2 + 3a - 4 = 0$ {−4, 1}
20. $x^2 - 8x - 20 = 0$ {−2, 10}
21. $b^2 + 11b + 24 = 0$
22. $y^2 + y - 42 = 0$ {−7, 6}
23. $k^2 + 2k - 24 = 0$ {−6, 4}
24. $r^2 - 13r - 48 = 0$
25. $n^2 - 9n = -18$ {3, 6}
26. $2z + z^2 = 35$ {−7, 5}
27. $-20x + 19 = -x^2$ {1, 19}
28. $10 + a^2 = -7a$ {−5, −2}
29. $z^2 - 57 = 16z$ {−3, 19}
30. $x^2 = -14x - 33$
31. $22x - x^2 = 96$ {6, 16}
32. $-144 = q^2 - 26q$ {8, 18}
33. $x^2 + 84 = 20x$ {6, 14}

Lesson 8-4

(pages 441–446)

Factor each trinomial, if possible. If the trinomial cannot be factored using integers, write *prime*. **1–30. See See Student Handbook Answer Appendix.**

1. $4a^2 + 4a - 63$
2. $3x^2 - 7x - 6$
3. $4r^2 - 25r + 6$
4. $2z^2 - 11z + 15$
5. $3a^2 - 2a - 21$
6. $4y^2 + 11y + 6$
7. $6n^2 + 7n - 3$
8. $5x^2 - 17x + 14$
9. $2n^2 - 11n + 13$
10. $5a^2 - 3a + 15$
11. $18v^2 + 24v + 12$
12. $4k^2 + 2k - 12$
13. $10x^2 - 20xy + 10y^2$
14. $12c^2 - 11cd - 5d^2$
15. $30n^2 - mn - m^2$

Solve each equation. Check your solutions.

16. $8t^2 + 32t + 24 = 0$
17. $6y^2 + 72y + 192 = 0$
18. $5x^2 + 3x - 2 = 0$
19. $9x^2 + 18x - 27 = 0$
20. $4x^2 - 4x - 4 = 4$
21. $12n^2 - 16n - 3 = 0$
22. $12x^2 - x - 35 = 0$
23. $18x^2 + 36x - 14 = 0$
24. $15a^2 + a - 2 = 0$
25. $14b^2 + 7b - 42 = 0$
26. $13r^2 + 21r - 10 = 0$
27. $35y^2 - 60y - 20 = 0$
28. $16x^2 - 4x - 6 = 0$
29. $28d^2 + 5d - 3 = 0$
30. $30x^2 - 9x - 3 = 0$

Lesson 8-5

(pages 447–452)

Factor each polynomial, if possible. If the polynomial cannot be factored, write *prime*. **1–16. See Student Handbook Answer Appendix.**

1. $x^2 - 9$
2. $a^2 - 64$
3. $4x^2 - 9y^2$
4. $1 - 9z^2$
5. $16a^2 - 9b^2$
6. $8x^2 - 12y^2$
7. $a^2 - 4b^2$
8. $75r^2 - 48$
9. $x^2 - 36y^2$
10. $3a^2 - 16$
11. $9x^2 - 100y^2$
12. $49 - a^2b^2$
13. $5a^2 - 48$
14. $169 - 16t^2$
15. $8r^2 - 4$
16. $-45m^2 + 5$

Solve each equation by factoring. Check your solutions.

17. $4x^2 = 16$ **$\{\pm 2\}$**
18. $2x^2 = 50$ **$\{\pm 5\}$**
19. $9n^2 - 4 = 0$ **$\left\{\pm\frac{2}{3}\right\}$**
20. $a^2 - \frac{25}{36} = 0$ **$\left\{\pm\frac{5}{6}\right\}$**
21. $\frac{16}{9} - b^2 = 0$ **$\left\{\pm\frac{4}{3}\right\}$**
22. $18 - \frac{1}{2}x^2 = 0$ **$\{\pm 6\}$**
23. $20 - 5g^2 = 0$ **$\{\pm 2\}$**
24. $16 - \frac{1}{4}p^2 = 0$ **$\{\pm 8\}$**
25. $\frac{1}{4}c^2 - \frac{4}{9} = 0$ **$\left\{\pm\frac{8}{3}\right\}$**
26. $2q^3 - 2q = 0$ **$\{-1, 0, 1\}$**
27. $3r^3 = 48r$ **$\{-4, 0, 4\}$**
28. $100d - 4d^3 = 0$ **$\{-5, 0, 5\}$**

Lesson 8-6

(pages 454–460)

Determine whether each trinomial is a perfect square trinomial. If so, factor it.

1. $x^2 + 12x + 36$ **yes; $(x + 6)^2$**
2. $n^2 - 13n + 36$ **no**
3. $a^2 + 4a + 4$ **yes; $(a + 2)^2$**
4. $x^2 - 10x - 100$ **no**
5. $2n^2 + 17n + 21$ **no**
6. $4a^2 - 20a + 25$ **yes; $(2a - 5)^2$**

Factor each polynomial, if possible. If the polynomial cannot be factored, write *prime*. **7–14. See See Student Handbook Answer Appendix.**

7. $3x^2 - 75$
8. $4p^2 + 12pr + 9r^2$
9. $6a^2 + 72$
10. $s^2 + 30s + 225$
11. $24x^2 + 24x + 9$
12. $1 - 10z + 25z^2$
13. $28 - 63b^2$
14. $4c^2 + 2c - 7$

Solve each equation. Check your solutions.

15. $x^2 + 22x + 121 = 0$ **$\{-11\}$**
16. $343d^2 = 7$ **$\left\{\pm\frac{1}{7}\right\}$**
17. $(a - 7)^2 = 5$ **$7 \pm \sqrt{5}$**
18. $c^2 + 10c + 36 = 11$ **$\{-5\}$**
19. $16s^2 + 81 = 72s$ **$\left\{\frac{9}{4}\right\}$**
20. $9p^2 - 42p + 20 = -29$ **$\left\{\frac{7}{3}\right\}$**

Lesson 9-1

(pages 471–477)

Use a table of values to graph each function. **1–3. See Student Handbook Answer Appendix.**

1. $y = x^2 + 6x + 8$
2. $y = -x^2 + 3x$
3. $y = -x^2$

Write the equation of the axis of symmetry, and find the coordinates of the vertex of the graph of each function. Identify the vertex as a maximum or minimum. Then graph the function. **4–18. See Student Handbook Answer Appendix.**

4. $y = -x^2 + 2x - 3$
5. $y = 3x^2 + 24x + 80$
6. $y = x^2 - 4x - 4$
7. $y = 5x^2 - 20x + 37$
8. $y = 3x^2 + 6x + 3$
9. $y = 2x^2 + 12x$
10. $y = x^2 - 6x + 5$
11. $y = x^2 + 6x + 9$
12. $y = -x^2 + 16x - 15$
13. $y = 4x^2 - 1$
14. $y = -2x^2 - 2x + 4$
15. $y = 6x^2 - 12x - 4$
16. $y = -x^2 - 1$
17. $y = -x^2 + x + 1$
18. $y = -5x^2 - 3x + 2$

Lesson 9-2

10. $0 < r < 1, 3 < r < 4$ 14. $-1 < b < 0, 5 < b < 6$

(pages 480–485)

Solve each equation by graphing. **1–6. See Student Handbook Answer Appendix for graphs.**

1. $a^2 - 25 = 0$ **$-5, 5$**
2. $n^2 - 8n = 0$ **$0, 8$**
3. $d^2 + 36 = 0$ **$\varnothing$**
4. $b^2 - 18b + 81 = 0$ **9**
5. $x^2 + 3x + 27 = 0$ **$\varnothing$**
6. $-y^2 - 3y + 10 = 0$ **$-5, 2$**

15. $-3 < x < -2, 0 < x < 1$ 17. $-3 < n < -2, 2 < n < 3$ 21. $-1 < x < 0, 0 < x < 1$

Solve each equation by graphing. If integral roots cannot be found, estimate the roots by stating the consecutive integers between which the roots lie. **7–24. See Student Handbook Answer Appendix for graphs.**

7. $x^2 + 2x - 3 = 0$ **$-3, 1$**
8. $-x^2 + 6x - 5 = 0$ **$1, 5$**
9. $-a^2 - 2a + 3 = 0$ **$-3, 1$**
10. $2r^2 - 8r + 5 = 0$
11. $-3x^2 + 6x - 9 = 0$ **$\varnothing$**
12. $c^2 + c = 0$ **$-1, 0$**
13. $3t^2 + 2 = 0$ **$\varnothing$**
14. $-b^2 + 5b + 2 = 0$
15. $3x^2 + 7x = 1$
16. $x^2 + 5x - 24 = 0$ **$-8, 3$**
17. $8 - n^2 = 0$
18. $x^2 - 7x = 18$ **$-2, 9$**
19. $a^2 + 12a + 36 = 0$ **-6**
20. $64 - x^2 = 0$ **$-8, 8$**
21. $-4x^2 + 2x = -1$
22. $5z^2 + 8z = 1$ **$-2 < z < -1, 0 < z < 1$**
23. $p = 27 - p^2$ **$-6 < p < -5, 4 < p < 5$**
24. $6w = -15 - 3w^2$ **$\varnothing$**

Lesson 9-3

(pages 486–491)

Solve each equation by taking the square root of each side. Round to the nearest tenth if necessary. **3. $-8.3, -1.7$**

1. $x^2 - 4x + 4 = 9$ **$-1, 5$**
2. $t^2 - 6t + 9 = 16$ **$-1, 7$**
3. $b^2 + 10b + 25 = 11$
4. $a^2 - 22a + 121 = 3$ **$9.3, 12.7$**
5. $x^2 + 2x + 1 = 81$ **$-10, 8$**
6. $t^2 - 36t + 324 = 85$ **$8.8, 27.2$**

Find the value of c that makes each trinomial a perfect square.

7. $a^2 + 20a + c$ **100**
8. $x^2 + 10x + c$ **25**
9. $t^2 + 12t + c$ **36**
10. $y^2 - 9y + c$ **$\frac{81}{4}$**
11. $p^2 - 14p + c$ **49**
12. $b^2 + 13b + c$ **$\frac{169}{4}$**

Solve each equation by completing the square. Round to the nearest tenth if necessary.

13. $a^2 - 8a - 84 = 0$ **$-6, 14$**
14. $c^2 + 6 = -5c$ **$-3, -2$**
15. $p^2 - 8p + 5 = 0$ **$0.7, 7.3$**
16. $2y^2 + 7y - 4 = 0$ **$-4, \frac{1}{2}$**
17. $t^2 + 3t = 40$ **$5, -8$**
18. $x^2 + 8x - 9 = 0$ **$-9, 1$**
19. $y^2 + 5y - 84 = 0$ **$-12, 7$**
20. $t^2 + 12t + 32 = 0$ **$-4, -8$**
21. $2x - 3x^2 = -8$ **$2, -\frac{4}{3}$**
22. $2y^2 - y - 9 = 0$ **$-1.9, 2.4$**
23. $2z^2 - 5z - 4 = 0$ **$-0.6, 3.1$**
24. $8t^2 - 12t - 1 = 0$ **$-0.1, 1.6$**

Lesson 9-4

(pages 493–499)

Solve each equation by using the Quadratic Formula. Round to the nearest tenth if necessary. 7. $-0.6, -3.4$ 12. $-2.4, -0.3$

1. $x^2 - 8x - 4 = 0$ $-0.5, 8.5$
2. $x^2 + 7x - 8 = 0$ $-8, 1$
3. $x^2 - 5x + 6 = 0$ $2, 3$
4. $y^2 - 7y - 8 = 0$ $-1, 8$
5. $m^2 - 2m = 35$ $-5, 7$
6. $4n^2 - 20n = 0$ $0, 5$
7. $m^2 + 4m + 2 = 0$
8. $2t^2 - t - 15 = 0$ $-2.5, 3$
9. $5t^2 = 125$ $-5, 5$
10. $t^2 + 16 = 0$ $\varnothing$
11. $-4x^2 + 8x = -3$ $-0.3, 2.3$
12. $3k^2 + 2 = -8k$
13. $8t^2 + 10t + 3 = 0$ $-\frac{3}{4}, -\frac{1}{2}$
14. $3x^2 - \frac{5}{4}x - \frac{1}{2} = 0$ $\frac{2}{3}, -\frac{1}{4}$
15. $-5b^2 + 3b - 1 = 0$ $\varnothing$
16. $n^2 - 3n + 1 = 0$ $2.6, 0.4$
17. $2z^2 + 5z - 1 = 0$ $0.2, -2.7$
18. $3h^2 = 27$ $3, -3$
19. 76; 2 real roots
20. 2.89; 2 real roots
21. -92; no real roots

State the value of the discriminant for each equation. Then determine the number of real roots of the equation.

19. $3f^2 + 2f = 6$
20. $2x^2 = 0.7x + 0.3$
21. $3w^2 - 2w + 8 = 0$
22. $4r^2 - 12r + 9 = 0$ 0; 1 real root
23. $x^2 - 5x = -9$ -11; no real roots
24. $25t^2 + 30t = -9$ 0; 1 real root

Lesson 9-5

(pages 502–508)

Graph each function. State the y-intercept. Then use the graph to determine the approximate value of the given expression. Use a calculator to confirm the value. 1–3. See Student Handbook Answer Appendix for graphs.

1. $y = 7^x$; $7^{1.5}$ 1; 18.5
2. $\left(\frac{1}{3}\right)^x$; $\left(\frac{1}{3}\right)^{5.6}$ 1; 0.002
3. $y = \left(\frac{3}{5}\right)^x$; $\left(\frac{3}{5}\right)^{-4.2}$ 1; 8.5

4–15. See Student Handbook Answer Appendix for graphs.

Graph each function. State the y-intercept.

4. $y = 3^x + 1$ 2
5. $y = 2^x - 5$ -4
6. $y = 2^{x+3}$ 8
7. $y = 3^{x+1}$ 3
8. $y = \left(\frac{2}{3}\right)^x$ 1
9. $y = 5\left(\frac{2}{5}\right)^x$ 5
10. $y = 5(3^x)$ 5
11. $y = 4(5)^x$ 4
12. $y = 2(5)^x + 1$ 3
13. $y = \left(\frac{1}{2}\right)^{x+1}$ $\frac{1}{2}$
14. $y = \left(\frac{1}{8}\right)^x$ 1
15. $y = \left(\frac{3}{4}\right)^x - 2$ -1

Determine whether the data in each table display exponential behavior. Explain why or why not. 16–17. See Student Handbook Answer Appendix.

16.

x	-1	0	1	2
y	-5	-1	3	7

17.

x	1	2	3	4
y	25	125	625	3125

Lesson 9-6

2. $V = 21{,}500(1 - 0.08)^5$; \$14,170.25

(pages 510–514)

1. **MONEY** Marco deposited \$8500 in a 4-year certificate of deposit earning 7.25% compounded monthly. Write an equation for the amount of money Marco will have at the end of the four years. Then find the amount. $M = 8500\,1 + \left(\frac{0.0725}{12}\right)^{12(4)}$; \$11,349.73
2. **TRANSPORTATION** Elise is buying a new car for \$21,500. The rate of depreciation on this type of car is 8% per year. Write an equation for the value of the car in 5 years. Then find the value of the car in 5 years.
3. **POPULATION** In 2000, the town of Belgrade had a population of 3422. For each of the next 8 years, the population increased by 4.9% per year. Find the projected population of Belgrade in 2008. 5017

Lesson 10-1

(pages 528–534)

Simplify.

1. $\sqrt{50}$ $5\sqrt{2}$
2. $\sqrt{200}$ $10\sqrt{2}$
3. $\sqrt{162}$ $9\sqrt{2}$
4. $\sqrt{700}$ $10\sqrt{7}$
5. $\frac{\sqrt{3}}{\sqrt{5}}$ $\frac{\sqrt{15}}{5}$
6. $\frac{\sqrt{72}}{\sqrt{6}}$ $2\sqrt{3}$
7. $\sqrt{\frac{8}{7}}$ $\frac{2\sqrt{14}}{7}$
8. $\sqrt{\frac{7}{32}}$ $\frac{\sqrt{14}}{8}$
9. $\sqrt{\frac{5}{8}} \cdot \sqrt{\frac{2}{6}}$ $\frac{\sqrt{30}}{12}$
10. $\sqrt{\frac{2}{3}} \cdot \sqrt{\frac{3}{2}}$ 1
11. $\sqrt{\frac{2x}{30}}$ $\sqrt{\frac{15x}{15}}$
12. $\sqrt{\frac{50}{z^2}}$ $\frac{5\sqrt{2}}{|z|}$
13. $\sqrt{10} \cdot \sqrt{20}$ $10\sqrt{2}$
14. $\sqrt{7} \cdot \sqrt{3}$ $\sqrt{21}$
15. $6\sqrt{2} \cdot \sqrt{3}$ $6\sqrt{6}$
16. $5\sqrt{6} \cdot 2\sqrt{3}$ $30\sqrt{2}$
17. $\sqrt{4x^4y^3}$ $2x^2|y|\sqrt{y}$
18. $\sqrt{200m^2y^3}$ $10|my|\sqrt{2y}$
19. $\sqrt{12ts^3}$ $2|s|\sqrt{3st}$
20. $\sqrt{175a^4b^6}$ $5a^2|b^3|\sqrt{7}$
21. $\sqrt{\frac{54}{g^2}}$ $\frac{3\sqrt{6}}{|g|}$
22. $\sqrt{99x^3y^7}$ $3|xy^3|\sqrt{11xy}$
23. $\frac{\sqrt{32c^5}}{9d^2}$ $\frac{4c^2\sqrt{2c}}{3|d|}$
24. $\sqrt{\frac{27p^4}{3p^2}}$ $3|p|$
25. $\frac{1}{3+\sqrt{5}}$ $\frac{3-\sqrt{5}}{4}$
26. $\frac{2}{\sqrt{3}-5}$ $\frac{\sqrt{3}+5}{-11}$
27. $\frac{\sqrt{3}}{\sqrt{3}-5}$ $\frac{3+5\sqrt{3}}{-22}$
28. $\frac{\sqrt{6}}{7-2\sqrt{3}}$ $\frac{7\sqrt{6}+6\sqrt{2}}{37}$

Lesson 10-2

(pages 536–540)

Simplify. 1. $7\sqrt{11}$ 4. $9\sqrt{7} - \sqrt{2}$ 5. in simplest form 6. $8\sqrt{2} - 3\sqrt{5}$

1. $3\sqrt{11} + 6\sqrt{11} - 2\sqrt{11}$
2. $6\sqrt{13} + 7\sqrt{13}$ $13\sqrt{13}$
3. $2\sqrt{12} + 5\sqrt{3}$ $9\sqrt{13}$
4. $9\sqrt{7} - 4\sqrt{2} + 3\sqrt{2}$
5. $3\sqrt{5} - 5\sqrt{3}$
6. $4\sqrt{8} - 3\sqrt{5}$
7. $2\sqrt{27} - 4\sqrt{12}$ $-2\sqrt{3}$
8. $8\sqrt{32} + 4\sqrt{50}$ $52\sqrt{2}$
9. $\sqrt{45} + 6\sqrt{20}$ $15\sqrt{5}$
10. $2\sqrt{63} - 6\sqrt{28} + 8\sqrt{45}$
11. $14\sqrt{3t} + 8$ $22\sqrt{3t}$
12. $7\sqrt{6x} - 12\sqrt{6x}$ $-5\sqrt{6x}$
13. $5\sqrt{7} - 3\sqrt{28}$ $-\sqrt{7}$
14. $7\sqrt{8} - \sqrt{18}$ $11\sqrt{2}$
15. $7\sqrt{98} + 5\sqrt{32} - 2\sqrt{75}$
16. $4\sqrt{6} + 3\sqrt{2} - 2\sqrt{5}$
17. $-3\sqrt{20} + 2\sqrt{45} - \sqrt{7}$
18. $4\sqrt{75} + 6\sqrt{27}$ $38\sqrt{3}$
19. $10\sqrt{\frac{1}{5}} - \sqrt{45} - 12\sqrt{\frac{5}{9}}$
20. $\sqrt{15} - \sqrt{\frac{3}{5}}$ $\frac{4\sqrt{15}}{5}$
21. $3\sqrt{\frac{1}{3}} - 9\sqrt{\frac{1}{12}} + \sqrt{243}$

10. $-6\sqrt{7} + 24\sqrt{5}$ 15. $69\sqrt{2} - 10\sqrt{3}$ 16. in simplest form 17. $-\sqrt{7}$ 19. $-5\sqrt{5}$ 21. $\frac{17\sqrt{3}}{2}$

Find each product.

22. $\sqrt{3}(\sqrt{5} + 2)$ $\sqrt{15} + 2\sqrt{3}$
23. $\sqrt{2}(\sqrt{2} + 3\sqrt{5})$ $2 + 3\sqrt{10}$
24. $(\sqrt{2} + 5)^2$ $27 + 10\sqrt{2}$
25. $(3 - \sqrt{7})(3 + \sqrt{7})$ 2
26. $(\sqrt{2} + \sqrt{3})(\sqrt{3} + \sqrt{2})$ $2\sqrt{6} + 5$
27. $(4\sqrt{7} + \sqrt{2})(\sqrt{3} - 3\sqrt{5})$ $4\sqrt{21} - 12\sqrt{35} + \sqrt{6} - 3\sqrt{10}$

Lesson 10-3

(pages 541–546)

Solve each equation. Check your solution. 17. no solution

1. $\sqrt{5x} = 5$ 5
2. $4\sqrt{7} = \sqrt{-m}$ -112
3. $\sqrt{t} - 5 = 0$ 25
4. $\sqrt{3b} + 2 = 0$ no solution
5. $\sqrt{x} - 3 = 6$ 39
6. $5 - \sqrt{3x} = 1$ $\frac{16}{3}$
7. $2 + 3\sqrt{y} = 13$ $\frac{121}{9}$
8. $\sqrt{3g} = 6$ 12
9. $\sqrt{a} - 2 = 0$ 4
10. $\sqrt{2j} - 4 = 8$ 72
11. $5 + \sqrt{x} = 9$ 16
12. $\sqrt{5y + 4} = 7$ 9
13. $7 + \sqrt{5c} = 9$ $\frac{4}{5}$
14. $2\sqrt{5t} = 10$ 5
15. $\sqrt{44} = 2\sqrt{p}$ 11
16. $4\sqrt{x - 5} = 15$ $\frac{305}{16}$
17. $4 - \sqrt{x - 3} = 9$
18. $\sqrt{10x^2 - 5} = 3x$ $\sqrt{5}$
19. $\sqrt{2a^2 - 144} = a$ 12
20. $\sqrt{3y + 1} = y - 3$ 8
21. $\sqrt{2x^2 - 12} = x$ $2\sqrt{3}$
22. $\sqrt{b^2 + 16 + 2b} = 5b$ $\sqrt{2}$
23. $\sqrt{m + 2 + m} = 4$ 2
24. $\sqrt{3 - 2c + 3} = 2c$ $\frac{3}{2}$