Chapter 9 Answers

Practice 9-1

1. $4y^3 - 4y^2 - y + 3$; cubic polynomial with four terms **2.** $x^4 + x^2 - 6$; fourth degree trinomial **3.** $x + 2$; linear binomial **4.** $-7m^3 + 2m^2 + 3m$; cubic trinomial **5.** $2x^2 - x + 4$; quadratic trinomial **6.** $7x^3 + 2x^2$; cubic binomial **7.** $n^2 - 5n$; quadratic binomial **8.** $7x^2 + 6$; quadratic binomial **9.** $a^3 + 3a^2 - 4a + 3$; cubic polynomial with four terms **10.** $3x + 5$; linear binomial **11.** $-8a^2 + 6a + 7$; quadratic trinomial **12.** $-x^2 + 5x + 4$; quadratic trinomial **13.** $-x^3 + 4x^2 + 2$; cubic trinomial **14.** $4x^3 - 2x^2$; cubic binomial **15.** $y^2 - 3y - 7$; quadratic trinomial **16.** $-6x^2 + x - 3$; quadratic trinomial **17.** $v^3 + 2v^2 - v$; cubic trinomial **18.** $3d^2 + 8d$; quadratic binomial **19.** $2x^2 - 9x - 3$ **20.** $3x^3 - 7x^2 + 4$ **21.** $-2y^3 - y^2 - 11y + 1$ **22.** $2x^3 - 7x + 1$ **23.** $3a^3 + 4a^2 + 5a$ **24.** $2y^3 - 4y + 10$ **25.** $6x^2 + x - 9$ **26.** $3n^2 - n - 4$ **27.** $4n^3 - n^2 + 4$ **28.** $7y^2 - 12y$ **29.** $3x^2 + 3x - 20$ **30.** $x^3 - 5x^2 + x$ **31.** $-2x^3 - x^2 - 2x$ **32.** $2d^3 - 4d^2 - 6d + 5$ **33.** $x^3 + 8x^2$ **34.** $3c^2 - 3c - 3$ **35.** $4y^2 - 11y$ **36.** $2c^2 - 3$ **37.** $16x^2 + 14x + 15$ **38.** $-15x^2 - 6x + 3$ **39.** $3x^2 + 7x + 16$ **40.** $7x^3 - 11x^2 - x + 3$ **41.** $y^3 - 5y^2 + y - 2$ **42.** $-x^3 - 7x^2 - 8x + 5$ **43.** $2x^2 - x + 2$ **44.** $-2x^2 - 8x + 1$ **45.** $-2x^3 + 11x^2 + x - 5$ **46.** $a^3 + 5a^2 + 3a$ **47.** $4x + 1$ **48.** $3n + 4$ **49.** $x^3 - x^2 + 7x - 6$ **50.** $6s^2 + 7s + 4$ **51.** $5x^2 - 6x + 14$ **52.** $5x^3 - x^2 - 3x + 13$ **53.** -6 **54.** $x^3 - 2x^2 + x + 3$ **55.** $4x^2 + 20$ **56.** $x^3 - 8x^2 - x + 12$ **57.** $2x + 9$ **58.** $2x^2 - 3x + 8$

Practice 9-2

1. $4a - 12$ **2.** $-5x + 10$ **3.** $-3x^4 - 9x^3$ **4.** $4x^4 - 12x^3$ **5.** $-5x^4 - 10x^3 - 5x^2$ **6.** $3x^3 - 15x^2 - 9x$ **7.** $2x^4 - 3x^3 + 2x^2$ **8.** $4d^4 - 12d^3 - 28d^2$ **9.** $5m^4 + 30m^3$ **10.** $2a^3 + 4a^2$ **11.** $5x^2 + x - 12$ **12.** $20x^2 - 24x$ **13.** 4 **14.** $15x$ **15.** x **16.** 4 **17.** 12 **18.** $4n^2$ **19.** $7x^2$ **20.** $4x$ **21.** 9 **22.** $5x^2$ **23.** $11x$ **24.** $2n^2$ **25.** $4d$ **26.** 3 **27.** 8 **28.** $2(4x + 5)$ **29.** $4n(3n^2 - 2)$ **30.** $2(7d - 1)$ **31.** $2h(3h - 4)$ **32.** $3z^2(z^2 - 5z - 3)$ **33.** $y(3y^2 - 8y - 9)$ **34.** $x^2(x - 5)$ **35.** $4x(2x^2 - 3x + 1)$ **36.** $7x^3(3x + 1)$ **37.** $2a(3a^2 - 6a + 7)$ **38.** $6x^2(x^2 + 2)$ **39.** $3n(n^3 - 2n + 3)$ **40.** $2w(w^2 + 3w - 2)$ **41.** $6c^2(2c - 5)$ **42.** $2(x^2 + 4x - 7)$ **43.** $4x(x^2 + 3x + 4)$ **44.** $4m(4m^2 - 2m + 3)$ **45.** $4a(a^2 - 5a - 2)$ **46.** $c(18c^3 - 9c + 7)$ **47.** $3y^2(2y^2 + 3y - 9)$ **48.** $3c(2c - 1)$ **49.** $x^2(4 - \pi)$ **50.** $5x^2$ **51.** $x^2(36\pi - 1)$

Practice 9-3

1. $2x^2 + x - 15$ **2.** $x^3 + 2x^2 - 1$ **3.** $12w^2 + 5w - 4$ **4.** $x^2 + 9x + 20$ **5.** $2b^3 - 7b^2 + 11b - 4$ **6.** $a^2 - 6a - 55$ **7.** $4g^3 - 4g^2 - 11g + 12$ **8.** $3s^2 - 19s + 20$ **9.** $4x^2 - 25x - 21$ **10.** $x^3 + 2x^2 - 21x + 18$ **11.** $20x^2 - 2x - 6$ **12.** $12y^2 + 43y + 35$ **13.** $3x^2 + 22x + 35$ **14.** $5x^2 + 13x - 6$ **15.** $3m^3 - 13m^2 + 22m - 16$ **16.** $a^2 + 2a - 48$ **17.** $2x^3 + x^2 - 4x + 4$ **18.** $a^3 - 1$ **19.** $x^3 + 2x^2 - 4x - 8$ **20.** $6r^2 + r - 1$ **21.** $3k^2 + 8k - 16$ **22.** $2n^3 - 7n^2 + 16n - 15$ **23.** $2p^2 - 5p - 12$ **24.** $12x^3 - 2x^2 + x + 1$ **25.** $8x^3 - 26x^2 + 23x - 6$ **26.** $x^2 + 12x + 35$ **27.** $6x^2 + x - 22$ **28.** $8x^2 + 10x + 3$ **29.** $9x^2 - 16$ **30.** $18x^2 - 9x - 5$ **31.** $n^2 - 3n - 28$ **32.** $6x^2 + x - 1$ **33.** $d^2 - 2d - 99$ **34.** $4x^3 + 12x^2 - x - 3$ **35.** $2b^2 + 11b - 40$ **36.** $2x^2 + 3x - 20$ **37.** $15x^2 + 4x - 35$ **38.** $2x^3 - 17x^2 + 33x + 10$ **39.** $4x^3 - 16x^2 + 13x + 11$ **40.** $4x^3 + 24x^2 + 27x - 28$ **41.** $3x^3 + 23x^2 + 63x + 55$ **42.** $35x^2 + 64x + 21$ **43.** $8x^2 - 34x + 35$ **44.** $3x^2 - 22x - 45$ **45.** $2x^3 - 15x^2 + 9x - 1$ **46a.** $2x^2 + 18x + 40$ **46b.** 544 in.^{2} **46c.** 760 in.^{2} **47a.** $3x^2 - 16x + 16$ **47b.** 156 ft^2 **47c.** 115 ft^2 **48.** 27 in. by 23 in.

Practice 9-4

1. $w^2 - 4w + 4$ **2.** $y^2 + 8y + 16$ **3.** $16w^2 + 16w + 4$ **4.** $w^2 - 18w + 81$ **5.** $9x^2 + 42x + 49$ **6.** $9x^2 - 42x + 49$ **7.** $4x^2 - 36x + 81$ **8.** $x^2 - 24x + 144$ **9.** $36x^2 + 12x + 1$ **10.** $16x^2 - 56x + 49$ **11.** $x^2 - 64$ **12.** $x^2 - 121$ **13.** $x^2 - 144$ **14.** $y^2 - w^2$ **15.** $4x^2 - 1$ **16.** $25x^2 - 4$ **17.** $36x^2 - 1$ **18.** $4x^2 - 16$ **19.** $x^4 + 2x^2y^2 + y^4$ **20.** $4x^4 + 4x^2y^2 + y^4$ **21.** $a^4 - 2a^2b^2 + b^4$ **22.** $y^4 - 8y^2w^2 + 16w^4$ **23.** $9 - 36x^2 + 36x^4$ **24.** $16a^2 - 24ay + 9y^2$ **25.** $9y^2 - 4a^2$ **26.** $x^4 - 4y^2$ **27.** $9x^4 - 16w^4$ **28.** $16x^2 - 9w^4$ **29.** $4a^2 - 49b^2$ **30.** $25a^4 - 36x^2$ **31.** 324 **32.** 4096 **33.** 899 **34.** 9991 **35.** 798 **36.** 19,475 **37.** $4x^2 + 4x + 1$ **38.** $9x^2 - 4$ **39.** $22x + 121$ **40.** $(18x + 81)\pi$

Practice 9-5

1. $(x + 4)(x + 4)$ **2.** $(d + 7)(d + 1)$ **3.** $(y + 4)(y + 2)$ **4.** $(b - 3)(b + 1)$ **5.** $(s - 5)(s + 1)$ **6.** $(x + 8)(x + 4)$ **7.** $(x - 4)(x - 5)$ **8.** $(x - 2)(x - 3)$ **9.** $(a + 2)(a + 1)$ **10.** $(p - 7)(p - 1)$ **11.** $(d + 1)(d + 5)$ **12.** $(n + 3)(n - 2)$ **13.** $(x + 7)(x - 2)$ **14.** $(b + 7)(b + 2)$ **15.** $(x + 9)(x + 5)$ **16.** $(a + 3)(a + 4)$ **17.** $(x + 2)(x + 11)$ **18.** $(x + 4)(x - 1)$ **19.** $(x - 6)(x - 2)$ **20.** $(x + 9)(x - 2)$ **21.** $(n - 5)(n - 2)$ **22.** $(s - 7)(s + 2)$ **23.** $(x - 8)(x - 1)$ **24.** $(x - 6)(x + 4)$ **25.** $(x - 9)(x + 3)$ **26.** $(x - 18)(x + 2)$ **27.** $(x + 5)(x + 2)$ **28.** $(x - 7)(x + 4)$ **29.** $(m - 7)(m + 3)$ **30.** $(x + 3)(x - 5)$ **31.** $(x - 8)(x + 3)$ **32.** $(b - 10)(b + 6)$ **33.** $(x - 6)(x + 3)$ **34.** $(m + 5)(m + 2)$ **35.** $(n - 9)(n + 8)$ **36.** $(k - 5)(k - 1)$ **37.** $(x + 4)(x + 5)$ **38.** $(x - 9)(x - 1)$ **39.** $(x - 4)(x - 4)$ **40.** $(d - 3)(d - 1)$ **41.** $(b - 24)(b - 2)$ **42.** $(n - 13)(n - 2)$ **43.** $(n - 3)(n + 2)$ **44.** $(z - 7)(z - 7)$ **45.** $(x + 4)(x + 3)$ **46.** $(x - 17)(x - 1)$ **47.** $(x + 14)(x + 2)$ **48.** $(t - 9)(t + 3)$

49. $(b + 6)(b - 2)$ **50.** $(d + 2)(d + 9)$
51. $(x + 5)(x - 4)$ **52.** $(x - 7)(x - 6)$
53. $(x + 3)(x - 2)$ **54.** $(x + 7)(x - 3)$
55. $(a - 5)(a + 7)$ **56.** $(h + 9)(h - 2)$
57. $(x + 5)(x - 2)$ **58.** $(p - 14)(p + 2)$
59. $(y + 11)(y - 5)$ **60.** $(b + 4)(b - 1)$
61. $(x + 9)(x - 7)$ **62.** $(x - 4)(x + 2)$
63. $(x - 15)(x + 4)$ **64.** $(r + 7)(r - 5)$
65. $(c - 5)(c + 2)$ **66.** $(x + 5)(x + 3)$
67. $(x - 5)(x - 3)$ **68.** $(n - 20)(n - 3)$
69. $(c + 5)(c - 2)$ **70.** $(x - 7)(x - 2)$
71. $(x - 6)(x - 4)$ **72.** $(x + 9)(x - 3)$
73. $(y - 8)(y - 8)$ **74.** $(n + 5)(n + 5)$
75. $(r - 17)(r + 3)$ **76.** $(x + 8)(x - 5)$
77. $(x - 7)(x + 6)$ **78.** $(n - 9)(n + 7)$
79. $(a + 6)(a + 1)$ **80.** $(x - 8)(x - 6)$
81. $(x - 7)(x - 4)$ **82.** $(n + 18)(n - 2)$
83. $(n - 7)(n + 3)$ **84.** $(y + 17)(y - 1)$

Practice 9-6

1. $(x + 1)(2x + 1)$ **2.** $(x + 1)(2x + 3)$
3. $(n + 2)(2n - 3)$ **4.** $(x + 1)(3x - 4)$
5. $(2y + 1)(y - 5)$ **6.** $(x + 1)(5x - 7)$
7. $(n + 1)(7n + 2)$ **8.** $(c - 6)(3c + 1)$
9. $(x + 2)(3x + 2)$ **10.** $(x - 2)(6x + 5)$
11. $(x - 2)(3x - 4)$ **12.** $(y - 6)(3y + 2)$
13. $(x + 1)(5x - 3)$ **14.** $(x + 2)(3x + 1)$
15. $(x - 1)(7x - 3)$ **16.** $(x + 1)(3x + 5)$
17. $(x + 4)(2x + 1)$ **18.** $(x - 1)(5x - 2)$
19. $(x - 4)(5x - 2)$ **20.** $(x + 5)(4x - 3)$
21. $(x - 7)(5x + 2)$ **22.** $(x - 2)(3x + 4)$
23. $(y + 3)(3y - 2)$ **24.** $(x + 8)(2x - 3)$
25. $(y - 3)(4y + 1)$ **26.** $(y + 1)(2y + 7)$
27. $(y - 1)(5y + 2)$ **28.** $(y + 2)(7y + 5)$
29. $(x - 4)(7x - 2)$ **30.** $(x + 5)(3x + 2)$
31. $(2x - 1)(x + 3)$ **32.** $(2x - 3)(x - 1)$
33. $(3x + 1)(x + 3)$ **34.** $(2x - 7)(x + 3)$
35. $(5x - 1)(x - 2)$ **36.** $(2x + 5)(2x - 3)$
37. $(3x - 5)(2x - 3)$ **38.** $(2x + 5)(x - 3)$
39. $(x - 3)(3x + 2)$ **40.** $(2x + 3)(x - 4)$
41. $(2x + 1)(3x - 5)$ **42.** $(4x + 3)(x + 1)$
43. $(3y - 1)(4y - 1)$ **44.** $(2y - 1)(3y - 1)$
45. $(2x - 1)(3x - 4)$ **46.** $(3x + 1)(4x + 5)$
47. $(y + 7)(7y - 2)$ **48.** $(x - 5)(11x + 1)$
49. $(3x - 2)(5x - 3)$ **50.** $(2x - 5)(4x - 5)$
51. $(2y + 3)(7y - 3)$ **52.** $(2x + 5)(11x - 2)$
53. $(2x - 5)(7x - 3)$ **54.** $(y + 1)(8y + 9)$
55. $(x + 8)(8x + 1)$ **56.** $(4x + 5)(5x + 3)$
57. $(3y + 4)(8y + 3)$ **58.** $(3x - 4)(6x - 1)$
59. $(2x - 1)(5x + 4)$ **60.** $(2y - 5)(5y - 2)$

Practice 9-7

1. $(x - 3)(x + 3)$ **2.** $(2m - 1)(2m + 1)$ **3.** $(a + 1)^2$
4. $(2x + 3)^2$ **5.** $(x - 11)^2$ **6.** $(n - 2)(n + 2)$
7. $(3x - 2)(3x + 2)$ **8.** $(4c - 7)(4c + 7)$
9. $(3x - 5)^2$ **10.** $(2x - 5)^2$ **11.** $2(a - 3)(a + 3)$
12. $(x - 12)^2$ **13.** $3(n - 1)(n + 1)$ **14.** $(3h + 10)^2$
15. $(3d - 7)(3d + 7)$ **16.** $(9a - 20)(9a + 20)$
17. $(r - 6)(r + 6)$ **18.** $3(a - 4)(a + 4)$ **19.** $(b + 2)^2$
20. $10(x - 3)(x + 3)$ **21.** $(5x - 8)(5x + 8)$
22. $3(2w - 3)(2w + 3)$ **23.** $g(g - 5)(g + 5)$
24. $(x + 3)^2$ **25.** $(a - 5)(a + 5)$ **26.** $9(2s - 5)(2s + 5)$
27. $(2b + 11)^2$ **28.** $(x - 8)^2$ **29.** $(x - 1)^2$ **30.** $(d - 7)(d + 7)$
31. $x(x - 6)(x + 6)$ **32.** $(3y - 17)(3y + 17)$
33. $(x - 15)^2$ **34.** $(10a - 3)(10a + 3)$ **35.** $2(x + 1)^2$
36. $5n(n + 2)(n - 2)$ **37.** $(3n + 2)^2$ **38.** $(d - 13)(d + 13)$
39. $(2a - 9)(2a + 9)$ **40.** $(x - 11)(x + 11)$ **41.** $5(x + 4)^2$
42. $(4n + 7)^2$ **43.** $3(n - 5)^2$ **44.** $(a + 13)^2$
45. $(5x - 12)(5x + 12)$ **46.** $(3d - 8)(3d + 8)$
47. $(n - 14)^2$ **48.** $(7a - 1)^2$ **49.** $(y + 4)^2$
50. $(y - 20)(y + 20)$ **51.** $(x - 5)^2$ **52.** $(2x - 15)^2$
53. $3(x - 11)(x + 11)$ **54.** $(y - 9)(y + 9)$
55. $(a - 10)(a + 10)$ **56.** $(16a - 1)(16a + 1)$
57. $(n + 17)^2$ **58.** $2d(d - 5)(d + 5)$ **59.** $(y + 11)^2$
60. $(12x - 5)(12x + 5)$ **61.** $(2x - 13)(2x + 13)$
62. $(x - 6)^2$ **63.** $(8r + 5)^2$ **64.** $2m(5m - 4)(5m + 4)$
65. $(b - 15)(b + 15)$ **66.** $(x - 9)^2$ **67.** $(b - 8)(b + 8)$
68. $(4x - 9)^2$ **69.** $(b - 16)(b + 16)$ **70.** $(x + 12)^2$
71. $(15x - 4)(15x + 4)$ **72.** $2x(x + 10)^2$
73. $(2r - 5)(2r + 5)$ **74.** $(4x + 1)^2$ **75.** $(b - 7)^2$
76. $(x + 15)^2$ **77.** $(m - 14)^2$ **78.** $(3r - 16)(3r + 16)$
79. $(b + 10)^2$ **80.** $(m - 4)(m + 4)$ **81.** $4(x - 4)^2$
82. $(x - 14)(x + 14)$ **83.** $8x(x - 2)(x + 2)$ **84.** $(5x - 3)^2$
85. $8(m - 1)^2$ **86.** $(3x - 20)(3x + 20)$
87. $(m - 12)(m + 12)$

Practice 9-8

1. $(x - 2)(a + 2)$ **2.** $(3 + a)(x + y)$ **3.** $(m + k)(x - 3)$
4. $(a - b)(y + 1)$ **5.** $(x + 2y)(x + 3)$ **6.** $(y + 4)(y - 5w)$
7. $(y - 2)(x + 4)$ **8.** $(b - 3)(a + 7)$ **9.** $(a + b)(x + y)$
10. $(a + b)(x - y)$ **11.** $(x - 3y)(2x + 5)$
12. $(x - 2y)(3x + 2)$ **13.** $(2x + b)(a + 3c)$
14. $(x^2 - 2)(y - 3)$ **15.** $(2 + x^2)(3 + y)$
16. $(2x - 1)(x - 1)$ **17.** $(2x - 1)(x - 3)$
18. $(3x + 2)(2x + 1)$ **19.** $(2x + 3)(2x + 1)$
20. $(3x - 2)(2x - 1)$ **21.** $(4x - 1)(x - 2)$
22. $(2x + 1)(x - 2)$ **23.** $(4x + 1)(3x - 1)$
24. $(6x + 1)(x + 3)$ **25.** $(3y - 2)(4y + 1)$
26. $(2y + 5)(5y - 2)$ **27.** $(5y + 3)(y + 2)$
28. $(8y + 1)(2y + 1)$ **29.** $(8x - 3)(2x - 1)$
30. $(4x + 1)(4x + 3)$ **31.** $(5x + 1)(2x - 1)$
32. $(9x - 2)(x + 3)$ **33.** $(7x - 3)(2x + 3)$
34. $(x + 4)(2x^2 + 1)$ **35.** $(4x^3 + 3)(2x - 7)$
36. $(x^2 + 3)(5x - 1)$ **37.** $(x + 3)(x^2 + 4)$
38. $(2x + 1)(3x^2 + 1)$ **39.** $(x + 3)(3x^2 + 2)$
40. $(3x - 4)(3x^2 + 1)$ **41.** $(2x - 5)(5x^2 + 2)$
42. $(x - 5)(4x^2 + 3)$ **43.** $3x(6x - 7)(8x - 5)$
44. $4x(x + 7)(7x + 4)$

Reteaching 9-1

1. $6x + 2y - 4$ **2.** $a^2 + 8a + 3$ **3.** $9x^2 - 2x - 3$
4. $7x^2 + 8x - 9$ **5.** $14z^3 + 2z^2 - 3$ **6.** $7x^2 + 1$
7. $5x^2 - x + 1$ **8.** $6x^3 - x^2 - 3x + 3$ **9.** $7y^2 + 1$
10. $2x^2 - 17$ **11.** $5x^3 + 3$ **12.** $4x^3 - 2x^2 + 6x - 5$
13. $x^3 + 4x^2 + 6x - 7$ **14.** $x^2 - x + 10$

Reteaching 9-2

1. $7(3x - 2)$ **2.** $5y(y^2 - 2y + 3)$ **3.** $x(x^2 + 3x + 1)$
4. $3x^2(1 + 2x^2)$ **5.** $6x(3x^2 - x + 4)$ **6.** $z^2(z - 3)$
7. $6k(2k^2 + k - 3)$ **8.** $2x(3x^2 - 2x + 4)$
9. $4p(2p^3 + 3p + 1)$ **10.** $18x(2x - 1)$ **11.** $6x(x + 3)$
12. $2x(3x^2 - x + 4)$ **13.** $6x(x^2 + x - 1)$ **14.** $5x^2(x + 1)$
15. $3(x + 1)(x + 1)$ **16.** $5x(2x + 7)$ **17.** $8x^3(x^2 + 2x - 1)$
18. $3x(3x - 5)(x + 1)$

Reteaching 9-3

1. $x^2 + 4x - 12$ **2.** $x^2 - 12x + 32$ **3.** $x^2 + 6x - 27$
4. $x^2 - 5x - 14$ **5.** $2x^2 + 11x + 12$ **6.** $2x^2 + 13x + 20$
7. $14x^2 - 20x - 16$ **8.** $9x^2 + 12x + 4$ **9.** $5x^2 + 6x + 1$
10. $2x^2 + 3x + 1$ **11.** $8x^2 - 2x - 1$ **12.** $3x^2 + 5x - 2$

Reteaching 9-4

1. $x^2 - 14x + 49$ **2.** $x^2 + 2x + 1$ **3.** $x^2 - 8x + 16$
4. $x^2 - 2xy + y^2$ **5.** $4x^2 + 12x + 9$ **6.** $9x^2 - 30x + 25$
7. $4x^2 + 4x + 1$ **8.** $25x^2 - 40x + 16$ **9.** $x^2 - 49$
10. $x^2 - 64$ **11.** $x^2 - 9$ **12.** $x^2 - y^2$ **13.** $16x^2 - 9$
14. $4x^2 - 25$ **15.** $9x^2 - 4$ **16.** $49x^2 - 1$

Reteaching 9-5

1. $(y + 9)(y + 2)$ **2.** $(x - 3)(x - 5)$ **3.** $(x - 9)(x - 2)$
4. $(y - 1)(y - 4)$ **5.** $(x + 4)(x + 2)$
6. $(y - 6)(y - 2)$ **7.** $(r + 12)(r + 1)$
8. $(x - 3)(x - 13)$ **9.** $(x - 2)(x - 8)$
10. $(x - 2)(x + 1)$ **11.** $(x - 8)(x + 4)$
12. $(x - 9)(x + 2)$ **13.** $(x + 2)(x + 5)$
14. $(x - 3)(x - 8)$ **15.** $(x + 7)(x + 9)$

Reteaching 9-6

1. $(2x + 7)(x + 2)$ **2.** $(2x - 5)(2x - 1)$
3. $(x - 2)(6x - 1)$ **4.** $(3x - 4)(2x + 5)$
5. $(x + 2)(3x - 2)$ **6.** $(8x - 3)(x + 2)$
7. $(x - 1)(2x - 3)$ **8.** $(5x + 4)(x - 6)$
9. $(3x + 1)(2x - 3)$ **10.** $(2x + 3)(3x - 1)$
11. $(4x + 3)(2x - 1)$ **12.** $(3x - 1)(5x - 2)$

Reteaching 9-7

1. $(a + 2)(a - 1)$ **2.** $(x + 8)(x - 8)$
3. $(y + 7)(y - 7)$ **4.** $(2x + 5)(2x - 5)$
5. $(3y + 4)(3y - 4)$ **6.** $(5x + 8)(5x - 8)$
7. $3(x + 2)(x - 2)$ **8.** $2(x + 3)(x - 3)$
9. $4(x - 2)(x + 2)$ **10.** $(x + 15)(x - 15)$
11. $(x - 12)(x + 12)$ **12.** $(4x + 7)(4x - 7)$
13. $6(x - 3)(x + 3)$ **14.** $7(x - 4)(x + 4)$
15. $5(x - 5)(x + 5)$

Reteaching 9-8

1. $(x + 2)(2x^2 + 1)$ **2.** $(x + 3)(2x^2 + 3)$
3. $(x - 5)(5x^2 + 2)$ **4.** $(x + 6)(2x^2 - 5)$
5. $(7x - 4)(x^2 + 1)$ **6.** $(3x - 4)(3x^2 - 6)$
7. $(x + 1)(3x - 2)$ **8.** $(x + 1)(2x - 3)$
9. $(5x - 1)(x + 7)$

Enrichment 9-1

1. All sums = 34.
2. yes;

10	5	19	12
15	16	6	9
4	11	13	18
17	14	8	7

3. yes;

0	−5	9	2
5	6	−4	−1
−6	1	3	8
7	4	−2	−3

4.

17	24	1	8	15
23	5	7	14	16
4	6	13	20	22
10	12	19	21	3
11	18	25	2	9

5. $3x - 3$ **6.** yes
7.

$x + 10$	$x - 3$	$x - 4$	$x + 7$
$x - 1$	$x + 4$	$x + 5$	$x + 2$
$x + 3$	x	$x + 1$	$x + 6$
$x - 2$	$x + 9$	$x + 8$	$x - 5$

Enrichment 9-2

1.

6	7	2
1	5	9
8	3	4

2. all sums equal 15
3. yes;

18	21	6
3	15	27
24	9	12

4.

$6x$	$7x$	$2x$
x	$5x$	$9x$
$8x$	$3x$	$4x$

5.

$12x + 6$	$14x + 7$	$4x + 2$
$2x + 1$	$10x + 5$	$18x + 9$
$16x + 8$	$6x + 3$	$8x + 4$

6. yes **7.** yes; sum = $7\frac{1}{2}x + 3$ **8.** Check students' work.

Enrichment 9-3

1. 3819 **2.** 121,968 **3.** $x^2 + 6x + 8$

Enrichment 9-4

1. $(x + 3)(x - 3)$ **2.** $x^2 - 9$; $x^2 + 8x + 15$
3. $(x^2 - 9) + (x^2 + 8x + 15) = 2x^2 + 8x + 6$
4. $(3x^2 + 12x + 9) - (2x^2 + 8x + 6) = x^2 + 4x + 3$ or $(x + 3)(x + 1)$ **5.** $(x + 3)(x - 1)$ **6.** $(x + 3)(x + 3)$
7. Add the polynomials in each row, column, and diagonal to see that they add to the magic sum.
8. $8x^2 - 2$

$2x^2 - 3x + 1$	$2x^2 - 13x + 6$	$2x^2 + 15x - 8$	$2x^2 + x - 1$
$2x^2 + 7x - 4$	$2x^2 + 9x - 5$	$2x^2 - 11x + 5$	$2x^2 - 5x + 2$
$2x^2 - 15x + 13$	$2x^2 - x - 6$	$2x^2 + 3x - 2$	$2x^2 + 13x - 7$
$2x^2 + 11x - 12$	$2x^2 + 5x + 3$	$2x^2 - 7x + 3$	$2x^2 - 9x + 4$

Enrichment 9-5

1. 2, 3, 5, 7, 11 **2.** 2310 **3.** 2311 **4.** yes
5. 30,031 **6.** 510,511 **7.** 223,092,871

Enrichment 9-6

1. $1 + 2 + 4 + 7 + 14 = 28$ **2.** $1 + 2 + 5 = 8$; deficient
3. $1 + 2 + 3 + 6 + 9 = 21$; abundant
4. $1 + 3 + 9 = 13$; deficient **5.** $1 + 2 + 4 + 8 = 15$; deficient
6. Prime numbers are deficient because the only proper factor of a prime number is 1.
7. 220: $1 + 2 + 4 + 5 + 10 + 11 + 20 + 22 + 44 + 55 + 110 = 284$
284: $1 + 2 + 4 + 71 + 142 = 220$; the sum of the proper factors for both numbers equals the other number.

Enrichment 9-7

1. 9 blocks; $5^2 - 4^2 = 9$ **2.** 8 blocks; $3^2 - 1^2 = 8$
3. 32 blocks; $6^2 - 2^2 = 32$ **4.** 12 blocks; $4^2 - 2^2 = 12$

Enrichment 9-8

1. $(x - y)(x^2 + xy + y^2)$ **2.** $(c + d)(c^2 - cd + d^2)$
3. $(ab^2 - x)(a^2b^4 + ab^2x + x^2)$
4. $(4a + b^2)(16a^2 - 4ab^2 + b^4)$
5. $x^3 - y^3$ **6.** $a^3 + 27b^3$ **7.** $8x^3 + y^3$ **8.** $125 - 8x^3$
9. $(3^3 + 4^3) = (3 + 4)(9 - 12 + 16) = 91$;
$27 + 64 = 91$
10. $(5^3 - 2^3) = (5 - 2)(25 + 10 + 4) = 117$;
$125 - 8 = 117$
11. $(1^3 + 6^3) = (1 + 6)(1 - 6 + 36) = 217$;
$1 + 36 = 217$
12. $(10^3 - 5^3) = (10 - 5)(100 + 50 + 25) = 875$;
$1000 - 125 = 875$
13. $(5^3 + 6^3) = (5 + 6)(25 - 30 + 36) = 341$;
$125 + 216 = 341$
14. $(7^3 - 3^3) = (7 - 3)(49 + 21 + 9) = 316$;
$343 - 27 = 316$
15. $(4^3 + 8^3) = (4 + 8)(16 - 32 + 64) = 576$;
$64 + 512 = 576$
16. $(9^3 - 4^3) = (9 - 4)(81 + 36 + 16) = 665$;
$729 - 64 = 665$

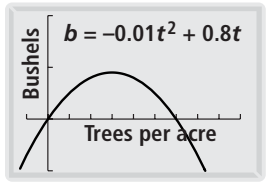
Chapter Project

Activity 1: Researching
Check students' work.

Activity 2: Calculating
about 668.5 board feet; about 19.2 ft

Activity 3: Calculating
about 30.7 in.

Activity 4: Graphing



; 40 trees per acre; 200 walnut trees, planting 40 trees per acre gives the greatest yield.

✓ Checkpoint Quiz 1

1. $10x^2 + 9x + 4$ **2.** $7y^2 - 9y + 8$ **3.** $14x^2 - 10x$
4. $-17x^3 + 21x^2$ **5.** $x^2 + 3x - 28$ **6.** $16x^4 + 2x^3 - 24x^2 - 3x$
7. $3w^4 + 5w^3 - 3w^2 + 15w - 18$ **8.** $6x^2 - 11x - 35$
9. $2(7y^2 - 4)$ **10.** $6t(t^3 + 3t - 4)$ **11.** $8x^2(4x^5 + 3x^3 + 2)$

✓ Checkpoint Quiz 2

1. $w^2 - 10w + 25$ **2.** $9x^2 + 48x + 64$ **3.** $x^2 - 169$
4. $(x + 12)^2$ **5.** $(x - 12)(x + 4)$ **6.** $(x - 7)(x - 9)$
7. $(2x + 13)(x + 1)$ **8.** $(5x + 3)(2x + 1)$ **9.** $4(x - 3)(x + 5)$
10. $3x^2 + 20x - 7$

Chapter Test, Form A

1. $2x^3 - x^2 + 4x$; cubic trinomial
2. $-3y^2 - 3y + 6$; quadratic trinomial
3. $-3w^3 - 8w^2 - 18w + 1$; cubic polynomial
4. $-x^5 - x^3$; fifth degree polynomial **5.** $2x^2 - x + 2$
6. $5x^2 + 9x + 2$ **7.** $7x^2 + 2x - 17$ **8.** $-3x^3 - 12x^2 + 15x$
9. Answers may vary. Sample: $8x^5 + 2x^4 - 7x$
10. $-8x^3 + 24x^2 + 32x$ **11.** $-8y^3 - y^2$ **12.** $42x^4 - 7x^2 + 21x$
13. $5y^6 + 40y^4$ **14.** $6x^3 + 12x^2 + 6x$ **15.** $y^2 + 7y + 12$
16. $a^2 + 2a - 3$ **17.** $2y^2 - 16y + 32$ **18.** $15x^2 - 7x - 36$
19. $x^3 + 5x^2 - 2x - 4$ **20.** $-2x^3 + 12x^2 - 13x - 15$
21. $24x^2 - 5x - 14$ **22.** $3x$ **23.** $2x$ **24.** $6y^2$ **25.** $2y$
26. Answers may vary. Sample: $(2x + 2) = 2(x + 1)$ when factored. If we used the distributive property over addition on $2(x + 1)$, we would get $2x + 2$.
27. $w(4w + 15)$; $4w^2 + 15w$
28. $h(4h - 20)(2h + 10)$; $8h^3 - 200h$
29. $(2 - \pi)r^2 + 12r$ **30.** $9x^2 + 4x$ **31.** $(x - 5)(x - 1)$
32. $(y + 9)^2$ **33.** $4(2x + 3)^2$ **34.** $(y + 12)(y - 12)$
35. $(y - 5)^2$ **36.** $(3x + 8)(3x - 8)$ **37.** $(8x + 2)(8x + 3)$
38. $14(x + 2)(x - 2)$ **39.** 16 **40.** 4 **41.** 36 **42.** 120
43. $3x^4$; 4 **44.** $4x^3$; -1 **45.** $(3y^2 + 1)(5y + 4)$
46. $2(x - 2)(3x + 5)$ **47.** $(x^3 + 6)(x - 6)$
48. $(6x^2 - 4)(2x - 3)$ **49.** $(8y^2 - 2)(3y + 7)$

50. $(y^2 - 2)(-4y + 3)$ **51.** Answers may vary. Sample: The common error is that the person just raised each term to the second power, not the entire quantity. It should be the binomial squared. $(x + y)(x + y) = x^2 + 2xy + y^2$

Chapter Test, Form B

1. $-x^4 - x + 7$; fourth degree trinomial
2. $6x^3 + 3x^2 - 15$; cubic trinomial
3. $15x^5 - 60x^4 - 45x^3$; fifth degree trinomial
4. $8x^6 + 40x^5 - 24x^4 + 32x$; sixth degree polynomial
5. $2x^2 - 2x - 1$ **6.** $-x^2 + 3x + 3$ **7.** $12x^2 + 4x - 3$
8. $-5x^3 - 2x^2 - 6$ **9.** Answers may vary. Sample: $6x^4 + 3x^3 + 7$ **10.** $-3x^3 + 6x^2 + 24x$
11. $-6y^3 - y^2$ **12.** $54y^4 - 12y^2 + 48y$ **13.** $35y^6 + 63y^4$
14. $8x^3 + 12x^2 + 28x$ **15.** $y^2 + 11y + 30$
16. $a^2 + 3a - 10$ **17.** $4y^2 - y - 14$ **18.** $3x^2 - 29x + 40$
19. $3x^3 + 8x^2 + 4x + 21$ **20.** $-x^3 + 9x^2 - 26x + 24$
21. $36x^2 + 7x - 15$ **22.** x^2 **23.** $4x^3$ **24.** $3y$ **25.** $5y$
26. Answers may vary. Sample: List the prime factors of each term. Identify the factors common to all terms. Find the product of these common factors; Check students' work.
27. $w(2w - 8)$; $2w^2 - 8w$
28. $h(3h + 1)(2h - 3)$; $6h^3 - 7h^2 - 3h$
29. $4r^2 + 6r$ **30.** $3x^2 + 12x + 9$ **31.** $(y + 8)(y - 1)$
32. $(3y + 2)^2$ **33.** $(3x + 2)(x + 1)$ **34.** $(5y + 8)(5y - 8)$
35. $(y - 4)^2$ **36.** $(x + 17)(x - 17)$ **37.** $4(2x + 5)^2$
38. $15(x + 2)(x - 2)$ **39.** 10 **40.** 49 **41.** 16 **42.** 16
43. $7x^3$; -21 **44.** $8x^2$; -2 **45.** $(6y^3 - 7)(y + 3)$
46. $(8x^3 - 3)(x - 1)$ **47.** $(7x^2 + 4)(2x - 1)$
48. $(x^2 + 9)(x + 3)$ **49.** $(-2x^2 - 1)(x - 2)$
50. $(4x^2 + 1)(3x - 2)$
51. Answers may vary. Sample: $(4x^2 - 25)$

Alternate Assessment, Form C

TASK 1 Scoring Guide:

3 Student writes a detailed guide for describing polynomials that covers all essential information. Student writes comprehensive advice covering all facets of adding and subtracting polynomials.

2 Student provides most of the necessary information on how to describe a polynomial. Student writes good advice about adding and subtracting polynomials.

1 Some information on how to describe a polynomial is provided. Student writes adequate advice.

0 Student makes no attempt, or no solution is present.

TASK 2 Scoring Guide:

3 Explanation is well thought out, concise, and clearly establishes the student's understanding that factoring reverses the multiplication process. Sample problems are consistent with the question and are solved correctly.

2 Explanation shows a good understanding of the mathematical concepts involved. Sample problems are correct except for minor errors.

1 Explanation is adequate but could be more thorough. Sample problems are not of the correct type or are solved incorrectly.

0 Student makes no attempt, or no solution is present.

TASK 3 Scoring Guide:

a. $4(a + 5)(a - 5)$ **b.** $(9m^2 + 4n)^2$
c. $(a^5b^2 - 4)(a^5b^2 + 4)$ **d.** $(2d + 9)^2$

3 All errors are identified, and each correct step and solution is written. Suggestions are thorough and provide insight that would be helpful in solving similar problems.

2 Most errors are identified and corrected. Suggestions are helpful.

1 Some errors are identified and corrected. Suggestions are adequate.

0 Student makes no attempt, or no solution is present.

TASK 4 Scoring Guide:

$(10a + b)(2y - x)$

3 Student writes exemplary explanations, and computations are correct.

2 Student's explanation is lacking in clarity. Computations are correct.

1 Written explanations are satisfactory. Computation contains errors.

0 Student makes no attempt, or no solution is present.

Cumulative Review

1. C **2.** B **3.** A **4.** D **5.** B **6.** C **7.** A **8.** A
9. B **10.** A **11.** D **12.** 1.08 **13.** 41 **14.** $\frac{1}{2}$
15. 17.5 **16.** 0.5 **17.** 12 **18.** 82 **19.** 4.36; 4; 5
20. $x - y = -2$ **21.** -9 and -4 **22.** 10 in. by 16 in.
23. Answers will vary. Sample: $(m - 4)(m + 4)$; $m^2 - 16$
24.