

81.  $2x(3x + 5)$  83.  $x^2(32x - 9)$  83.  $5(x + 3)(x - 2)^2(x + 1)$  84.  $6(x + 5)^3(x - 1)(x + 1)$  85.  $3(4x - 3)(4x - 1)$   
 86.  $3x^2(3x + 4)(5x + 4)$  87.  $6(3x - 5)(2x + 1)^2(5x - 4)$  88.  $2(4x + 5)^2(5x + 1)(50x + 31)$  89.  $\frac{19}{(3x - 5)^2}$  90.  $\frac{13}{(5x - 2)^2}$   
 91.  $\frac{x^2 - 1}{(x^2 + 1)^2}$  92.  $\frac{x^2 + 4}{(x^2 - 4)^2}$  93.  $\frac{x(3x + 2)}{(3x + 1)^2}$  94.  $\frac{x^2(4x - 15)}{(2x - 5)^2}$  95.  $-\frac{3x^2 + 8x - 3}{(x^2 + 1)^2}$  96.  $-\frac{2(x^2 - 5x - 9)}{(x^2 + 9)^2}$

#### A.4 Assess Your Understanding (page 982)

1. quotient; divisor; remainder 2.  $-3$ ;  $2$ ;  $-5$ ;  $1$  3. T 4. T 5.  $4x^2 - 11x + 23$ ; remainder  $-45$  6.  $3x^2 - 7x + 15$ ; remainder  $-32$   
 7.  $4x - 3$ ; remainder  $x + 1$  8.  $3x - 1$ ; remainder  $x - 2$  9.  $5x^2 - 13$ ; remainder  $x + 27$  10.  $5x^2 - 11$ ; remainder  $x + 20$   
 11.  $2x^2$ ; remainder  $-x^2 + x + 1$  12.  $x^2$ ; remainder  $x - 2$  13.  $x^2 - 2x + \frac{1}{2}$ ; remainder  $\frac{5}{2}x + \frac{1}{2}$  14.  $x^2 - \frac{2}{3}x - \frac{1}{9}$ ; remainder  $\frac{16}{9}x - \frac{17}{9}$   
 15.  $-4x^2 - 3x - 3$ ; remainder  $-7$  16.  $-3x^3 - 3x^2 - 3x - 5$ ; remainder  $-6$  17.  $x^2 - x - 1$ ; remainder  $2x + 2$   
 18.  $x^2 + x - 1$ ; remainder  $-2x + 2$  19.  $x^2 + ax + a^2$ ; remainder  $0$  20.  $x^4 + ax^3 + a^2x^2 + a^3x + a^4$ ; remainder  $0$   
 21.  $x^2 + x + 4$ ; remainder  $12$  22.  $x^2 + x - 4$ ; remainder  $5$  23.  $3x^2 + 11x + 32$ ; remainder  $99$  24.  $-4x^2 + 10x - 21$ ; remainder  $43$   
 25.  $x^4 - 3x^3 + 5x^2 - 15x + 46$ ; remainder  $-138$  26.  $x^3 + 2x^2 + 5x + 10$ ; remainder  $22$  27.  $4x^5 + 4x^4 + x^3 + x^2 + 2x + 2$ ; remainder  $7$   
 28.  $x^4 - x^3 + 6x^2 - 6x + 6$ ; remainder  $-16$  29.  $0.1x^2 - 0.11x + 0.321$ ; remainder  $-0.3531$  30.  $0.1x - 0.21$ ; remainder  $0.241$   
 31.  $x^4 + x^3 + x^2 + x + 1$ ; remainder  $0$  32.  $x^4 - x^3 + x^2 - x + 1$ ; remainder  $0$  33. No 34. No 35. Yes 36. Yes 37. Yes 38. Yes  
 39. No 40. Yes 41. Yes 42. No 43.  $a = 1, b = -4, c = 11, d = -17; a + b + c + d = -9$

#### A.5 Assess Your Understanding (page 997)

5. equivalent equations 6. identity 7. F 8. T 9. add;  $\frac{25}{4}$  10. discriminant; negative 11. F 12. F  
 13.  $\{7\}$  14.  $\{-8\}$  15.  $\{-3\}$  16.  $\{-6\}$  17.  $\{4\}$  18.  $\{-4\}$  19.  $\left\{\frac{5}{4}\right\}$  20.  $\left\{\frac{27}{4}\right\}$  21.  $\{-1\}$  22.  $\{1\}$  23.  $\{-18\}$  24.  $\left\{\frac{7}{5}\right\}$  25.  $\{-3\}$   
 26.  $\{-2\}$  27.  $\{-16\}$  28.  $\{-8\}$  29.  $\{0.5\}$  30.  $\{-10\}$  31.  $\{2\}$  32.  $\left\{\frac{3}{10}\right\}$  33.  $\{2\}$  34.  $\{3\}$  35.  $\{3\}$  36.  $\{2\}$  37.  $\{0, 9\}$  38.  $\{0, 1\}$   
 39.  $\{0, 9\}$  40.  $\{0, 2\}$  41.  $\{21\}$  42.  $\{-10\}$  43.  $\{-2, 2\}$  44.  $\{2, 5\}$  45.  $\{6\}$  46.  $\left\{-\frac{1}{3}\right\}$  47.  $\{-3, 3\}$  48.  $\{-4, 4\}$  49.  $\{-4, 1\}$   
 50.  $\left\{-\frac{1}{3}, 1\right\}$  51.  $\left\{-1, \frac{3}{2}\right\}$  52.  $\{-1, 2\}$  53.  $\{-4, 4\}$  54.  $\{-1, 1\}$  55.  $\{2\}$  56.  $\{3\}$  57. No real solution 58. No real solution  
 59.  $\{-2, 2\}$  60.  $\{-3, 3\}$  61.  $\{-1, 3\}$  62.  $\{-4, 3\}$  63.  $\{-2, -1, 0, 1\}$  64.  $\{-4, -3, 0, 1\}$  65.  $\{0, 4\}$  66.  $\{-8, 0\}$  67.  $\{-6, 2\}$  68.  $\{-3, -4\}$   
 69.  $\left\{-\frac{1}{2}, 3\right\}$  70.  $\left\{-1, -\frac{2}{3}\right\}$  71.  $\{3, 4\}$  72.  $\{-4, 3\}$  73.  $\left\{\frac{3}{2}\right\}$  74.  $\left\{\frac{4}{5}\right\}$  75.  $\left\{-\frac{2}{3}, \frac{3}{2}\right\}$  76.  $\{3, 4\}$  77.  $\left\{-\frac{3}{4}, 2\right\}$  78.  $\left\{-\frac{5}{2}, 1\right\}$   
 79.  $\{-6\}$  80.  $\{-7\}$  81.  $\{-2, -1, 1, 2\}$  82.  $\{-\sqrt{5}, \sqrt{5}\}$  83.  $\{-6, -5\}$  84.  $\left\{-\frac{7}{2}, -1\right\}$  85.  $\left\{-\frac{3}{2}, 2\right\}$  86.  $\left\{\frac{5}{3}, 2\right\}$  87.  $\{-5, 0, 4\}$   
 88.  $\{-7, 0, 1\}$  89.  $\{-1, 1\}$  90.  $\{-4, -1, 1\}$  91.  $\left\{-2, \frac{1}{2}, 2\right\}$  92.  $\left\{-3, -\frac{4}{3}, 3\right\}$  93.  $\{-5, 5\}$  94.  $\{-6, 6\}$  95.  $\{-1, 3\}$  96.  $\{-3, -1\}$   
 97.  $\{-3, 0\}$  98.  $\left\{0, \frac{4}{3}\right\}$  99.  $16$  100.  $4$  101.  $\frac{1}{16}$  102.  $\frac{1}{36}$  103.  $\frac{1}{9}$  104.  $\frac{1}{25}$  105.  $\{-7, 3\}$  106.  $\{3 - \sqrt{22}, 3 + \sqrt{22}\}$  107.  $\left\{-\frac{1}{4}, \frac{3}{4}\right\}$   
 108.  $\left\{-1, \frac{1}{3}\right\}$  109.  $\left\{\frac{-1 - \sqrt{7}}{6}, \frac{-1 + \sqrt{7}}{6}\right\}$  110.  $\left\{\frac{3 - \sqrt{17}}{4}, \frac{3 + \sqrt{17}}{4}\right\}$  111.  $\{2 - \sqrt{2}, 2 + \sqrt{2}\}$  112.  $\{-2 - \sqrt{2}, -2 + \sqrt{2}\}$   
 113.  $\left\{\frac{5 - \sqrt{29}}{2}, \frac{5 + \sqrt{29}}{2}\right\}$  114.  $\left\{\frac{-5 - \sqrt{13}}{2}, \frac{-5 + \sqrt{13}}{2}\right\}$  115.  $\left\{1, \frac{3}{2}\right\}$  116.  $\left\{-\frac{3}{2}, -1\right\}$  117. No real solution 118. No real solution  
 119.  $\left\{\frac{-1 - \sqrt{5}}{4}, \frac{-1 + \sqrt{5}}{4}\right\}$  120.  $\left\{\frac{-1 - \sqrt{3}}{2}, \frac{-1 + \sqrt{3}}{2}\right\}$  121.  $\left\{\frac{-\sqrt{3} - \sqrt{15}}{2}, \frac{-\sqrt{3} + \sqrt{15}}{2}\right\}$  122.  $\left\{\frac{-\sqrt{2} - \sqrt{10}}{2}, \frac{-\sqrt{2} + \sqrt{10}}{2}\right\}$   
 123. No real solution 124. No real solution 125. Repeated real solution 126. Repeated real solution 127. Two unequal real solutions  
 128. Two unequal real solutions 129.  $R = \frac{R_1 R_2}{R_1 + R_2}$  130.  $r = \frac{A - P}{Pt}$  131.  $R = \frac{mv^2}{F}$  132.  $T = \frac{PV}{nR}$  133.  $r = \frac{S - a}{S}$   
 134.  $t = \frac{v_0 - v}{g}$  135.  $\frac{-b + \sqrt{b^2 - 4ac}}{2a} + \frac{-b - \sqrt{b^2 - 4ac}}{2a} = \frac{-2b}{2a} = \frac{-b}{a}$   
 136.  $\frac{-b + \sqrt{b^2 - 4ac}}{2a} \cdot \frac{-b - \sqrt{b^2 - 4ac}}{2a} = \frac{b^2 - (b^2 - 4ac)}{4a^2} = \frac{b^2 - b^2 + 4ac}{4a^2} = \frac{4ac}{4a^2} = \frac{c}{a}$   
 137.  $k = -\frac{1}{2}$  or  $\frac{1}{2}$  138.  $k = -4$  or  $4$  139. The solutions of  $ax^2 - bx + c = 0$  are  $\frac{b + \sqrt{b^2 - 4ac}}{2a}$  and  $\frac{b - \sqrt{b^2 - 4ac}}{2a}$ .