

## Chapter 10 answers

### 10.1

1.  $\{-3, 4\}$       3.  $\{14, 3\}$       5.  $\{1/3, -7/2\}$       7.  $\{0, 7\}$       9.  $\{11/3, -11/3\}$       11.  $\{4, -3/7\}$   
 13.  $\{-8, 8\}$       15.  $\{0, 2/5, 1/3\}$       17.  $\{6, -1\}$       19.  $\{15, -1\}$       21.  $\{1, -3\}$   
 23.  $\{12, -13\}$       25.  $\{6, 1\}$       27.  $\{9, -17\}$       29.  $\{1/2, -5/6\}$       31.  $x^2 - 3x + 2 = 0$   
 33.  $x^2 - x - 2 = 0$       35.  $x^2 - 16 = 0$       37.  $x^2 + 7x + 12 = 0$       39.  $8x^2 + 6x + 1 = 0$   
 41.  $20x^2 + 11x - 4 = 0$       43.  $8x^2 + 9x + 1 = 0$       45.  $15x^2 + 11x + 2 = 0$   
 47.  $x^2 - 2 = 0$       49.  $x^2 - 4x + 1 = 0$       51.  $\{\pm 2\}$       53.  $\{4, -2\}$       55.  $\{-3 \pm \sqrt{7}\}$   
 57.  $\{3 \pm 2\sqrt{3}\}$       59.  $\{2 \pm 3i\}$       61.  $\{-9, -5\}$       63.  $\{0, -2\}$       65.  $\{3, 1\}$       67.  $\{3\}$   
 69.  $\{-6 \pm 2i\}$       71.  $\{0, 1\}$       73.  $\{0, 2/3\}$       75.  $\{3 \pm 2\sqrt{3}\}$       77.  $\{7, 1\}$       79.  $\{1/3 \pm \frac{\sqrt{2}}{3}i\}$

### 10.2

1.  $x^2 - 4x + 4, (x-2)^2$       3.  $y^2 + 8y + 16, (y+4)^2$       5.  $x^2 + 3x + \frac{9}{4}, (x + \frac{3}{2})^2$   
 7.  $t^2 - \frac{1}{2}t + \frac{1}{16}, (t - \frac{1}{4})^2$       9.  $x^2 + \frac{2}{5}x + \frac{1}{25}, (x + \frac{1}{5})^2$       11.  $\{5, -1\}$   
 13.  $\{-4 \pm \sqrt{17}\}$       15.  $\{-\frac{3}{2} \pm \frac{\sqrt{5}}{2}\}$       17.  $\{\frac{1}{4} \pm \frac{\sqrt{31}}{4}i\}$       19.  $\{-\frac{1}{5}\}$   
 21.  $\{1 \pm \frac{\sqrt{2}}{2}\}$       23.  $\{-3 \pm \frac{\sqrt{87}}{3}\}$       25.  $\{0, 2\}$       27.  $\{2 \pm i\}$       29.  $\{-\frac{1}{2} \pm \frac{\sqrt{7}}{2}i\}$   
 31.  $\{-\frac{3}{8} \pm \frac{\sqrt{129}}{24}\}$       33.  $\{-\frac{3}{2} \pm \frac{\sqrt{41}}{2}\}$       35.  $\{-2 \pm 2\sqrt{3}\}$       37.  $\{\frac{15}{4} \pm \frac{\sqrt{505}}{4}\}$   
 39.  $\{\frac{3}{4} \pm \frac{\sqrt{23}}{4}i\}$       41.  $\{-4, \frac{7}{2}\}$       43.  $\{1 \pm \sqrt{2}\}$       45.  $\{-1, -\frac{1}{2}\}$       47.  $\{\frac{5}{8} \pm \frac{\sqrt{185}}{8}\}$   
 49.  $\{\frac{21}{5}, \frac{9}{5}\}$       51.  $\{2 \pm \frac{3\sqrt{2}}{2}\}$       53.  $\{-5, 10\}$       55.  $\{\frac{5}{6} \pm \frac{\sqrt{91}}{6}\}$       57.  $\{3, 0\}$

### 10.3

1. 2 real solutions      3. 2 complex solutions      5. 2 real solutions      7. 1 real solution  
 9. 2 complex solutions      11.  $\{3 \pm \sqrt{11}\}$       13.  $\{-2 \pm 2\sqrt{3}\}$       15.  $\{\frac{5}{4} \pm \frac{\sqrt{41}}{4}\}$       17.  $\{-\frac{5}{4} \pm \frac{\sqrt{41}}{4}\}$   
 19.  $\{\frac{2}{3}, \frac{3}{2}\}$       21.  $\{\frac{3}{10} \pm \frac{\sqrt{31}}{10}i\}$       23.  $\{1 \pm \frac{\sqrt{15}}{3}\}$       25.  $\{1 \pm 2i\sqrt{3}\}$       27.  $\{1 \pm \sqrt{5}\}$   
 29.  $\{\frac{1}{2} \pm \frac{\sqrt{5}}{2}\}$       31.  $\{4, 2\}$       33.  $\{1, \frac{1}{2}\}$       35.  $\{\frac{3}{20} \pm \frac{\sqrt{71}}{20}i\}$       37.  $\{\frac{50}{21} \pm \frac{\sqrt{2038}}{21}\}$   
 39.  $\{\frac{3}{8} \pm \frac{\sqrt{105}}{8}\}$       41.  $\{9 \pm 3\sqrt{10}\}$       43.  $\{\frac{10}{3} \pm \frac{\sqrt{97}}{3}\}$       45.  $\{-4, \frac{7}{2}\}$       47.  $\{-2, -\frac{3}{2}\}$   
 49.  $\{3 \pm 5\sqrt{10}\}$       51.  $\{-1 \pm \frac{3\sqrt{3}}{2}\}$       53.  $\{18, -\frac{3}{2}\}$       55.  $s = \pm \sqrt{\frac{A}{6}}$   
 57.  $c = \pm \sqrt{d^2 - a^2 - b^2}$       59.  $k = \frac{3 \pm \sqrt{8N+9}}{2}$       61.  $n = \frac{1 \pm \sqrt{8N+1}}{2}$   
 63.  $T = \frac{1 \pm \sqrt{24A+1}}{6}$       65.  $x = h \pm \sqrt{r^2 - (y-k)^2}$       67.  $x = h \pm \sqrt{\frac{y-k}{a}}$

### 10.4

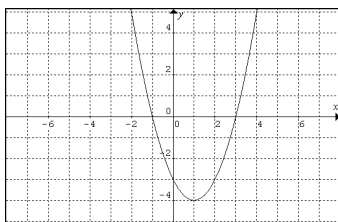
1.  $\{\pm 3, \pm 4\}$       3. No solution      5.  $\{343, 1\}$       7.  $\{1/3\}$       9.  $\{1/4\}$       11.  $\{\pm \frac{1}{2}, \pm 1\}$   
 13.  $\{\frac{2401}{16}, \frac{1}{81}\}$       15.  $\{1\}$       17.  $\{3^{2/3}\}$       19.  $\{1\}$       21.  $\{\pm i\sqrt{3}, \pm i\}$   
 23.  $\{8 + 2\sqrt{7}\}$       25.  $\{\frac{3 \pm \sqrt{5}}{4}\}$       27.  $\{\pm \sqrt{\frac{7 \pm \sqrt{29}}{10}}\}$       29.  $\{(\frac{1 \pm \sqrt{22}}{3})^3\}$       31.  $\{\pm \sqrt{3}, \pm i\sqrt{2}\}$

33.  $\{-3/4, 2\}$     35.  $\{4\}$     37.  $\{-5/2\}$     39.  $\{1 \pm i\sqrt{3}, \frac{1}{2} \pm \frac{\sqrt{3}}{2}i, 1, -2\}$     41.  $\{4\}$   
 43.  $\{-3, -5\}$     45.  $\{6\}$     47.  $\{4\}$     49.  $\{-1\}$     51. No solution    53.  $\{2, 6\}$   
 55.  $\left\{\frac{1 \pm \sqrt{61}}{2}\right\}$     57.  $\{22 - 4\sqrt{29}\}$     59.  $\{0\}$     61.  $\{-2, -3\}$     63.  $\{4, -3/2\}$     65.  $\{6, -1\}$   
 67.  $\{-2\}$     69.  $\{4\}$     71.  $\{-2\}$     73.  $\{\pm i\}$     75.  $\{0\}$     77.  $\{\pm i\sqrt{3}\}$   
 79.  $\left\{-\frac{1}{10} \pm \frac{\sqrt{29}}{10}i\right\}$

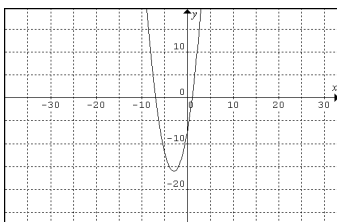
### 10.5

1. vertex: (1, -1), axis of sym:  $x = 1$ , min value of -1, x-int: 0, 2, y-int: 0  
 3. vertex: (-2, 0), axis of sym:  $x = -2$ , max value of 0, x-int: -2, y-int: -4  
 5. vertex: (2, 1), axis of sym:  $x = 2$ , min value of 1, x-int: none, y-int: 13  
 7. vertex: (0, 4), axis of sym:  $x = 0$ , min value of 4, x-int: none, y-int: 4  
 9. vertex: (-4, 2), axis of sym:  $x = -4$ , min value of 2, x-int: none, y-int: 18  
 11. vertex: (-1/2, 1), axis of sym:  $x = -1/2$ , max value of 1, x-int: 1/2, -3/2, y-int: 3/4  
 13. vertex: (3/2, 18), axis of sym:  $x = 3/2$ , max value of 18, x-int: 9/2, -3/2, y-int: 27/2  
 15. vertex: (3, 6), axis of sym:  $x = 3$ , max value of 6, x-int:  $3 \pm 2\sqrt{3}$ , y-int: 3/2  
 17. vertex: (-3, -3/2), axis of sym:  $x = -3$ , min value of -3/2, x-int:  $-3 \pm \frac{\sqrt{3}}{2}$ , y-int: 33/2  
 19. vertex: (2/3, 1/27), axis of sym:  $x = 2/3$ , max value of 1/27, x-int: 1, 1/3, y-int: -1/9

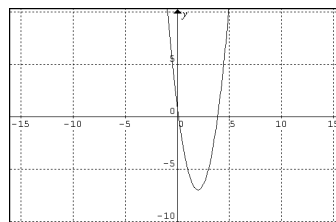
21. vert: (1, -4), min of -4  
 x-int: 3, -1, y-int: -3



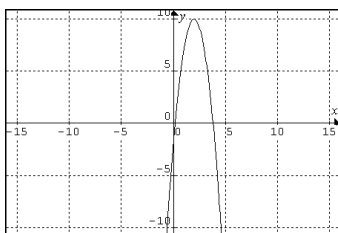
23. vert: (-3, -16), min of -16  
 x-int: 1, -7, y-int: -7



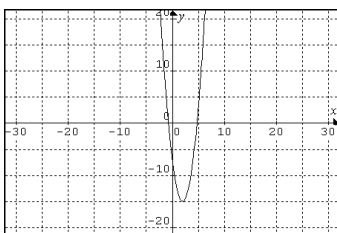
25. vert: (2, -7), min of -7  
 x-int:  $\frac{4 \pm \sqrt{14}}{2}$ , y-int: 1



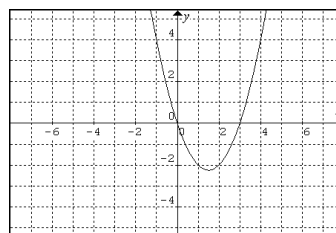
27. vert: (2, 10), max of 10  
 x-int:  $\frac{6 \pm \sqrt{30}}{3}$ , y-int: -2



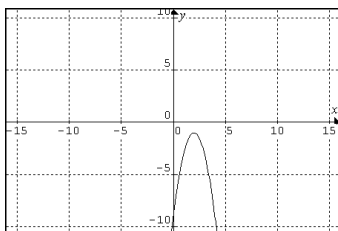
29. vert: (2, -15), min of -15  
 x-int:  $\frac{4 \pm \sqrt{30}}{2}$ , y-int: -7



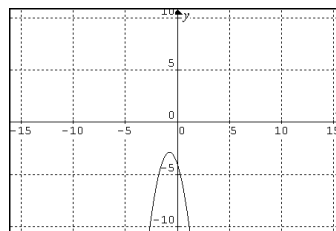
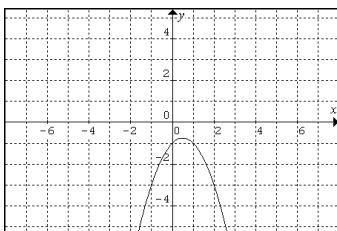
31. vert: (3/2, -9/4), min of -9/4  
 x-int: 0, 3, y-int: 0



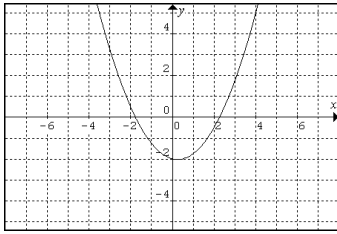
33. vert: (2, -1), max of -1  
 x-int: none, y-int: -9



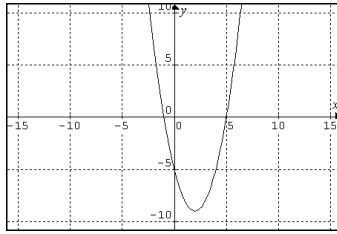
35. vert: (1/2, -3/4), max of -3/4    37. vert: (-3/4, -23/8)  
 max of -23/8  
 x-int: none, y-int: -1    x-int: none, y-int: -4



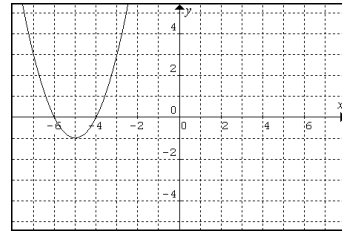
39. vert:  $(\frac{1}{4}, -\frac{65}{32})$ , min of  $-\frac{65}{32}$   
 x-int:  $\frac{1 \pm \sqrt{65}}{4}$ , y-int: -2



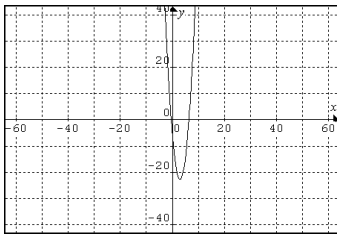
41. vert: (2, -9), min of -9  
 x-int: 5, -1, y-int: -5



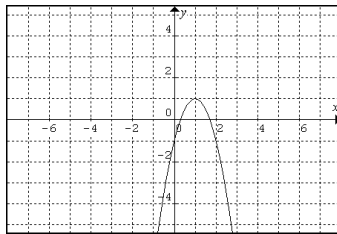
43. vert: (-5, -1), min of -1  
 x-int: -6, -4, y-int: 24



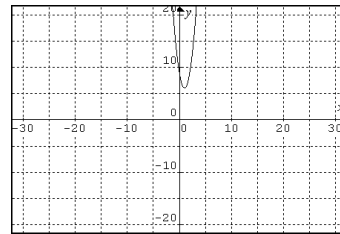
45. vert: (3, -23), min of -23  
 x-int:  $\frac{6 \pm \sqrt{46}}{2}$ , y-int: -5



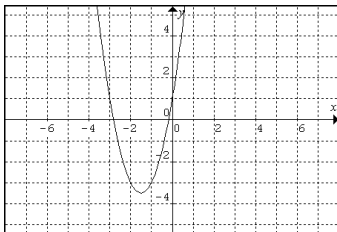
47. vert: (1, 1), max of 1  
 x-int:  $\frac{2 \pm \sqrt{2}}{2}$ , y-int: -1



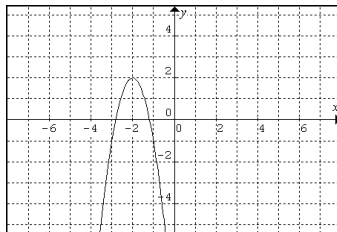
49. vert: (1, 6), min of 6  
 x-int: none, y-int: 9



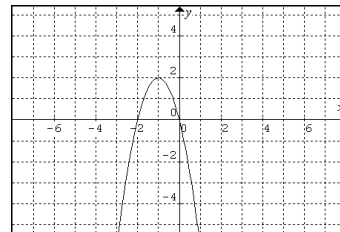
51. vert:  $(-\frac{3}{2}, -\frac{7}{2})$ , min of  $-\frac{7}{2}$   
 x-int:  $\frac{-3 \pm \sqrt{7}}{2}$ , y-int: 1



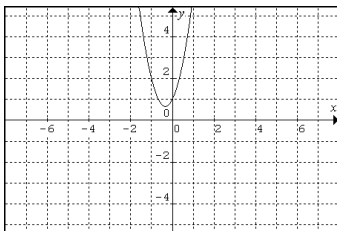
53. vert: (-2, 24), max of 24  
 x-int:  $\frac{-6 \pm \sqrt{6}}{3}$ , y-int: -10



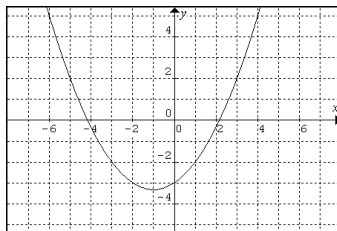
55. vert: (-1, 2), max of 2  
 x-int: 0, -2, y-int: 0



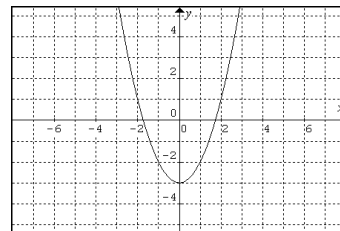
57. vert:  $(-\frac{1}{3}, \frac{2}{3})$ , min of  $\frac{2}{3}$   
 x-int: none, y-int: 1



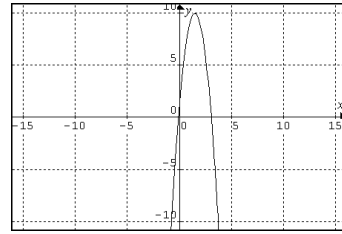
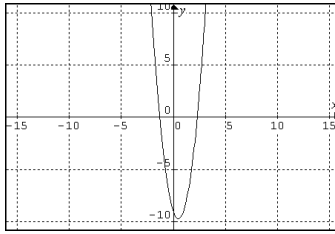
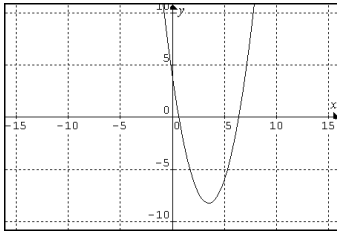
59. vert:  $(-1, -\frac{10}{3})$ , min of  $-\frac{10}{3}$   
 x-int:  $-1 \pm \sqrt{10}$ , y-int: -3



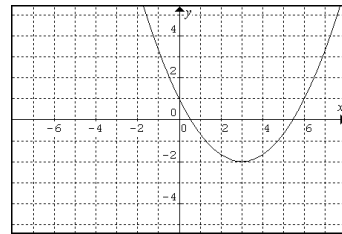
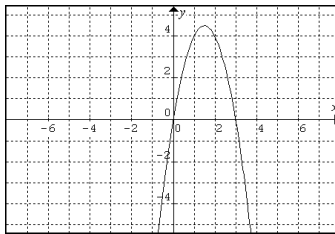
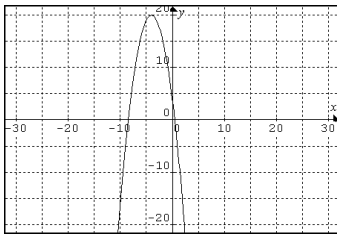
61. vert: (0, -3), min of -3  
 x-int:  $\pm \sqrt{3}$ , y-int: -3



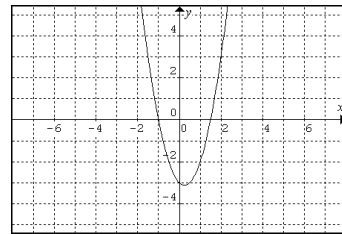
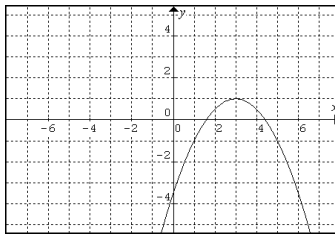
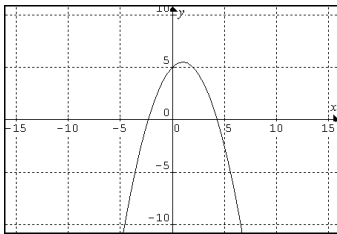
63. vert:  $(\frac{7}{2}, -\frac{33}{4})$ , min of  $-\frac{33}{4}$  x-int:  $\frac{7 \pm \sqrt{33}}{2}$ , y-int: 4  
 65. vert:  $(\frac{1}{2}, -\frac{39}{4})$ , min of  $-\frac{39}{4}$  x-int:  $\frac{1 \pm \sqrt{13}}{2}$ , y-int: -9  
 67. vert:  $(\frac{3}{2}, 10)$ , max of 10 x-int:  $\frac{3 \pm \sqrt{10}}{2}$ , y-int: 1



69. vert: (-4, 20), max of 20 x-int:  $-4 \pm 2\sqrt{5}$ , y-int: 4  
 71. vert:  $(\frac{3}{2}, \frac{9}{2})$ , max of  $\frac{9}{2}$  x-int: 0, 3, y-int: 0  
 73. vert: (3, -2), min of -2 x-int:  $3 \pm \sqrt{6}$ , y-int: 1



75. vert:  $(1, \frac{11}{2})$ , max of  $\frac{11}{2}$  x-int:  $1 \pm \sqrt{11}$ , y-int: 5  
 77. vert: (3, 1), max of 1 x-int:  $3 \pm \sqrt{2}$ , y-int:  $-\frac{7}{2}$   
 79. vert:  $(\frac{1}{4}, -\frac{25}{8})$ , min of  $-\frac{25}{8}$  x-int:  $\frac{3}{2}, -1$ , y-int: -3



### 10.6

1. 85.73 board feet, 0.86 inches      3. 6 teams      5. 500 balls      7. \$5000, \$5000  
 9. 1222 units      11. 500 units      13. 1990      15. 10 sec, 256 ft      17. 6 sec, 576 ft  
 19. 1.6 sec, 14.8 ft      21. 5 sec, 196 ft      23. 3.8 sec, 50 ft      25. 14 ft, 8.6 ft  
 27. 1/2 sec, 2.12 sec      29. 8 ft X 13 ft      31. 20 yds X 30 yds      33. 8 ft base, 5 ft height  
 35. 0      37. 2 cm height, 9 cm base; no minimum      39. 12.5 yds X 12.5 yds  
 41. 625 ft<sup>2</sup>      43. 100 ft X 100 ft OR 50 ft X 200 ft; 11,250 ft<sup>2</sup>      45. 50 yds X 33 1/3 yds  
 47. 6666 2/3 m<sup>2</sup>      49. 20 ft X 40 ft      51. 5 ft X 10 ft      53. 175 ft X 350 ft  
 55.  $x = \frac{1}{16} mi$ ,  $r = \frac{1}{16\pi} mi$

### 10.7 No graphs

1.  $(-\infty, -3) \cup (2, \infty)$       3.  $[-1, 4]$       5.  $(-\infty, 0] \cup [2, \infty)$       7.  $(-\infty, -5)$   
 9.  $\{-4\} \cup [6, \infty)$       11.  $(2, 3) \cup (4, \infty)$       13.  $(-2, 1) \cup (1, 2)$       15.  $(-\infty, -1] \cup [3, \infty)$   
 17.  $[-1, 4]$       19.  $(-\infty, -4) \cup (\frac{3}{2}, \infty)$       21.  $(3, \infty)$       23. No solution  
 25.  $(-\infty, 0] \cup [2, \infty)$       27.  $(-\infty, -1] \cup [1, \infty)$       29.  $(-\infty, -1] \cup \{0\} \cup [1, \infty)$   
 31.  $(-\infty, -1) \cup (0, \infty)$       33.  $[-1, 3)$       35.  $(-2, 2] \cup (3, \infty)$       37.  $(0, 1) \cup (3, \infty)$

39.  $(-7, -5] \cup (1, 6]$  41.  $(-\infty, -1) \cup (1, 2] \cup [3, \infty)$  43.  $(-\infty, -1) \cup (-\frac{1}{2}, \infty)$   
45.  $(5, 15)$  47.  $(-\infty, -6) \cup (0, 4]$  49.  $(-\frac{3}{4}, 3) \cup [6, \infty)$  51.  $(-2, -1) \cup (1, \infty)$   
53.  $(-\infty, -\frac{13}{2}] \cup (-4, 0] \cup (1, \infty)$  55.  $(-2, 1) \cup [2, 4]$   
57.  $(-\infty, -4) \cup (-\frac{3}{2}, 1) \cup (4, \infty)$  59.  $(-\infty, -2] \cup (-1, 1) \cup [3, \infty)$   
61.  $(-\infty, 3) \cup (5, \infty)$  63.  $\{3\}$  65.  $(-\infty, \infty)$  67.  $(-\infty, 0) \cup (1, \infty)$   
69.  $(-2, 1]$  71.  $(-\infty, -1] \cup (1, \infty)$