Lesson 4.2.1

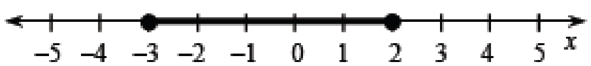
4-58. See below:

a. The x-coordinate for each point of intersection; $x = –3$ and $x = 2$

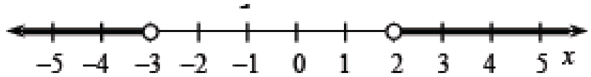
b. The graph of $y = 2x^2 + 5x – 3$ increases faster, or substitute a number such as 0 or –2 for x in both equations, or the y-intercept of $y = 2x^2 + 5x – 3$ is –3 and the other is 3, etc.

c. The solutions are the x-values of the points where the graph of $y = 2x^2 + 4x – 3$ intersects and dips below the graph of $y = x^2 + 4x + 3$; there are infinite solutions; $–3 \le x \le 2$.

d. See number line below.



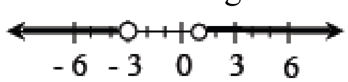
e. See number line below; $x < –3$ or $x > 2$



4-59. See below:

a. There are two boundaries: $x = 1$ and $x = –3$. Both should be unfilled.

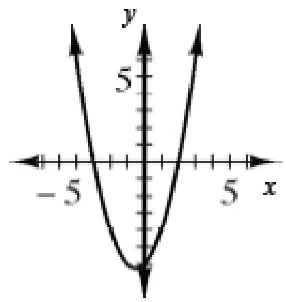
b. There are three regions to test; the solutions are $x > 1$ or $x < –3$. See number line below.



4-60. See below:

a. He rewrote the inequality $2x^2 + 5x – 3 < x^2 + 4x + 3$ by moving all terms to one side, leaving zero on the other side. Then he used that to make a function.

b. See graph below. Solutions to the original inequality are those x-values for which $f(x)$ is below the x-axis, $f(x) < 0$. $–3 < x < 2$



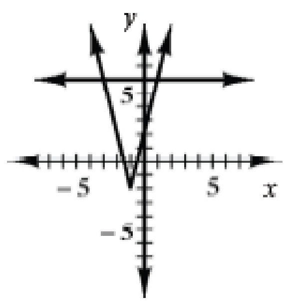
c. Yes

d. $x \le -2$ or $x \ge 5$

4-61. See below:

a. $f(x)=4|x+1|-2$ and $g(x) = 6$

b. See graph below. Solutions are those x-values for which $f(x)$ is above $g(x)$, that is when $x < -3$ or $x > 1$.



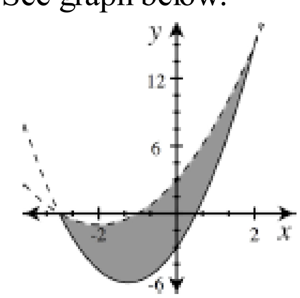
4-62. See below:

a. (–3, 0) makes one inequality true, but not the other; (–1, 1) makes one inequality true, but not the other; (1, 5) is a solution to both.

b. The y-values are part of the solution, so the solution is represented by the points in the region between the two curves, including the curve $y = 2x^2 + 5x - 3$.

c. The region containing solutions to the system of inequalities is bounded by the graphs of the equations. The graph of $y = 2x^2 + 5x - 3$ is included, and therefore is shown as a solid curve, but the graph of $y = x^2 + 4x + 3$ should be dashed to indicate it as a boundary that is not part of the solution.

d. See graph below.



4-63. See below:

a. $-\frac{1}{3}(x+3)(x-4) = -\frac{1}{2}x + 2$

b. $y \le -\frac{1}{3}(x+3)(x-4)$ and $y > -\frac{1}{2}x + 2$

c. $y \le -\frac{1}{3}(x+3)(x-4)$

d. $y > -\frac{1}{2}x + 2, y \le -\frac{1}{3}(x+3)(x-4), x \ge 0$

4-65. See below:

a. boundary point $x = -4$

b. boundary points $x = 4, -\frac{3}{2}$

4-66. See below:

a. $-4 < x < 1$

b. $x \le -4$ or $x \ge 1$

c. $-1 < x < 4$

d. $x \le -1$ or $x \ge 4$

e. $-1 < x < 4$

f. $x \le -1$ or $x \ge 4$

g. Some possibilities: The solutions for (c) and (e) are the same as the results for (d) and (f) because $2x - 3 = -(3 - 2x)$ and $|A| = |-A|$. On the number line the graphs for (a) and (b) and for (c) and (d) are complementary. For (a) and (c) and for (b) and (d) the difference between adding and subtracting 3 shows up as reversed opposites.

4-67. See below:

a. $y = -3x + 8$

b. $y = -x - \frac{1}{2}$

4-68. See below:

a. No real solution.

b. $y = 7$, $y = \frac{13}{3}$ is extraneous.

4-69. See below:

a. $\frac{3x^2+x-3}{2x^3+9x^2-5x}$

b. $\frac{3x-5}{2x+3}$

c. $\frac{x+4}{4x-3}$

d. $\frac{m+5}{m+4}$

4-70. $x = -6 + 4\sqrt{6}$ or $x = -6 - 4\sqrt{6}$

4-71. See below:

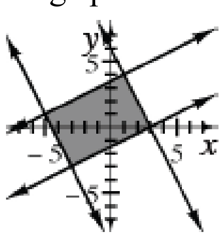
a. $x(b + a)$

b. $x(1 + a)$

c. $\frac{a}{x+1}$

d. $\frac{x-b}{a}$

4-72. See graph below.



a. Rectangle; perpendicular lines or slopes.

b. (1, 4), (–3, –3), (–5, 1), (3, 0)

4-73. See below:

a. $-5 < x < 13$

b. $x \geq 250$ or $x \leq -70$

c. $\frac{3}{2} \leq x \leq \frac{7}{2}$

4-74. See below:

a. $C = 800 + 60m$

b. $C = 1200 + 40m$

c. 20 months

d. 5 years

4-75. See below:

a. input x, output x

b. Replace x with c in first function machine resulting in $c - 5$, then substitute this expression for x in the second function machine, yielding $\frac{6(c-5)+8}{2} = 3c - 11$. Substitute this a third time in the final machine, giving $\frac{(3c-11)+11}{3} = c$.

4-76. See below:

a. $\frac{x-3}{3x-14}$

b. $\frac{2x-1}{x+1}$

4-77. (1, 12) and (–5, 42)

4-78. See below:

a. $y = \frac{1}{2}x - 2$

b. $y = 2x + 2$