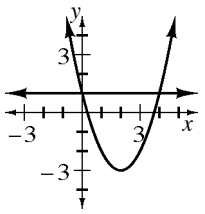
Lesson 4.1.1

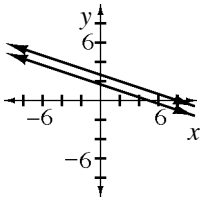
4-7. See graph at right. $x = 0$ and $x = 4$



4-8. **a:** $x = 5$ or $x = -3$ **b:** $m = 35$

c: no solution **d:** $x = 7$

4-9. **a:** $y = 0$ **b:** $x = 0$



4-10. **a:** Combining the equations leads to an impossible result, so there is no solution.

b: See graph at right.

c: There can be no intersection because the lines are parallel. When assuming there is an intersection, students will find that their work results in a false statement.

4-11. This is a scalene triangle, because the sides have lengths $\sqrt{29}$, $\sqrt{17}$ and $\sqrt{20}$.

4-12. **a:** 63 **b:** 0 **c:** $n^3 - 1$ **d:** Neither; answers will vary.

4-13. **a:** $\frac{(x-2)(x+6)}{(x+4)(2x+3)}$ **b:** $\frac{2x+1}{x-5}$ **c:** $\frac{9m+27}{m+3} = 9$ **d:** $\frac{n+3}{n-1}$

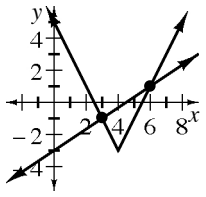
4-14. **a:** 0–2 times **b:** 0–4 times **c:** 0–4 times

d: 1-3 times if you consider parabolas that open up or down. 0-4 times if you consider rotated parabolas.

Lesson 4.1.2

4-22. Answers will vary.

4-23. See graph at right. $x = 3$ and $x = 6$



4-24. **a:** $x = 15$ **b:** $x = \frac{7}{3}$ or $x = -5$

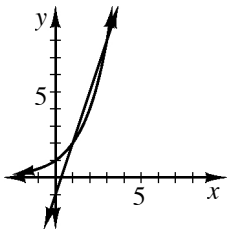
4-25. The lines intersect at the point (2, 6).
Ted will solve the system algebraically by setting $18x - 30 = -22x + 50$.

4-26. $a = 18.5,\ b = 5.5$

4-27. $x = 13, x = 5$ is extraneous

4-28. $x = 36$ **b:** $x = 20\sqrt{2}$ or $x \approx 28.28$

4-29. See graph at right. $x = 1$ and $x = 3$; No.



4-30. **a:** $\frac{1}{2}(x-2)^3 + 1 = 2x^2 - 6x - 3$, $x = 0$ or $x = 4$

b: $x = 6$ is also a solution.

c: $\frac{1}{2}(x-2)^3 + 1 = 0$, $x \approx 0.74$

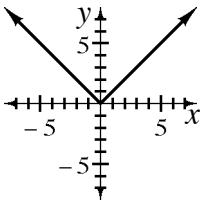
d: Domain and range of $f(x)$: all real numbers, domain of $g(x)$: all real numbers, range of $g(x)$: $y \geq -7.5$

4-31. **a:** $x = -3$ **b:** $x = 1$ or $x = 3$ **c:** $x = -8$ or $x = 13$ **d:** $x = 1.2$

4-32. **a:** $y = \frac{5}{3}x - 4$ **b:** $m_2 = \frac{Fr^2}{Gm_1}$

c: $m = \frac{2E}{v^2}$ **d:** $y = \pm\sqrt{10 - (x-4)^2} + 1$

4-33. $(a+b)^2 = a^2 + 2ab + b^2$, substitute numbers, etc.

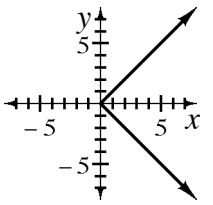


4-34. **a:** See graph at top right.

b: See graph at bottom right.

c: Graph (b) is similar to graph (a), but is rotated 90° clockwise.

d: (a) D: all real numbers, R: $y \geq 0$; (b) D: $x \geq 0$, R: all real numbers



4-35. **a:** 21.00 **b:** 117.58

Lesson 4.1.3

4-40. **a:** (–2, –11); The lines intersect at one point.

b: infinite solutions; The equations are equivalent.

c: (2, 45), and(–1, 3); The line and parabola intersect twice.

d: (3, 6); The line is tangent to the parabola.

4-41. **a:** $y = 3$ or $y = -5$ **b:** $x = -\frac{99}{4}$ **c:** $y = 1$ **d:** $x = -13$

4-42. **a:** E $t(n) = -2 + 3n$; R $t(0) = -2, t(n+1) = t(n) + 3$

b: E $t(n) = 6(\frac{1}{2})^n$; R $t(0) = 6, t(n+1) = \frac{1}{2}t(n)$

c: $t(n) = 10 - 7$ **d:** $t(n) = 5(1.2)^n$ **e:** $t(n) = 1620$

4-43. 19.79 feet

4-44. **a:** $m = -\frac{6}{5}$ **,** $b = (0, -7)$ **b:** $m = \frac{3}{2}$, $b = (0, -5)$ **c:** $m = 2, b = (0, -12)$

4-45. **a:** not a function; D: $-3 \le x \le 3$; R: $-3 \le y \le 3$

b: a function; D: $-2 \le x \le 3$; R: $-2 \le y \le 2$

4-46. (–7, 11)

Lesson 4.1.4

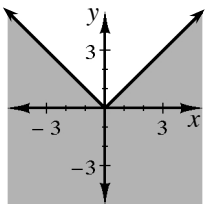
4-51. $4c + 5p = 32, c + 8p = 35$, cylinders weigh 3 oz. and prisms weigh 4 oz.

4-52. Yes. No. Any value of x such that $-3 \le x \le 2$ is a solution.

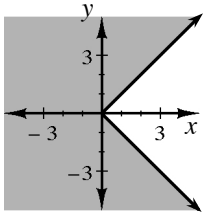
4-53. **a:** $x = 4$ **b:** $x = 6$ **c:** $x = 6$ **d:** $x = \frac{3}{2}$

4-54. **a:** (4, –6) **b:** (4, –6) **c:** $\left(\frac{3}{2}, -\frac{9}{4}\right)$

4-55. **a:**

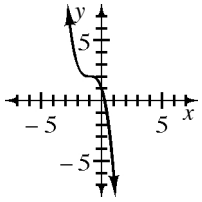


b:



4-56. B

4-57. **a:** See graph at right. **b:** $x \approx 0.71$



Lesson 4.2.1

4-65. **a:** boundary point $x = -4$ **b:** boundary points $x = 4, -\frac{3}{2}$

4-66. **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 $x \ge 4$

4-67. **a:** $y = -3x + 8$ **b:** $y = -x - \frac{1}{2}$

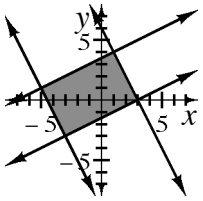
4-68. **a:** No real solutions **b:** $y = 7$, $y = \frac{13}{3}$ is extraneous

4-69. **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. **a:** $x(b + a)$ **b:** $x(1 + a)$ **c:** $\frac{a}{x+1}$ **d:** $\frac{x-b}{a}$

4-72. See graph at right.



a: Rectangle; perpendicular lines or slopes.

b: (1, 4), (–3, –3), (–5, 1), (3, 0)

4-73. **a:** $-5 < x < 13$ **b:** $x \ge 250$ or $x \le -70$ **c:** $\frac{3}{2} \le x \le \frac{7}{2}$

4-74. **a:** C = 800 + 60*m* **b:** C = 1200 + 40*m* **c:** 20 months **d:** 5 years

4-75. **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 $\frac{(3c-11)+11}{3} = c$.

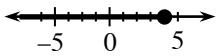
4-76. **a:** $\frac{x-3}{3x-14}$ **b:** $\frac{2x-1}{x+1}$

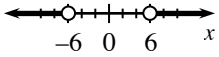
4-77. (1, 12) and (–5, 42)

4-78. **a:** $y = \frac{1}{2}x - 2$ **b:** $y = 2x + 2$

Lesson 4.2.2

4-83. $x = -2, y = 3, z = -5$; Solve the system to two equations with x and y, then substitute these values into the third equation to find z.

4-84. **a:** $x \le 4$ 

b: $x < -6$ or $x > 6$ 

4-85. red = 10 cm, blue = 14 cm

4-86. The points on the line $y = 2x - 2$ are excluded from the solution region of $y < 2x - 2$.

4-87. **a:** $y = \frac{1}{3}x - 4$ **b:** $y = \frac{6}{5}x - \frac{1}{5}$ **c:** $y = (x + 1)^2 + 4$ **d:** $y = x^2 + 4x$

4-88. $y = 0, x = 0$

4-89. 2.11 feet

Lesson 4.2.3

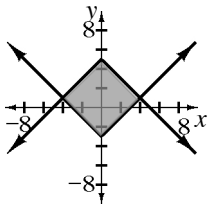
4-92. There is no solution, so the lines are parallel.

4-93. See graph at right.

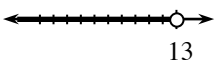
a: A square, justifications will vary.

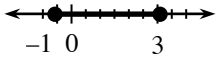
b: (0, –3), (4, 1), (–4, 1), (0, 5)

c: 32 square units.



4-94. **a:** $x < 13$ **b:** $\frac{5-\sqrt{57}}{4} \le x \le \frac{5+\sqrt{57}}{4}$ or $-0.637 \le x \le 3.137$



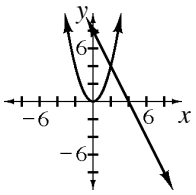


4-95. **a:** no solution **b:** $y \approx 4.3$ or 10.7

4-96. (25, –3)

a: $x^2 + 3y = 16$ and $x^2 - 2y = 31$

b: The solutions to the new system are (5, –3) and (–5, –3).



4-97. **a:** See graph at right; $y = -2x + 8$

b: 63.43° or 116.57°

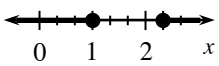
Lesson 4.2.4

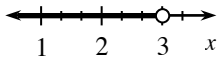
4-99. **a:** $y = \frac{1}{2}(x+3)^2 - 2$ **b:** $y = x + 5$ **c:** $x = 1$ or $x = -5$

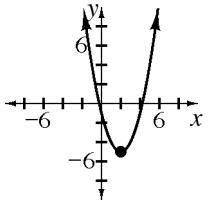
d: $(1, 6)$ and $(-5, 0)$ **e:** $x < -5$ and $x > 1$ **f:** $x = -1$ or $x = -5$

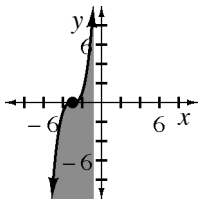
g: $x = -1$ **h:** Answers will vary.

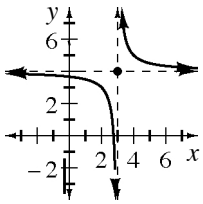
4-100. $y \le 3x + 3$, $y \ge 0.5x - 2$, $y \le -0.75x + 3$ 89784

4-101. **a:** $x \le 1$ or $x \ge \frac{7}{3}$ 

b: $x < 3$ 

4-102. **a:** 

b: 

c: 

4-103. 60°

4-104. **a:** $y > 3x - 3$ **b:** $y < 3$ **c:** $y \ge \frac{3}{2}x - 3$ **d:** $y \ge x^2 - 9$

4-105. **a:** $w = 0$ or $w = -4$ **b:** $w = 0$ or $w = \frac{2}{5}$ **c:** $w = 0$ or $w = 6$