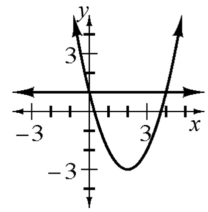
Lesson 5.1.1



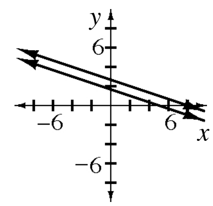
5-6. See graph at right; $x = 0$ and $x = 4$.

5-7. a: $x = 5$ or $x = -3$, b: $m = 35$, c: no solution, d: $x = 7$

5-8. a: horizontal line through (0, 3), domain: all real numbers, range: 3;
b: vertical line through (–2, 0), domain: –2, range: all real numbers;
c: (–2, 3)

5-9. $y = 2$, a: $y = 0$, b: $x = 0$

5-10. 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.

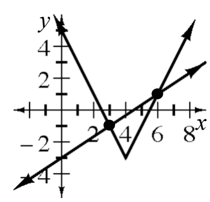


5-11. a: $5^{1/2}$, b: $9^{1/3}$, c: $17^{x/8}$, d: $7x^{3/4}$

5-12. a: 0-2 times, b: 0-4 times, c: 0-4 times, d: 0-4 times

Lesson 5.1.2

5-18. Students could graph $y = (x-3)^2 - 2$ and $y = x + 1$ and find the x-values of the points of intersection. They could also graph $y = x^2 - 7x + 6$ and find the x-intercepts. Solutions: $x = 1$ and $x = 6$.

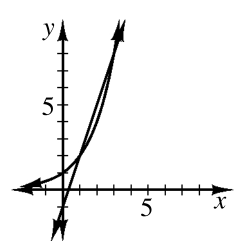


5-19. See graph at right; $x = 3$ and $x = 6$.

5-20. a: $x = 15$, b: $x = \frac{7}{3}$ or $x = -5$

5-21. The lines intersect at the point (2, 6). Ted will solve the system algebraically by setting $18x - 30 = -22x + 50$.

5-22. a: $C = 800 + 60m$, b: $C = 1200 + 40m$, c: 20 months, d: 5 years



5-23. a: $(\frac{9}{2}, 0)$ and $(0, -3)$, b: $(-6, 0)$ and $(0, 4)$

5-24. a: $x = 36$, b: $x = 20\sqrt{2}$ or $x \approx 28.28$

5-25. See graph at right; $x = 1$ and $x = 3$; no.

5-26. 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 $g(x)$: $y\geq -7.5$

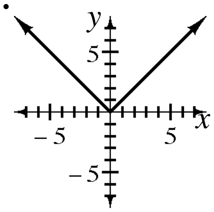
5-27. a: $x=-3$, b: $x=1$ or $x=3$, c: $x=-8$ or $x=13$, d: $x=1.2$

5-28. a: (1, –4); b: (1, –4); c: $(-2.5,-4.25)$, d: domain: $-\infty<x<\infty$, range: $y\geq -4.25$

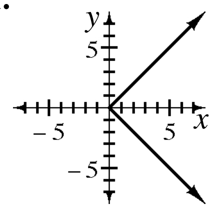
5-29. a: $y=\frac{5}{3}x-4$, b: $m_2=\frac{Fr^2}{Gm_1}$, c: $m=\frac{2E}{v^2}$, d: $y=\pm\sqrt{10-(x-4)^2}+1$

5-30. $(a+b)^2=a^2+2ab+b^2$, substitute numbers, etc.

5-31. a: graph:



b: graph:



c: Graph (b) is similar to graph (a), but is rotated 90° clockwise.
d: (a) domain: all real numbers, range: $y\geq 0$;
(b) domain: $x\geq 0$, range: all real numbers

5-32. a: 21.00’, b: 117.58’

Lesson 5.1.3

5-37. 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.

5-38. a: $y=3$ or $y=-5$, b: $x=-\frac{99}{4}$, c: $y=1$, d: $x=-13$

5-39. domain: all real numbers, range: $y\geq 0$, a: 8, b: $2a^2+16a+32$, c: 1 or –7, d: –3

5-40. 19.79 feet

5-41. The first graph opens downward, is stretched, and has its vertex at (–1, –3). The second is the parent graph.

5-42. $(-7,11)$

5-43. a: 1.03, b: $f(n)=10.25(1.03)^n$, c: \$13.78

Lesson 5.1.4

5-48. $4c + 5p = 32$, $c + 8p = 35$; **Cylinders weigh 3 ounces, and prisms weigh 4 ounces.**

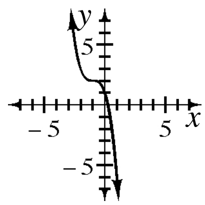
5-49. $x = -1$ **is a solution;** $x = 5$ **is not. Any value of** x **such that** $-3 \le x \le 2$ **is a solution.**

5-50. **a:** $x = 4$, **b:** $x = 6$, **c:** $x = 6$, **d:** $x = \frac{3}{2}$

5-51. **a:** $(4, -6)$, **b:** $(4, -6)$, **c:** $(\frac{3}{2}, -\frac{9}{4})$

5-52. **a: V shape, shading below; b: V shape, open to the right, shading to the left**

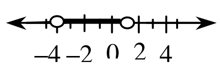
5-53. **a: graph:**



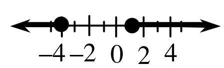
b: $x \approx 0.71$

Lesson 5.2.1

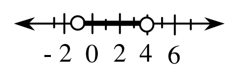
5-63. **a:** $-4 < x < 1$



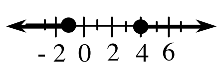
b: $x \le -4$ **or** $x \ge 1$



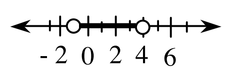
c: $-1 < x < 4$



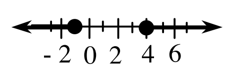
d: $x \le -1$ **or** $x \ge 4$



e: $-1 < x < 4$



f: $x \le -1$ **or** $x \ge 4$

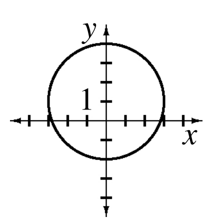


g: Some possibilities: The solutions for (c) and (e) are the same as the results for (d) and (f) because $2x - 3 = -(3 - 2x)$ **and** $|A| = |-A|$. **On the number line, the graphs for (a) and (b) and for (c) and (d) are complementary. For (a) and (c) and for (b) and (d) the difference between adding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

5-64. **a: 63, b: 0, c:** $n^3 - 1$, **d: Neither; both the differences and ratios between the terms vary.**

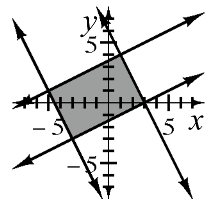
5-65. **a: 1722, b: 1368, c:** $y = 1500(1.047)^{n+3}$

5-66. $x^2 + (y - 1)^2 = 9$, **graph:**



5-67. a: $x(b+a)$, b: $x(1+a)$, c: $\frac{a}{x+1}$, d: $\frac{x-b}{a}$

5-68. See graph at right.
a: rectangle; perpendicular lines or slopes
b: (1,4), (–3,–3), (–5,1), (3,0)



5-69. a: $-5 < x < 13$, b: $x \geq 250$ or $x \leq -70$, c: $\frac{3}{2} \leq x \leq \frac{7}{2}$

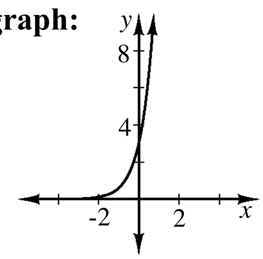
5-70. $a = 18.5$, $b = 5.5$

5-71. input x, output x

5-72. a: $x^2 + y^2 = 36$, b: $(x-2)^2 + (y+3)^2 = 36$, c: $(x-4)^2 + (y+5)^2 = 36$

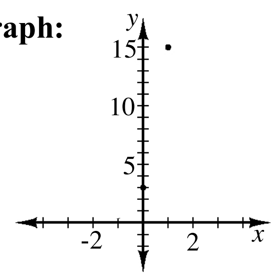
5-73. a: $y = \frac{1}{2}x - 2$, b: $y = 2x + 2$

5-74. graph:



a: all real numbers

b: graph:

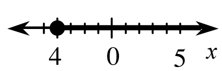


c: $f(x)$ is a continuous function with range $y > 0$, while *t(n)* is a discrete series with positive integer inputs.

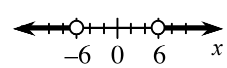
Lesson 5.2.2

5-79. $x = -2$, $y = 3$, $z = -5$; Solve the system to two equations with x and y, then substitute these values into the third equation to find z.

5-80. a: $x \leq 4$



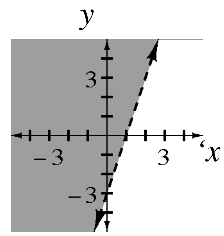
b: $x < 6$ or $x > 6$



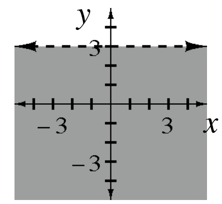
5-81. red = 10 cm, blue = 14 cm

5-82. The points on the line $y = 2x - 2$ are excluded from the solution region of $y < 2x - 2$.

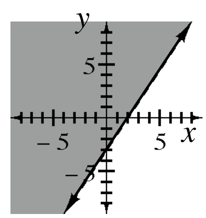
5-83. **a:** $y > 3x - 3$



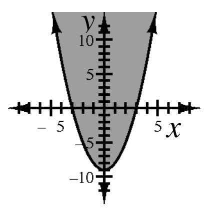
b: $y < 3$



c: $y \ge \frac{3x}{2} - 3$



d: $y \ge x^2 - 9$



5-84. **a:** $y = \frac{1}{3}x - 4$, **b:** $y = \frac{6}{5}x - \frac{1}{5}$, **c:** $y = (x+1)^2 + 4$, **d:** $y = x^2 + 4x$

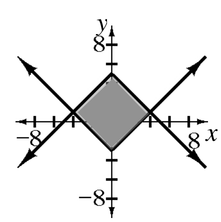
5-85. $y = 0$, $x = 0$

5-86. **2.11 feet**

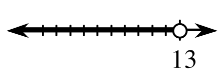
Lesson 5.2.3

5-89. **There is no solution, so the lines are parallel.**

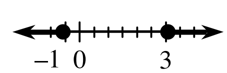
5-90. **See graph at right.**
a: A square; justifications vary.
b: (0, –3), (4, 1), (–4, 1), (0, 5)
c: 32 square units



5-91. **a:** $x < 13$



b: $x \le \frac{5-\sqrt{57}}{4}$ **or** $x \ge \frac{5+\sqrt{57}}{4}$ **or** $x \le\sim -0.637$ **or** $x \ge\sim 3.137$

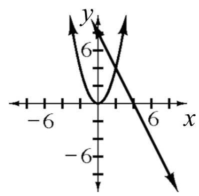


5-92. **a:** $y = -3x + 8$, **b:** $y = -x - \frac{1}{2}$

5-93. $n \cdot 3^{15} = 72\text{ million}$, $n = 5$; **There were 5 bacteria at first.**

5-94. **solution to system: (25, –3)**
a: $x^2 + 3y = 16$; $x^2 - 2y = 31$
b: The solutions to the new system are (5, –3) and (–5, –3).

5-95. **a: graph:**



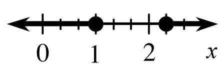
equation: $y = -2x + 8$; **b: 63.43° or 116.57°**

Lesson 5.2.4

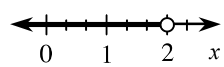
5-97. **a:** $y = \frac{1}{2}(x+3)^2 - 2$, **b:** $y = x + 5$, **c:** $x = 1$ **or** $x = -5$, **d:** $(1, 6)$ **and** $(-5, 0)$, **e:** $x < -5$ **and** $x > 1$, **f:** $x = -1$ **or** $x = -5$, **g:** $x = -1$, **h: Answers vary; the parabola could be shifted up or flipped over.**

5-98. $y \le 3x + 3$, $y \ge 0.5x - 2$, $y \le -0.75x + 3$

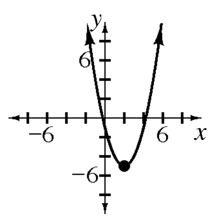
5-99. **a:** $x \le 1$ **or** $x \ge \frac{7}{3}$



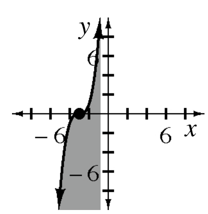
b: $x < 2$



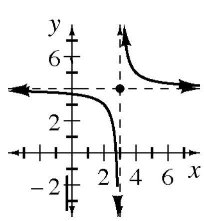
5-100. **a: parabola with vertex (2, –5)**



b: cubic with locator (–3, 0), shaded below



c: hyperbola with locator (3, 4)



5-101. **60°**

5-102. **a:** $w = 0$ **or** $w = -4$, **b:** $w = 0$ **or** $w = \frac{2}{5}$, **c:** $w = 0$ **or** $w = 6$