Lesson 1.1.1

1-4. **a:** $\frac{1}{2}$ **b:** 3

1-5. **a:** $h(x)$ then $g(x)$ **b:** Yes, $g(x)$ then $h(x)$.

1-6. See graph above right.

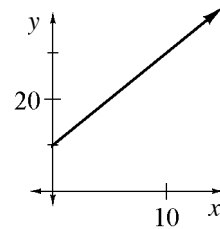**1-7.** **a:**   **b:**   **c:**   **d:**
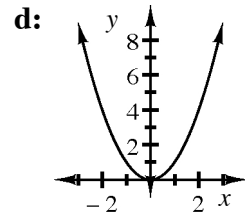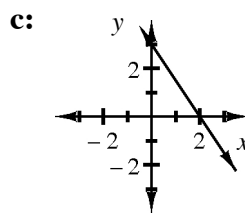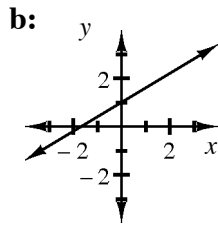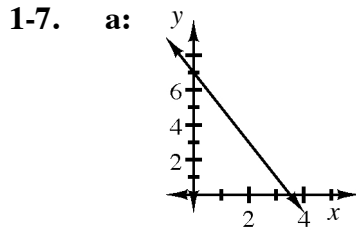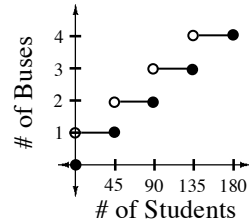
1-8. **a:** Not linear. **b:** The exponent. **c:** A parabola.

1-9. Answers will vary.

Lesson 1.1.2 (Day 1)

1-12. $y = 2x + 10$

See graph and table at right.

x	0	1	2	3	4
y	10	12	14	16	18

1-13. **a:** $x = -13$ or 17 **b:** $x = -\frac{3}{2}$ or $\frac{7}{3}$

c: $x = 0$ or 3 **d:** $x = 0$ or 5

e: $x = 7$ or -5 **f:** $x = \frac{1}{3}$ or -5

1-14. **a:** $14, -4, 3x - 1$ **b:** $f(x) = 3x - 1$

1-15. **a:** $y = 5x - 2$ **b:** $x = \frac{2}{5}$

1-16. **a:** $21, 15, (0, 15)$ **b:** $-3, 3, (0, 3)$

1-17. **a:** 16 **b:** 9 **c:** 478.38
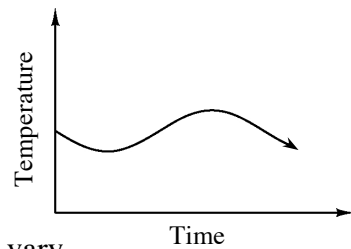
1-18. **a**: y depends on x; x is independent. Explanations will vary.

b: Temperature is dependent; time is independent.

c: See graph above right.

Lesson 1.1.2 (Day 2)
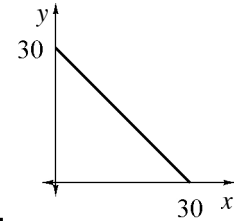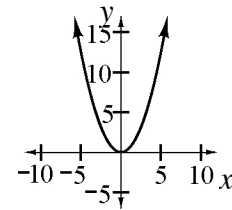
1-19. $y = 30 - x$
Graph and table shown at right.
Answers will vary.

x	0	1	6	20
y	30	29	24	10

1-20. See graph below. Possible inputs:
all real numbers; possible outputs:
any number greater than or equal to zero.

x	–4	–2	0	1	6
y	8	2	0	0.5	18

1-21. **a:** 1   **b:** $x = 12$

c: 13   **d:** no solution

e: $x = \pm\sqrt{\frac{13}{2}} \approx \pm 2.55$ **f:** $x = \pm\sqrt{7} \approx \pm 2.65$

1-22. Cube each input: $f(x) = x^3$

1-23. **a:** The more gas you buy, the more money you spend. I: gallons, D: dollars

b: People grow a lot in their early years and then their growing slows down.
I: age, D: height

c: As time goes by, the ozone concentration goes down, although the effect is
slowing. I: year, D: ozone

d: As the number of students grows, more classrooms are used and each
classroom holds 30 students. I: students, D: classrooms

e: Possible inputs: x can be any number between and including 0 and 120,
possible outputs: $y = 1, 2, 3, 4$
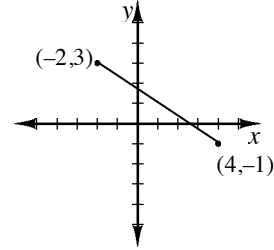
1-24. They are similar by AA.

a: $\frac{n}{m}$ **b:** $\frac{m}{x}$

1-25. Error in line 2: It should be -14, not $+14$; $x = -37$.

Lesson 1.1.3

1-34. **a:** The numbers between –2 and 4 inclusive.

b: The numbers between –1 and 3 inclusive.

c: No. He is missing all the values between those numbers. The curve is continuous, so the description needs to include all real numbers, not just integers.

d: See graph at right.

1-35. **a:** 70   **b:** 2   **c:** 43   **d:** undefined

e: $3x^2 = \sqrt{x-5} - 3$ **f:** $3x^2 = \sqrt{x-5} + 7$

g: all real numbers   **h:** all real numbers greater than or equal to 5.

i: They are different because the square root of a negative is undefined, whereas any real number can be squared.

1-36. Chelita is correct about *how* to find the intercepts, but she makes an error with signs while factoring. The correct equation is $(x-7)(x-3) = 0$ and the x-intercepts are 7 and 3.
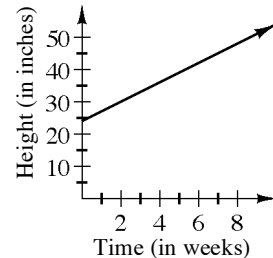
1-37. **a:** $y = \frac{x-6}{3}$ **b:** $y = \frac{x+10}{5}$ **c:** $y = \pm\sqrt{x}$

d: $y = \pm\sqrt{\frac{x+4}{2}}$ **e:** $y = \pm\sqrt{x} + 5$

1-38. **a:** –7   **b:** 3.5   **c:** The x- and y-intercepts.

1-39. **a:** $y = 3x + 24$; Table and graph shown at right.

1-40. **a:** $x = 13$ **b:** $x = 8$

x	y
0	24
1	27
2	30
3	33
4	36
5	39

Lesson 1.1.4

1-46. $(2, 1)$

1-47. **a:** 2   **b:** 10   **c:** 100   **d:** ≈ 142.86

1-48. **a:** $x = 5, 3$ **b:** $x \approx 3.39, -0.89$ or $x = \frac{5 \pm \sqrt{73}}{4}$

1-49. **a:** $\sqrt{34} \approx 5.83$ units   **b:** $\frac{3}{5}$

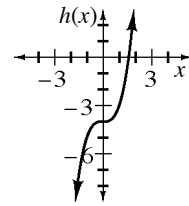**1-50.** **a:** $\frac{1}{52}$ **b:** $\frac{51}{52}$

1-51. The error is in line 3. It should be: $0 = 5.4x + 23.7$, $x \approx -4.39$

1-52. **a:** $x \approx -7.37$ **b:** $x = 2.8$

Lesson 1.2.1 (Day 1)

1-59. Table and graph shown below right.
D: $-\infty < x < \infty$, R: $-\infty < x < \infty$
intercepts $(0, -4)$ and $\left(\sqrt[3]{4}, 0 \right)$ or $(\approx 1.59, 0)$

x	$h(x)$
-3	-31
-2	-12
-1	-5
0	-4
1	-3
2	4
3	23

1-60. **a:** ≈ 5.18 **b:** ≈ 18.66

     c: ≈ 24.62 **d:** $\sqrt{180} \approx 13.42$
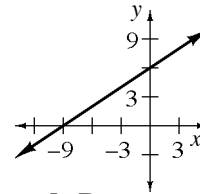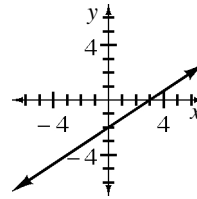
1-61. **a:** A line, no variables are raised to a power.

     b: $y = \frac{2}{3} x - 2$, graph shown at right.

     c: Substitute $x = 0$ and solve for y, substitute $y = 0$ and solve for x, $(3, 0)$ and $(0, -2)$.

     d: Answers will vary.

     e: The intercepts are $(-9, 0)$ and $(0, 6)$, graph shown at right.

1-62. **a:** D: $x = -1, 1, 2$ **b:** D: $-1 \le x < 1$ **c:** D: $x \ge -1$ **d:** D: $-\infty < x < \infty$
     R: $y = -2, 1, 2$ R: $-1 \le y < 2$ R: $y \ge -1$ R: $y \ge -2$

1-63. There is an error in line 2. Both sides need to be multiplied by x: $5 = x^2 - 4x$,
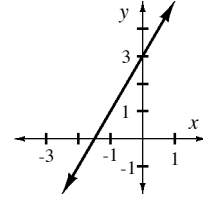$0 = x^2 - 4 - 5 = (x - 5)(x + 1)$, $x = -1, 5$.

1-64. **a:** $x = 3, -2$ **b:** $x = 3, -3$

Lesson 1.2.1 (Day 2)

1-65. **a:** 2   **b:** –4   **c:** $\frac{1}{0}$ is undefined   **d:** Answers will vary.

1-66. **a:** $(0, 3)$ and $\left(-\frac{3}{2}, 0\right)$, see graph at right.

     b: These equations are equivalent, they just have different notation.

1-67. $x \approx 2.72$ feet, $y \approx 1.27$ feet

1-68. **a:** D: –2, –1, 2   **b:** D: $-1 < x \le 1$ **c:** D: $x > -1$ **d:** D: $-\infty < x < \infty$
       R: –1, 0, 1   R: $-1 < y \le 2$ R: $y > -1$ R: $-\infty < y < \infty$

1-69. $l = 4w$ and $l + w = 22$ or $w + 4w = 22$
     The length is 17.6 cm, and the width is 4.4 cm.

1-70. **a:** $x = -\frac{1}{17} \approx -0.059$ **b:** $x = \frac{66}{13} \approx 5.08$ **c:** $x = -1, 3$

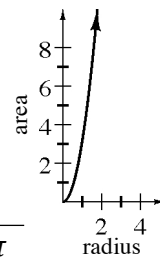**1-71.** **a:** $(-1, 9)$ and $(5, 21)$ **b:** $x^2 + 17$ **c:** $x^2 - 4x - 5$

Lesson 1.2.1 (Day 3)

1-72. **a:** $x = \frac{5(y-1)}{3}$ **b:** $x = \frac{-2y+6}{3}$

     c: $x = \pm\sqrt{y}$ **d:** $x = \pm\sqrt{y+100}$

1-73. $y = \pi x^2$, table and graph shown at right.

x	0	1	2	3	4
y	0	π	4π	9π	16π

1-74. **a:** $\sqrt{58} \approx 7.62$

     b: $-\frac{3}{7}$

1-75. Solve $x^2 + 2x + 1 = 1$; 0 or –2.

1-76. **a:** $(0, 6)$ **b:** $(0, 2)$ **c:** $(0, 0)$
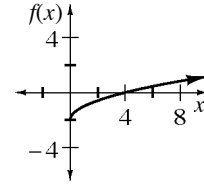   **d:** $(0, -4)$ **e:** $(0, 25)$ **f:** $(0, 13)$

1-77. The second line should be $3x + 2 = 10 - 4x + 4$. $x = \frac{12}{7}$

Lesson 1.2.2 (Day 1)

1-84. $(1, 3)$ and $(7, 81)$

1-85. **a:** $x = -6$ **b:** $x = \frac{38}{13} \approx 2.92$

1-86. Graph shown at right. intercepts: $(0, -2)$ and $(4, 0)$,
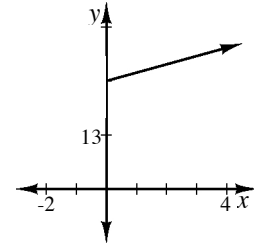domain: $x \geq 0$, range: $y \geq -2$

1-87. $x + (x + 18)$ or $x + y = 84$ and $y = x + 18$; 33 and 51 meters long.

1-88. **a:** Table and graph shown at right, $y = 2x + 26$.

x	y
0	26
1	28
2	30
3	32
4	34

b: 37 weeks after his birthday.

1-89. $y = 0$
a: $(-2, 0)$ **b:** $(-10, 0)$ **c:** $(0, 0)$

d: $\left(\pm\sqrt{2}, 0 \right)$ **e:** $(5, 0)$ **f:** $\left(\sqrt[3]{13}, 0 \right)$

1-90. Graph shown at right. domain: $-\infty < x < \infty$, range: $y \geq -8$
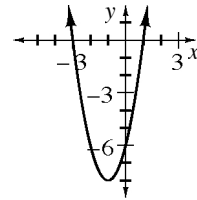
Lesson 1.2.2 (Day 2)

1-91. **a:** $x = \frac{y-b}{m}$ **b:** $r = \pm\sqrt{\frac{A}{\pi}}$

   c: $W = \frac{V}{LH}$ **d:** $y = \frac{1}{3-2x}$

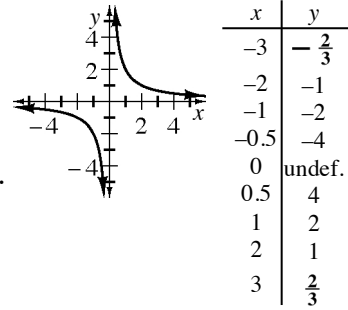**1-92.** See table and graph at right. Answers will vary.

x	y
–3	$-\frac{2}{3}$
–2	–1
–1	–2
–0.5	–4
0	undef.
0.5	4
1	2
2	1
3	$\frac{2}{3}$

1-93. **a:** Answers will vary.

   b: When the y-values are the same, they must be equal.

   c: $3x + 15 = 3 - 3x, x = -2$

   d: $y = 9$

   e: They cross at the point $(-2, 9)$.

1-94. 7.5 feet

1-95. $\left(\pm\sqrt{5}, 0\right)$; Graph shown at right.
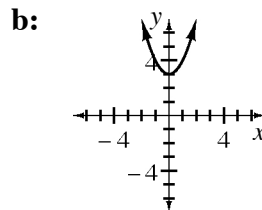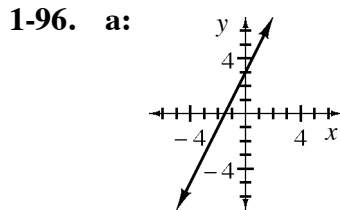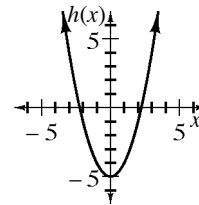
1-96. **a:**   **b:**   **c:** y-intercept $(0, 3)$ for both,
x-intercept $\left(-\frac{3}{2}, 0\right)$ for (a) and
none for (b).

   d: $(0, 3)$ and $(2, 7)$, solve
$2x + 3 = x^2 + 3$ to get $x = 0$
or $x = 2$

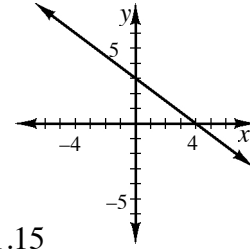**1-97.** **a:** 4   **b:** 2   **c:** 3   **d:** 1

Lesson 1.2.3

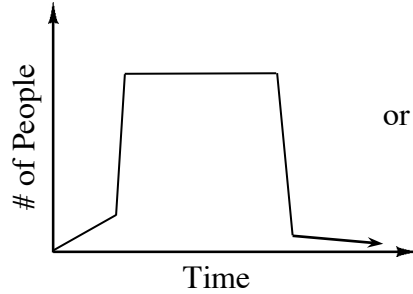**1-104.** $m = -\frac{3}{4}$, $(4, 0)$, $(0, 3)$, graph shown at right.

1-105. $y = \frac{3}{2}x - 3$

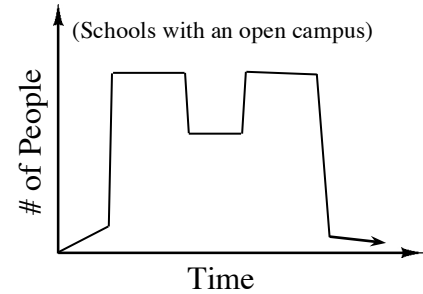**1-106.** $x = \frac{-3 \pm \sqrt{21}}{2} \approx -3.79, 0.79$ **b:** $x = \frac{7 \pm \sqrt{193}}{6} \approx 3.48, -1.15$

1-107. $12.00

1-108. Sample graphs.

or

(Schools with an open campus)

1-109. a: D: $-3 \le x \le 3$ **b:** D: $x = 2$ **c:** D: $x \ge -2w$
R: $y = -2, 1, 3$ R: $-\infty < y < \infty$ R: $-\infty < y < \infty$

**1-110. a:** 1, 2, 3, 4, 5 or 6   **b:** $\frac{1}{6}$ **c:** $\frac{4}{6} = \frac{2}{3}$

Lesson 1.2.4

1-112. a: A portion of the trip at a specific speed.

b: About 400 miles. It is the total distance on the graph.

c: Graph shown below – a speed of approximately 30 mph for 1 hour, approximately 80 mph for the next 3 hours, 0 mph for 2 hours, approximately 40 mph for 2 hours, and then approximately 20 mph for the last 2 hours. Note that the step graph assumes instantaneous change of speed, which is not technically possible.
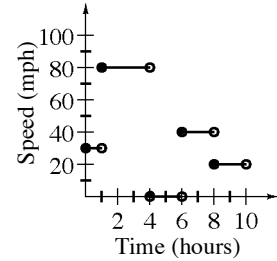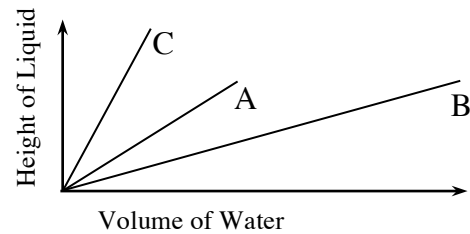
1-113. a: $x = 2$ **b:** $x = 4$

1-114. $m\angle B = 39.8°$, $\sqrt{244} \approx 15.62$

1-115. 56 inches

1-116. The independent variable is the volume of water; the dependent variable is the height of the liquid. The graph is 3 line segments starting at the origin. C is the steepest, and B is the least steep.

1-117. Diagrams vary; graph and table below, $y = 3x$.

1-118. a: $\frac{1}{26}$ **b:** $\frac{1}{25}$

x	y
1	3
2	6
3	9