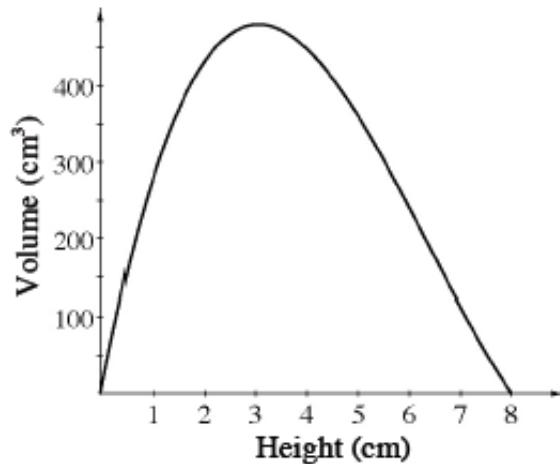


Lesson 1.2.1

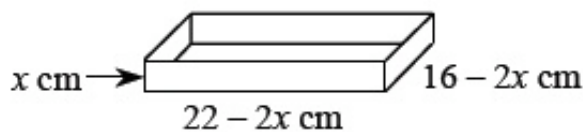
1-53. The graph and table for a box made from a paper of dimensions $22\text{ cm} \times 16\text{ cm}$ follows.

x	y
0	0
1	280
2	432
3	480
4	448
5	360
6	240
7	112
8	0



1-55. See below:

- a. See diagram below for a box made from a paper of dimensions $22\text{ cm} \times 16\text{ cm}$.



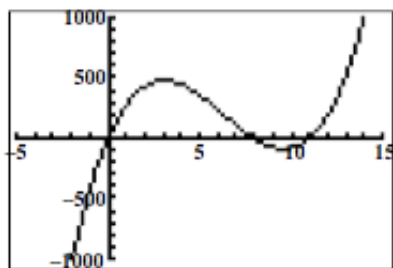
b. $y = x(22 - 2x)(16 - 2x) = 4x^3 - 76x^2 + 352x$

1-56. See below:

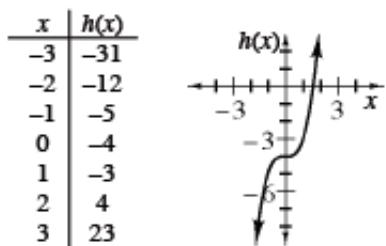
- Negative values of x do not make sense, and neither do values that are greater than half of the smaller dimension of the paper (for example, the domain is $0 \leq x \leq 8$ for a box made from a paper of dimensions $22\text{ cm} \times 16\text{ cm}$).
- The volume should not be negative.
- Continuous, because the values for x do not need to be integers.
- Answers vary.
- Answers vary.

1-57. The graph of the function is cubic. The graph for the $22\text{ cm} \times 16\text{ cm}$ box follows. A cubic function has a domain of all real numbers. The graph of this relationship is a portion of the cubic with domain limited to only

those points that represent possible heights of the paper box.



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

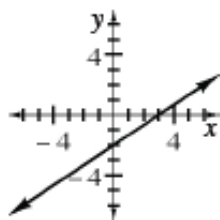


1-60. See below:

- a. ≈ 5.18 m
- b. ≈ 18.66 inches
- c. $\approx 24.62^\circ$
- d. $\sqrt{180} \approx 13.42$

1-61. See below:

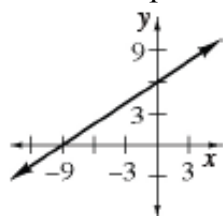
- a. A line, no variables are raised to a power.
- b. $y = \frac{2}{3}x - 2$, graph shown below.



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

d. Answers vary.

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



1-62. See below:

a. D: $x = -1, 1, 2$; R: $y = -2, 1, 2$

b. D: $-1 \leq x < 1$; R: $-1 \leq y < 2$

c. D: $x \geq -1$; R: $y \geq -1$

d. D: $-\infty < x < \infty$; R: $y \geq -2$

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

1-64. See below:

a. $x = 3, -2$

b. $x = 3, -3$

1-65. See below:

a. 2

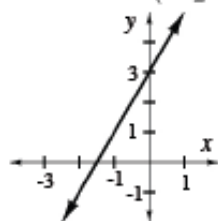
b. -4

c. $\frac{1}{0}$ is undefined

d. Justifications vary.

1-66. See below:

a. $(0, 3)$ and $(-\frac{3}{2}, 0)$, see graph below.



b. See part (a).

c. These equations are equivalent, they just have different notation.

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

1-68. See below:

a. D: $-2, -1, 2$; R: $-1, 0, 1$

b. D: $-1 < x \leq 1$; R: $-1 \leq y < 2$

c. D: $x > -1$; R: $y > -1$

d. D: $-\infty < x < \infty$; 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. See below:

a. $x = -\frac{1}{17} \approx -0.059$

b. $x = \frac{66}{13} \approx 5.08$

c. $x = -1, 3$

1-71. See below:

a. $(-1, 9)$ and $(5, 21)$

b. $x^2 + 17$

c. $x^2 - 4x - 5$

1-72. See below:

a. $x = \frac{5(y-1)}{3}$

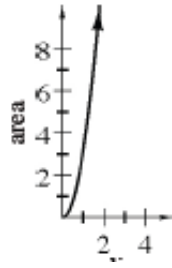
b. $x = \frac{-2y+6}{3}$

c. $x = \pm\sqrt{y}$

d. $x = \pm\sqrt{y+100}$

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

x	0	1	2	3	4
y	0	π	4π	9π	16π



1-74. See below:

a. $\sqrt{58} \approx 7.62$

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

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

1-76. See below:

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 $3x + 2 = 10 - 4x + 4$. $x = \frac{12}{7}$