Lesson 8.3.3

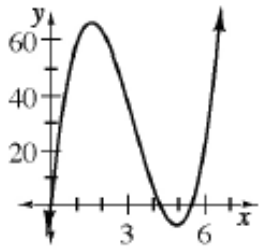
8-167. If students are using inches, the smallest cut might be a square with half-inch sides, and the largest cut might be a square with four-inch sides.

a. A very common conjecture is that the larger the cutout, the smaller the volume.

b. For inches: length = $11 - 2x$, width = $8.5 - 2x$. For centimeters: length = $27.9 - 2x$, width = $21.6 - 2x$

c. $V = x(11 - 2x)(8.5 - 2x)$ cm ^{3} or V = $x(27.9 - 2x)(21.6 - 2x)$cm^3

d. See graph below.



e. domain: $0 < x < 4.25$, range: $0 < y < 66.1$

f. $V = 66.1$cm^3, $h = 1.6$ in., $w = 5.3$ in., $l = 7.8$ in. or V = 1083 cm^3, $h = 4.05$, $w = 13.5$ cm, $l = 19.8$ cm

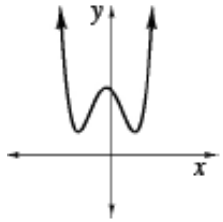
8-168. See below:

a. $0 < x < 4.25$

b. The length and width decrease as the height increases.

8-169. (0, 0), (3, 0), and (−0.5, 0)

8-170. See graph below.



8-171. See below:

a. $(x+\sqrt{10})(x-\sqrt{10})$

b. $\left(x-\frac{3+\sqrt{37}}{2}\right)\left(x-\frac{3-\sqrt{37}}{2}\right)$

c. $(x + 2i)(x - 2i)$

d. $(x - (1 + i))(x - (1 - i))$

8-172. See below:

a. real

b. complex

c. complex

d. real

e. real

f. complex

8-173. It is not; $16 + 8 \neq 32 - 40$.

8-174. See below:

a. $x = 5$ or 1

b. $x = 4$ or 0

c. $x = 7$

d. $x = 1$

8-175. See below:

a. 24

b. $(x^3 - 3x^2 - 7x + 9) \div (x - 5) = (x^2 + 2x + 3)$ with a remainder of 24.

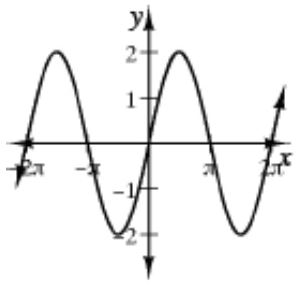
8-176. See below:

a. $y = x^2 + 1$

b. $y = x^2 - 2x - 1$

8-177. See graphs below:

a.



b.