d. Each expression is in the form $a^2 - b^2$, so it can be factored as $(a + b)(a - b)$. The term $(a + b)$, if it is prime, is the largest prime factor of the original number.

6. a. $x = 3$ or $x = 8$ **b.** $x = 7$
c. $x = -5$ **d.** $x = 0$ or $x = 11$
e. $x = -1$ or $x = -6$
f. $x = 2$ or $x = 8$

7. a. no **b.** yes; $(x - 12)^2$
c. yes; $(x + 16)^2$ **d.** yes; $(x - 21)^2$
e. no **f.** no

8. a. $(x + 6)(x + 6)$
b. $(x + 20)(x - 20)$
c. $(x + 1)(x + 8)$
d. $(x + 8)(x + 4)$
e. Not factorable; you cannot take the square root of a negative number.
f. Not factorable; no integers multiply to 10 and have a sum of 9.
g. $(x + 1)(x + 11)$
h. $(x + 1)(x + 399)$
i. $(x + 3)(x + 6)$

9. a. $x = -5$ or $x = -7$
b. $x = -2$ or $x = -10$
c. No solution; no integers multiply to -35 and have a sum of 12.
d. No solution; no integers multiply to -20 and have a sum of 12.

Lesson 7.12 Additional Practice

1. a. 3 **b.** 4
c. 3.5 **d.** 5.5

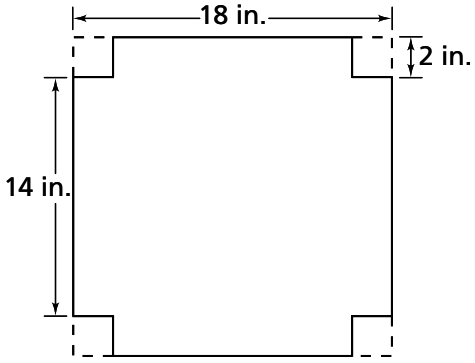
2. a. 48 **b.** 25

3. a. $x = 1$ or $x = 9$
b. $x = -1$ or $x = \frac{2}{3}$
c. $x = -2 - \sqrt{11}$ or $x = -2 + \sqrt{11}$
d. $x = 6 - \sqrt{37}$ or $x = 6 + \sqrt{37}$
e. $x = -5$ or $x = 1$
f. $x = -6$ or $x = 6$

4.
$$\begin{aligned} x^2 - 12x - 5 &= 8 \\ x^2 - 12x - 13 &= 0 \\ (x^2 - 12x + 36) - 49 &= 0 \\ (x - 6)^2 - 7^2 &= 0 \\ ((x - 6) + 7)((x - 6) - 7) &= 0 \\ (x + 1)(x - 13) &= 0 \\ x = -1 \text{ or } x &= 13 \end{aligned}$$

5. a. $x = 5 + 3\sqrt{5}$ or $x = 5 - 3\sqrt{5}$
b. $x = -6 - 4\sqrt{11}$ or $x = -6 + 4\sqrt{11}$
c. $x = -27$ or $x = 7$
d. $x = 3 - \sqrt{186}$ or $x = 3 + \sqrt{186}$

6. a.



b. 2 in. by 2 in.; let the length of the side of a cut square be x inches. The bottom area is 196 in.^{2}, giving the equation $(18 - 2x)(18 - 2x) = 196$. Expanding and combining like terms gives $4x^2 - 72x + 128 = 0$. Solve for x by dividing by 4 and factoring.

$$\begin{aligned} x^2 - 18x + 32 &= 0 \\ (x - 2)(x - 16) &= 0 \\ x = 2 \text{ or } x &= 16 \end{aligned}$$

From the diagram in part (a), the length of the side of a cut square cannot be 16 in. So, the side length of a cut square is 2 in.

c. 324 in.^{2}; 4 in.^{2}

7. a. $+36$ **b.** $+36$ **c.** $+\frac{81}{4}$

d. $+\frac{81}{4}$ **e.** $+144$ **f.** $+\frac{1}{4}$

g. $+\frac{b^2}{4}$ **h.** $+\frac{b^2}{4}$ **i.** $+\frac{b^2}{16}$

Chapter 8

Lesson 8.02 Additional Practice

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

c. 1.5

d. $\frac{-3+3\sqrt{2}}{2}, \frac{-3-3\sqrt{2}}{2}$

e. No real-number solutions; using the quadratic formula, $2^2 - 4(3)(10)$ is negative.

f. $1, -\frac{3}{2}$

2. a. Answers may vary. Sample: $p = 7$ (or any value such that $p < 8$)

b. $p = 8$

c. Answers may vary. Sample: $p = 9$ (or any value such that $p > 8$)

3. a. $\frac{3-\sqrt{149}}{10} < x < \frac{3+\sqrt{149}}{10}$

b. $x < \frac{3-\sqrt{149}}{10}$ or $x > \frac{3+\sqrt{149}}{10}$

c. $x = \frac{3-\sqrt{149}}{10}$ or $x = \frac{3+\sqrt{149}}{10}$

4. a. $x = 0$

b. $x = \frac{45+\sqrt{1961}}{4}$ or $x = \frac{45-\sqrt{1961}}{4}$

5 a. $x^2 - 5x - 14 = 0$

b. Answers may vary. Sample: $2x^2 - 10x - 28 = 0$, $3x^2 - 15x - 42 = 0$

c. $x^2 + 5x - 14 = 0$

d. Answers may vary. Sample: $2x^2 + 10x - 28 = 0$, $3x^2 + 15x - 42 = 0$

6. a. $\frac{3+\sqrt{-11}}{2}, \frac{3-\sqrt{-11}}{2}$

b. $3+\sqrt{-6}, 3-\sqrt{-6}$

c. $\frac{1+\sqrt{-7}}{2}, \frac{1-\sqrt{-7}}{2}$

7. a. $\frac{7 \pm \sqrt{41}}{2}$; sum is 7, product is 2.

b. $\frac{10 \pm \sqrt{92}}{2}$; sum is 10, product is 2.

c. $\frac{-10 \pm \sqrt{68}}{2}$; sum is -10, product is 8.

d. $\frac{1}{2}$, 2; sum is 2.5, product is 1.

e. $\frac{-p \pm \sqrt{p^2 - 4t}}{2}$; sum is $-p$, product is t.

f. $\frac{-10 \pm \sqrt{20}}{2}$; sum is -10, product is 20.

g. For the equation $ax^2 + bx + c = 0$, the sum is the value $-\frac{b}{a}$ and the product is the value $\frac{c}{a}$.

Lessons 8.03 and 8.04 Additional Practice

1. a. $x^2 - 16x + 48 = 0$

b. $x^2 + 16x + 48 = 0$

c. $x^2 - 49x + 328 = 0$

d. $x^2 - 6x + 4 = 0$

e. $x^2 + 8x + 9 = 0$

f. $x^2 - 18x + 63 = 0$

2. a. $-\frac{2}{3}$ **b.** $-\frac{8}{3}$ **c.** $-\frac{1}{3}$

3. a. $x = \frac{5}{7}$ or $x = \frac{9}{8}$

b. $(7x - 5)(8x - 9)$

c. $x = \frac{4}{13}$ or $x = \frac{23}{12}$

d. $(13x - 4)(12x - 23)$

e. For quadratics with rational roots, use the quadratic formula to find the two roots, $\frac{m}{p}$ and $\frac{n}{q}$. The factored quadratic equation over $\mathbb{Z}$ is $(px - m)(qx - n)$.

4. a. $(4x + 1)(4x - 9)$
b. $(5x - 7)(5x - 1)$
c. $(25x - 14)(x + 1)$
d. $(25x - 7)(x + 2)$
e. $(16x - 3)(x + 1)$
f. $(16x^2 - 3)(x^2 + 1)$

5. a. $(4x + y)(4x - 9y)$
b. $(5x - 7y)(5x - y)$
c. $(25x - 14y)(x + y)$
d. $(25x - 7y)(x + 2y)$

6. a. $-(10x + 1)(2x + 7)$
b. $-(10x + 1)(2x - 7)$
c. $(7 - 10x)(7 + 10x)$
d. $x(10x + 1)(2x - 7)$

7. a. $(8x - 1)(x + 3)$
b. $(4x - 1)(2x + 3)$
c. $(4x - 3)(2x + 1)$
d. $(4x + 1)(2x + 3)$
e. $(8x^2 - 1)(x^2 + 3)$
f. $(8x^2 - 32x + 31)(x^2 - 4x + 7)$
g. $(2x^2 + x + 2)(2x^2 - x + 4)$

8. $x = -3$ or $x = \frac{2}{3}$

Lesson 8.06 Additional Practice

1. a. $y = -7$ **b.** $y = -9$
c. $y = -56.25$

2. Answers may vary. Sample: $y = x^2 - 15$

3. 16 and 16

4. 87.5 and 87.5

5. 500.5 and 500.5

6. -80

7. a. 52 ft-by-52 ft
b. 52 ft-by-104 ft

8. -1

9. -4

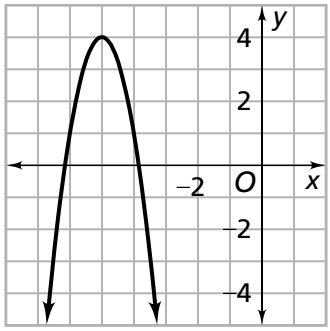
10. $f(-4 + 1) = f(-3) = 0$;
$f(-4 - 1) = f(-5) = 0$

11. $f(-4 + 2) = f(-2) = 3$;
$f(-4 - 2) = f(-6) = 3$

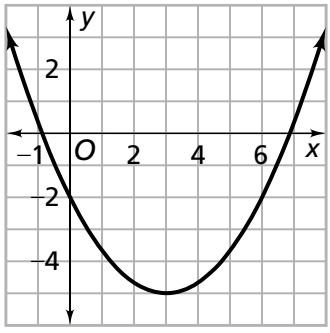
12. If $f(m)$ is the minimum value of a quadratic function and a is any real number, then $f(m + a) = f(m - a)$.

Lessons 8.07 and 8.08 Additional Practice

1. a. $(-5, 4)$; $x = -5$



b. $(3, -5)$; $x = 3$



c. $(-3, -7)$; $x = -3$