Practice Book

3 Practice and Apply

Use Practice Book pp. 203–204

Assignment Guide	
Decelerated	1–9, 19–24
Average	2–36 Even
Accelerated	10–18, 25–37

■ Before assigning the exercises on Practice Book pages 203–204, walk through the examples in the teaching display. Refer to the Think box, and have students explain why there is no x-term.

Errors Commonly Made
Some students may have difficulty remembering the pattern when multiplying $(a + b)(a - b)$. Remind them that they can always use the FOIL method if they forget the pattern.

■ In exercises 1–18, remind students of the differences in the patterns of perfect square trinomials and the difference of two squares.

■ Have students check the factors in exercises 19–34 by multiplying using the FOIL method. Some students may have difficulty finding the square root of decimal numbers or fractions in exercises 25–34. Review this as necessary.

Problem Solving

■ Some students may find it helpful to write an algebraic equation, such as $(x + y)(x - y) = 32$, for problems 35 and 36 in order to visualize the placement of the numbers in the factors.

Critical Thinking

■ Students should recognize that they can factor out a 5 from the binomial. Then the remaining binomial is a difference of two squares.

8-5 Special Product and Factoring: $(a + b)(a - b) = a^2 - b^2$

Name _____ Date _____

Multiply: $(2x + 15)(2x - 15)$

Think
$(a + b)(a - b) = a^2 - b^2$

$(2x + 15)(2x - 15) = (2x)^2 - (15)^2$
$= 4x^2 - 225$

Factor: $25x^2 - 144$

$25x^2 - 144 = (5x)^2 - (12)^2$ ← The binomial can be expressed as the difference of two perfect squares.
$= (5x + 12)(5x - 12)$

Check: $25x^2 - 144 \stackrel{?}{=} (5x + 12)(5x - 12)$
$\stackrel{?}{=} 25x^2 - 60x + 60x - 144$
$= 25x^2 - 144$ **True**

Multiply.

1. $(b + 17)(b - 17)$
$(b)^2 - (17)^2$
$b^2 - 289$

2. $(a + 21)(a - 21)$
$(a)^2 - (21)^2$
$a^2 - 441$

3. $(r - 35)(r + 35)$
$(r)^2 - (35)^2$
$r^2 - 1225$

4. $(g - 40)(g + 40)$
$(g)^2 - (40)^2$
$g^2 - 1600$

5. $(4x - 3)(4x + 3)$
$(4x)^2 - (3)^2$
$16x^2 - 9$

6. $(7h - 5)(7h + 5)$
$(7h)^2 - (5)^2$
$49h^2 - 25$

7. $(9x + 7y)(9x - 7y)$
$(9x)^2 - (7y)^2$
$81x^2 - 49y^2$

8. $(8m + 13n)(8m - 13n)$
$(8m)^2 - (13n)^2$
$64m^2 - 169n^2$

9. $(10t + 9u)(10t - 9u)$
$(10t)^2 - (9u)^2$
$100t^2 - 81u^2$

10. $(20b + 7c)(20b - 7c)$
$(20b)^2 - (7c)^2$
$400b^2 - 49c^2$

11. $(q - 0.8)(q + 0.8)$
$(q)^2 - (0.8)^2$
$q^2 - 0.64$

12. $(d - 0.9)(d + 0.9)$
$(d)^2 - (0.9)^2$
$d^2 - 0.81$

13. $(3.2r + 1.1s)(3.2r - 1.1s)$
$(3.2r)^2 - (1.1s)^2$
$10.24r^2 - 1.21s^2$

14. $(2.6v + 2.1w)(2.6v - 2.1w)$
$(2.6v)^2 - (2.1w)^2$
$6.76v^2 - 4.41w^2$

15. $\left(f - \frac{1}{3}\right)\left(f + \frac{1}{3}\right)$
$f^2 - \frac{1}{9}$

16. $\left(k - \frac{1}{8}\right)\left(k + \frac{1}{8}\right)$
$(k)^2 - \left(\frac{1}{8}\right)^2$
$k^2 - \frac{1}{64}$

17. $\left(\frac{3}{5}p + \frac{7}{3}q\right)\left(\frac{3}{5}p - \frac{7}{3}q\right)$
$\left(\frac{3}{5}p\right)^2 - \left(\frac{7}{3}q\right)^2$
$\frac{9}{25}p^2 - \frac{49}{9}q^2$

18. $\left(\frac{5}{4}x + \frac{5}{6}y\right)\left(\frac{5}{4}x - \frac{5}{6}y\right)$
$\left(\frac{5}{4}x\right)^2 - \left(\frac{5}{6}y\right)^2$
$\frac{25}{16}x^2 - \frac{25}{36}y^2$

Use with SOURCEBOOK Lesson 8-5, pages 212–213.

Factor. Then check your answer.

19. $x^2 - 324$

$(x)^2 - (18)^2$
$(x + 18)(x - 18)$
Check:
$= x^2 - 18x + 18x - 324$
$= x^2 - 324$ ✓

20. $b^2 - 900$

$(b)^2 - (30)^2$
$(b + 30)(b - 30)$

21. $121 - 64d^2$

$(11)^2 - (8d)^2$
$(11 + 8d)(11 - 8d)$

22. $169 - 100m^2$

$(13)^2 - (10m)^2$
$(13 + 10m)(13 - 10m)$

23. $25r^2 - 256s^2$

$(5r)^2 - (16s)^2$
$(5r + 16s)(5r - 16s)$

24. $49f^2 - 361g^2$

$(7f)^2 - (19g)^2$
$(7f + 19g)(7f - 19g)$

25. $h^2 - 1.44$

$(h)^2 - (1.2)^2$
$(h + 1.2)(h - 1.2)$

26. $k^2 - 2.25$

$(k)^2 - (1.5)^2$
$(k + 1.5)(k - 1.5)$

27. $p^2 - \frac{25}{9}$

$(p)^2 - \left(\frac{5}{3}\right)^2$
$\left(p + \frac{5}{3}\right)\left(p - \frac{5}{3}\right)$

28. $w^2 - \frac{36}{49}$

$(w)^2 - \left(\frac{6}{7}\right)^2$
$\left(w + \frac{6}{7}\right)\left(w - \frac{6}{7}\right)$

29. $\frac{1}{4}\ell^2 - \frac{1}{9}m^2$

$\left(\frac{1}{2}\ell\right)^2 - \left(\frac{1}{3}m\right)^2$
$\left(\frac{1}{2}\ell + \frac{1}{3}m\right)\left(\frac{1}{2}\ell - \frac{1}{3}m\right)$

30. $\frac{1}{25}x^2 - \frac{1}{16}y^2$

$\left(\frac{1}{5}x\right)^2 - \left(\frac{1}{4}y\right)^2$
$\left(\frac{1}{5}x + \frac{1}{4}y\right)\left(\frac{1}{5}x - \frac{1}{4}y\right)$

31. $0.25b^2 - 0.36c^2$

$(0.5b)^2 - (0.6c)^2$
$(0.5b + 0.6c)(0.5b - 0.6c)$

32. $0.16p^2 - 0.25q^2$

$(0.4p)^2 - (0.5q)^2$
$(0.4p + 0.5q)(0.4p - 0.5q)$

33. $6.25v^2 - 0.49w^2$

$(2.5v)^2 - (0.7w)^2$
$(2.5v + 0.7w)(2.5v - 0.7w)$

34. $0.01j^2 - 0.04k^2$

$(0.1j)^2 - (0.2k)^2$
$(0.1j + 0.2k)(0.1j - 0.2k)$

Problem Solving

Answers may vary. Check students' answers.

35. The sum of two numbers times the difference of the same two numbers is 32. What are the numbers?

Possible response:
$(6 + 2)(6 - 2) = 8 \cdot 4 = 32$; The two numbers are 6 and 2.

36. One number is 3 more than a second number. The product of their sum and their difference is 45. What are the numbers?

Possible response:
$(9 + 6)(9 - 6) = 15(3) = 45$; The two numbers are 9 and 6.

CRITICAL THINKING

37. Can the binomial $5y^2 - 125$ be factored as the difference of two perfect squares? Explain your answer.

Yes; the binomial $5y^2 - 125$ can be expressed as $5(y^2 - 25)$, and $y^2 - 25$ is the difference of two squares.

Additional Resources

ONLINE www.progressinmathematics.com

- Meeting Individual Needs Activities
- Alternative Teaching Models
- Vocabulary Activities
- Audio Glossary
- Virtual Manipulatives
- Check Your Progress II
- Practice Activities (Lessons 4–5)

Meeting Individual Needs
See page 199F.

4 Summarize/Assess

Conceptual Thinking

■ To assess whether students have conceptualized the lesson concepts, lead a discussion in which they explain how to find products such as $(2x + 5)(2x - 5)$. Then have them factor the difference of two squares, such as $9x^2 - 16$. $4x^2 - 25$; $(3x + 4)(3x - 4)$

In their *Math Journals*, have students describe the special products resulting in a perfect square trinomial and the difference of two squares, and give examples.

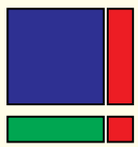
ONLINE **Check Your Progress II**

Administer Check Your Progress II to assess understanding of Lessons 4–5. For additional practice, assign the online Practice Activities.

5 Follow-Up

Reteaching

■ Explain to students that although area cannot be negative, a model using negative algebra tiles can be used to represent the product of two binomials that include negative numbers. Draw the following figure on the board.



Help students understand that the large square models $x^2 - 1$, which represents the product $(x + 1)(x - 1)$.

Have students work in pairs. Provide several products that result in the difference of two squares, such as $(2x + 3)(2x - 3)$, and have students use algebra tiles to model and find the product. Then discuss the pattern of the special product.

ONLINE **See Chapter 8 Alternative Teaching Models.**

End of Lesson