Name _____ Date _____

LESSON 8.3

Study Guide

For use with the lesson "Find Special Products of Polynomials"

GOAL **Use special product patterns to multiply polynomials.**

Square of a Binomial Pattern

Algebra	Example
$(a + b)^2 = a^2 + 2ab + b^2$	$(x + 3)^2 = x^2 + 6x + 9$
$(a - b)^2 = a^2 - 2ab + b^2$	$(3x - 2)^2 = 9x^2 - 12x + 4$

EXAMPLE 1 Use the square of a binomial pattern

Find the product.

a. $(7x + 2)^2$ **b.** $(6x - 5y)^2$

Solution

a. $(7x + 2)^2 = (7x)^2 + 2(7x)(2) + 2^2$ Square of a binomial pattern

$= 49x^2 + 28x + 4$ Simplify.

b. $(6x - 5y)^2 = (6x)^2 - 2(6x)(5y) + (5y)^2$ Square of a binomial pattern

$= 36x^2 - 60xy + 25y^2$ Simplify.

Exercises for Example 1

Find the product.

1. $(y + 9)^2$
2. $(3z + 7)^2$
3. $(2w - 3)^2$
4. $(10r - 3s)^2$

Sum and Difference Pattern

Algebra	Example
$(a + b)(a - b) = a^2 - b^2$	$(x + 5)(x - 5) = x^2 - 25$

LESSON 8.3

Study Guide *continued*

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EXAMPLE 2 Use the sum and difference pattern

Find the product.

a. $(m + 9)(m - 9)$ **b.** $(4n - 3)(4n + 3)$

Solution

a. $(m + 9)(m - 9) = m^2 - 9^2$ Sum and difference pattern

$= m^2 - 81$ Simplify.

b. $(4n - 3)(4n + 3) = (4n)^2 - 3^2$ Sum and difference pattern

$= 16n^2 - 9$ Simplify.

Exercises for Example 2

Find the product.

5. $(g + 11)(g - 11)$

6. $(7f - 1)(7f + 1)$

7. $(2h + 9)(2h - 9)$

8. $(6k - 8)(6k + 8)$

EXAMPLE 3 Use special products and mental math

Use special products to find the product of 37 · 43.

Solution

Notice that 37 is 3 less than 40 while 43 is 3 more than 40.

$37 \cdot 43 = (40 - 3)(40 + 3)$ Write as a product of difference and sum.

$= 40^2 - 3^2$ Sum and difference pattern

$= 1600 - 9$ Evaluate powers.

$= 1591$ Simplify.

Exercises for Example 3

Describe how you can use special products to find the product.

9. 55^2

10. $31 \cdot 49$