

Name: _____

Date: _____

7.3 Multiplying Special Products

Essential Question What are the patterns in the special products $(a + b)(a - b)$, $(a + b)^2$, and $(a - b)^2$?

Copy down the box for side length $(a + b)$ here:

Copy down the box for the binomial $(a - b)^2$ here:

Core Concept

Square of a Binomial Pattern

Algebra

$$(a + b)^2 = a^2 + 2ab + b^2$$

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

Example

$$\begin{aligned}(x + 5)^2 &= (x)^2 + 2(x)(5) + (5)^2 \\ &= x^2 + 10x + 25\end{aligned}$$

$$\begin{aligned}(2x - 3)^2 &= (2x)^2 - 2(2x)(3) + (3)^2 \\ &= 4x^2 - 12x + 9\end{aligned}$$

EXAMPLE 1 Using the Square of a Binomial Pattern

Find each product.

a. $(3x + 4)^2$

b. $(5x - 2y)^2$

Using the Sum and Difference Pattern

To find the product $(x + 2)(x - 2)$, you can multiply the two binomials using the FOIL Method.

$$\begin{aligned}(x + 2)(x - 2) &= x^2 - 2x + 2x - 4 && \text{FOIL Method} \\ &= x^2 - 4 && \text{Combine like terms.}\end{aligned}$$

This suggests a pattern for the product of the sum and difference of two terms.

Core Concept

Sum and Difference Pattern

Algebra

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

Example

$$(x + 3)(x - 3) = x^2 - 9$$

EXAMPLE 2 Using the Sum and Difference Pattern

Find each product.

a. $(t + 5)(t - 5)$

b. $(3x + y)(3x - y)$

EXAMPLE 3 Using Special Product Patterns and Mental Math

Use special product patterns to find the product $26 \cdot 34$.