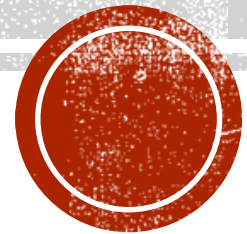


SPECIAL PRODUCTS

Lesson 7.4



Some pairs of binomials show patterns when multiplied. You can use these patterns to multiply other similar pairs of binomials.

SPECIAL PRODUCT PATTERNS

Sum and Difference Pattern aka the Difference of Squares

$$(a + b)(a - b)$$



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Example: $(3x + 4)(3x - 4)$



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Example: $(3x + 4)(3x - 4)$
 $= 9x^2 - 12x + 12x - 16$



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Example: $(3x + 4)(3x - 4)$
 $= 9x^2 - 12x + 12x - 16$

Notice that the middle term is zero.



EXAMPLE**1****Using the Sum and Difference Pattern**

Find each product.

a. $(x + 7)(x - 7)$

b. $(3x - 1)(3x + 1)$



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Sum and Difference Pattern

$$(x + 7)(x - 7) = x^2 - 7^2$$

Use pattern.

b. $(3x - 1)(3x + 1)$



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

Sum and Difference Pattern

$$(x + 7)(x - 7) = x^2 - 7^2$$

Use pattern.

$$= x^2 - 49$$

Simplify.

b. $(3x - 1)(3x + 1)$



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

Sum and Difference Pattern

$$(3x - 1)(3x + 1) = (3x)^2 - 1^2$$

Use pattern.



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Sum and Difference Pattern

$$(3x - 1)(3x + 1) = (3x)^2 - 1^2$$

Use pattern.

$$= 9x^2 - 1$$

Simplify.



On Your Own

Find the product.

$$\begin{aligned} 1. \quad & (x - 4)(x + 4) \\ & = x^2 - 16 \end{aligned}$$

$$\begin{aligned} 2. \quad & (b + 10)(b - 10) \\ & = b^2 - 100 \end{aligned}$$

$$\begin{aligned} 3. \quad & (2g + 5)(2g - 5) \\ & = 4g^2 - 25 \end{aligned}$$



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SPECIAL PRODUCT PATTERNS

Square of Binomial Pattern

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

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



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Notice that the middle term is twice the product of the terms of the binomial.



EXAMPLE**2****Using the Square of a Binomial Pattern**

Find each product.

a. $(y + 1)^2$

b. $(2z - 3)^2$



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EXAMPLE**2****Using the Square of a Binomial Pattern****Find each product.**

a. $(y + 1)^2$

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

Square of a Binomial Pattern

$$(y + 1)^2 = y^2 + 2(y)(1) + 1^2$$

Use pattern.

b. $(2z - 3)^2$



EXAMPLE**2****Using the Square of a Binomial Pattern**

Find each product.

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

Square of a Binomial Pattern

$$(y + 1)^2 = y^2 + 2(y)(1) + 1^2$$

Use pattern.

$$= y^2 + 2y + 1$$

Simplify.

b. $(2z - 3)^2$



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Simplify.

b. $(2z - 3)^2$

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

Square of a Binomial Pattern



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

Square of a Binomial Pattern

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Use pattern.

$$= y^2 + 2y + 1$$

Simplify.

b. $(2z - 3)^2$

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

Square of a Binomial Pattern

$$(2z - 3)^2 = (2z)^2 - 2(2z)(3) + 3^2$$

Use pattern.



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Square of a Binomial Pattern

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Use pattern.

$$= y^2 + 2y + 1$$

Simplify.

b. $(2z - 3)^2$

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

Square of a Binomial Pattern

$$(2z - 3)^2 = (2z)^2 - 2(2z)(3) + 3^2$$

Use pattern.

$$= 4z^2 - 12z + 9$$

Simplify.



On Your Own

Find the product.

$$\begin{aligned} 4. \quad & (w + 2)^2 \\ & = w^2 + 4w + 4 \end{aligned}$$

$$\begin{aligned} 6. \quad & (3y - 1)^2 \\ & = 9y^2 - 6y + 1 \end{aligned}$$

$$\begin{aligned} 5. \quad & (x - 7)^2 \\ & = x^2 - 14x + 49 \end{aligned}$$

$$\begin{aligned} 7. \quad & (5z + 4)^2 \\ & = 25z^2 + 40z + 16 \end{aligned}$$

