

Algebra 1 8.4

Find squares of sums and differences

Find the product of a sum and a difference

product

sum +  
difference -  
product x

$$(x+3)(x+7)$$

" EWE " difference of squares "

$$(x-3)(x^2+5x-7)$$

X-factor

$$sq. - sq$$

$$\begin{aligned} & \text{!} \rightarrow x^2 + 9 \\ & (x+3)^2 = (x+3)(x+3) \end{aligned}$$

What does it mean to square something?

$$17^2 = 17 \cdot 17 = 289$$

$$(10+7)(10+7) = 289$$

$$\begin{array}{c} 100 + 49 \\ \downarrow \downarrow \end{array}$$

Is  $17 = 10 + 7$ ?

Is  $17^2 = (10+7)^2$ ?

(what is the correct answer?)

Is that the same as  $10^2 + 7^2$ ?

$$\begin{array}{r} 17 \\ \times 17 \\ \hline 49 \\ 70 \\ \hline 100 \\ \hline 289 \end{array}$$

$$(x+6)^2 = x^2 + 12x + 36$$

EWE: look for patterns

$$(x+5)^2 = x+3$$

$$= x^2 + 10x + 25$$

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

$$= x^2 + 6x + 9$$

$$\rightarrow (x+10)^2 = x^2 \quad 3x \quad 9$$

$$= x^2 + 20x + 100$$

$$(x+8)^2 = x^2 \quad 3x$$

$$= x^2 + 16x + 64$$

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

$$= x^2 + 14x + 49$$

$$(3x+6)^2 =$$

EWE always!

$$9x^2 + 25$$

**Example 1** Square of a Sum

Find  $(3x + 5)^2$ .  $(3x + 5)(3x + 5)$

$$\begin{array}{r} 3x + 5 \\ 3x + 5 \\ \hline 9x^2 + 15x + 15x + 25 \\ \hline 9x^2 + 30x + 25 \end{array}$$

$$(3x + 5)^2 = 9x^2 + 30x + 25$$

**Guided**Practice

Find each product.

1A.  $(8c + 3d)^2 = 64c^2 + 48cd + 9d^2$

$$8c + 3d$$

$$\underline{8c + 3d}$$

$$1B. (3x + 4y)^2 = 9x^2 + 24xy + 16y^2$$

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**Example 2** Square of a Difference

Find  $(2x - 5y)^2$ .  $-5y \cdot -5y$

$$4x^2 - 20xy + 25y^2$$

↑

$$(4x - 3y)^2 \quad -3y \cdot -3y$$

$$16x^2 - 24xy + 9y^2$$

**Guided**Practice

Find each product.

**2A.**  $(6p - 1)^2$

**2B.**  $(a - 2b)^2$

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 **Real-World Example 3** Square of a Difference

**PHYSICAL SCIENCE** Each edge of a cube of aluminum is 4 centimeters less than each edge of a cube of copper. Write an equation to model the surface area of the aluminum cube.

### Guided Practice

3. **GARDENING** Alano has a garden that is  $g$  feet long and  $g$  feet wide. He wants to add 3 feet to the length and the width.
- A. Show how the new area of the garden can be modeled by the square of a binomial.
- B. Find the square of this binomial.

Difference of squares: EWE look for a pattern

$$(x + 5)(x - 5)$$

$$(x + 3)(x - 3)$$

$$(x + 9)(x - 9)$$

**Example 4** Product of a Sum and a Difference

Find  $(2x^2 + 3)(2x^2 - 3)$ .

**Guided**Practice

Find each product.

**4A.**  $(3n + 2)(3n - 2)$

**4B.**  $(4c - 7d)(4c + 7d)$