

Algebra 1 8.4

Find squares of sums and differences

Find the product of a sum and a difference

sum +

difference -

product  $\times$

EWE

difference of squares

X-factor

$$(a+6)(a-3)$$
$$\begin{array}{r} a+6 \\ a-3 \\ \hline a^2+6a \\ -3a-18 \\ \hline a^2+3a-18 \end{array}$$



What does it mean to square something?

$$\begin{array}{r} 10+7 \\ 10+7 \\ \hline 49 \\ 100 \\ \hline \end{array}$$

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

↓   ↓

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

$$\begin{array}{r} 10+7 \\ 10+7 \\ \hline 70+49 \\ 100+70 \\ \hline 289 \end{array}$$

Is  $17 = 10 + 7$  ?

Is  $17^2 = (10+7)^2$  ?  
(what is the correct answer?)

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

EWE: look for patterns

$$(x+5)^2 = (x+5)(x+5) = x^2 + 10x + 25$$

$$(x+3)^2 = (x+3)(x+3) = x^2 + 6x + 9$$

$$(x-10)^2 = (x-10)(x-10) = x^2 - 20x + 100$$

$$(x+8)^2 = (x+8)(x+8) = x^2 + 16x + 64$$

$$(x-7)^2 = (x-7)(x-7) = x^2 - 14x + 49$$

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

$$(x+12)^2 = (x+12)(x+12) = x^2 + 24x + 144$$

$$(x+9)^2 = x^2 + 18x + 81$$

EWE always!

**Example 1** Square of a Sum

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

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

$$\del{9x^2 + 25}$$

**Guided Practice**

Find each product.

1A.  $(8c + 3d)^2$

$$64c^2 + 9d^2$$

$$\begin{array}{r} 8c + 3d \\ 8c + 3d \\ \hline 64c^2 + 24cd + 9d^2 \\ \hline 64c^2 + 48cd + 9d^2 \end{array}$$

1B.  $(3x + 4y)^2$

$$\begin{array}{r} 3x + 4y \\ \underline{3x + 4y} \\ 9x^2 + 12xy + 12xy + 16y^2 \\ \underline{9x^2 + 24xy + 16y^2} \end{array}$$

### Example 2 Square of a Difference

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

$$\begin{array}{r} 2x - 5y \\ 2x - 5y \\ \hline 4x^2 - 10xy + 25y^2 \\ -10xy \\ \hline 4x^2 - 20xy + 25y^2 \end{array}$$

e we { Simplify  
Find the product  
multiply

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