

Algebra 1 8.4

Find squares of sums and differences

Find the product of a sum and a difference

sum +

difference -

~~product~~ x

EWE

difference of squares

X-factor

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

$$\left(\quad \right)^2 - \left(\quad \right)^2$$

What does it mean to square something?

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

$$\begin{array}{r} 17 \\ \times 17 \\ \hline 119 \\ 100 \\ \hline \end{array}$$

$$\begin{array}{r} 17 \\ \times 17 \\ \hline 119 \\ 100 \\ \hline \end{array}$$

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

Is $17 = 10 + 7$?

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

(what is the correct answer?)

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

Perfect square

EWE: look for patterns

$()^2$ double sign
↓ ↓ ↓

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

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

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

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

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

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

$$\begin{array}{r} x+5 \\ x+5 \\ \hline x^2 \quad \textcircled{5x} + 25 \\ \quad \textcircled{5x} \end{array}$$

$$\begin{array}{r} x+3 \\ x+3 \\ \hline x^2 \quad \textcircled{3x} + 9 \\ \quad \textcircled{3x} \end{array}$$

EWE always!

Example 1 Square of a Sum

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

$$(3x+5)(3x+5)$$

$\swarrow \quad \searrow$
 $15x$

$$9x^2 + 30x + 25$$

$$(x-13)^2 = \underline{x^2} - 26x + \underline{169}$$

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

$$\begin{array}{r} x-11 \\ x-11 \\ \hline \end{array} (x-11)^2 = x^2 - 22x + 121$$

Guided Practice

Find each product.

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

$$(8c + 3d)(8c + 3d)$$
$$64c^2 + 48cd + 9d^2$$

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

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

$5y5y$

Example 2 Square of a Difference

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

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

GuidedPractice

Find each product.

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

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

 **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.

D.O.S.

Difference of squares: EWE look for a pattern

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

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

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

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

$$x^2 - 49$$

$$\begin{array}{r} x + 3 \\ x - 3 \\ \hline \end{array}$$

$$\begin{array}{r} x + 5 \\ x - 5 \\ \hline \end{array}$$

$$(\quad)(\quad) = x^2 - 81$$

Example 4 Product of a Sum and a Difference

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

$$4x^4 - 9$$

GuidedPractice

Find each product.

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

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