Algebra 1 8.4

Find squares of sums and differences

Find the product of a sum and a difference

sum +

difference −

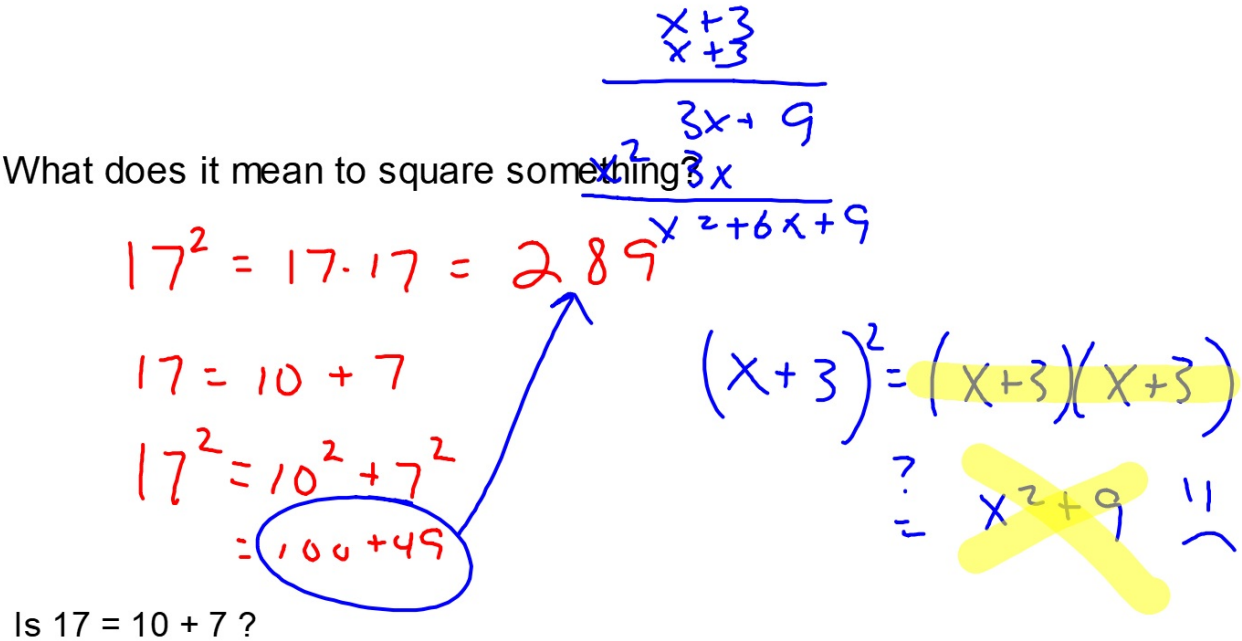
product ×

EWE

difference of squares

X-factor

What does it mean to square something?



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

$(x+5)^2 = (x+5)(x+5) = x^2+10x+25$ $\quad (x-5)^2 = x^2-10x+25$

$(x+3)^2 = (x+3)(x+3) = x^2+6x+9$ $\quad (x+4)^2 = x^2+8x+16$

$(x-10)^2 = (x-10)(x-10) = x^2-20x+100$ $\quad (x-7)^2 = x^2-14x+49$

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

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

EWE always!

Example 1 Square of a Sum

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

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

GuidedPractice

Find each product.

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

$64c^2 + 48cd + 9d^2$

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

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

Example 2 Square of a Difference

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

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

$-25y^2$

$2x - 5y$

$2x - 5y$

GuidedPractice

Find each product.

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

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

$36p^2 - 6p + 1$

$36p^2 + -12p + 1$

$a^2 + 4b^2 - 4ba$

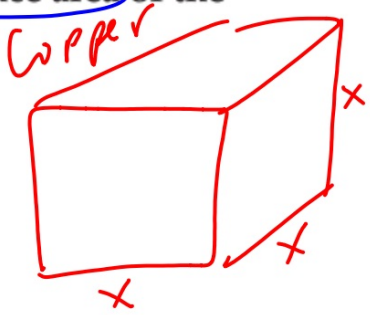
$a^2 - 4ba + 4b^2$

Real-World Example 3 Square of a Difference

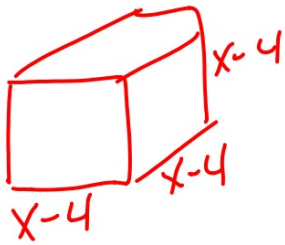
PHYSICAL SCIENCE Each edge of a cube of aluminum is 4 centimeters less than each edge of a cube of copper. Write an equation to model the surface area of the aluminum cube.

Copper

$SA = 6(x^2) = 6x^2$



Alum.



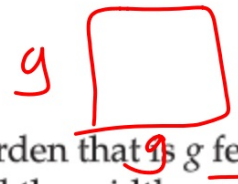
Alum.

$SA = 6((x-4)(x-4))$

$6(x^2 - 8x + 16)$

$= 6x^2 - 48x + 96$

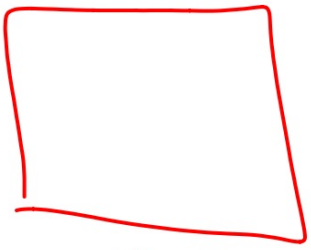
GuidedPractice



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.



$(g+3)(g+3)$

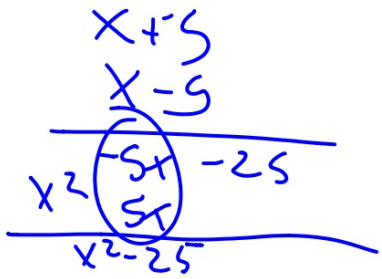
$(g+3)^2 = g^2+6g+9$

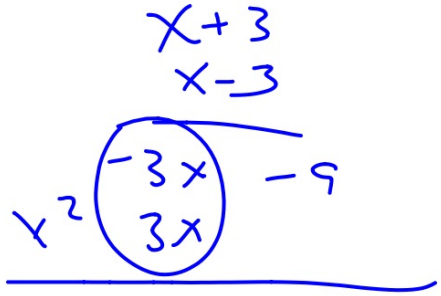
Difference of squares: EWE look for a pattern

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

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

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





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

$(m+3)(m-3)$

Example 4 Product of a Sum and a Difference

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

$4x^4-9$

$=$ $=$

$2x^2+3$

$2x^2-3$

$-6x^2+6x^2-9$

$4x^4-9$

GuidedPractice

Find each product.

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

$9n^2 - 4$

( )( )

$25x^2 - 49$

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