

Looking for Shortcuts: Part 1

Consider: Say we want to expand and simplify the expression $(x + 2)(x - 2)$.

Using the distributive property, from last class, we could figure out the answer this way:

$$(x + 2)(x - 2)$$

$$= x^2 + 2x - 2x - 4$$

$$= x^2 - 4$$

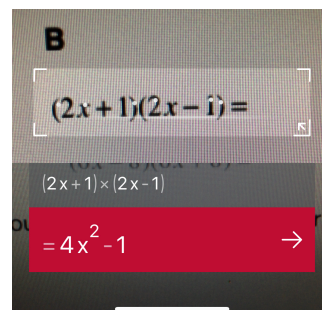
Hmm.

That looks like a lot of work.
Could there be a better (faster) way?

Let's find a better way. We can use [Photomath](#), to save time when investigating.

1. Using Photomath, expand the expressions below.

How to do this is shown at right.



A

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

$$(x + 2)(x - 2) = x^2 - 4$$

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

$$(x + 4)(x - 4) = x^2 - 16$$

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

B

$$(2x + 1)(2x - 1) = 4x^2 - 1$$

$$(2x + 2)(2x - 2) = 4x^2 - 4$$

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

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

$$(6x - 8)(6x + 8) = 36x^2 - 64$$

REFLECT: Describe any patterns you see. Note the *signs* of terms in your answers!

To get answer:

- multiply first terms in brackets
- multiply second terms in brackets

PREDICT: Don't use the Photomath software.

What will $(5x + 3)(5x - 3)$ be? $25x^2 - 9$

How about $(6x - 2)(6x + 2)$ be? $36x^2 - 4$

MAKE RULES: If $(a + b)(a - b)$ then the answer is... $a^2 - b^2$

If $(a - b)(a + b)$ then the answer is... $a^2 - b^2$

This is a shortcut for the product of a sum and difference