# Quadratic Relations: Day 2
# Converting from Factored Form to Standard Form

Previously, we learned how to convert **factored form** quadratic equations into **standard form** quadratic equations using **THE GRID METHOD**.

Now, we will learn how to do the very same thing, but this time using **FOIL**.

## Expanding Factored Form Quadratic Equations Using FOIL

$$Expand: y = (x - 5)(x + 3)$$

Insert arrows to identify what terms are being multiplied together (**Use FOIL**).

$y = (x - 5)(x + 3)$ (O, F, I, L)

F – First Term in each set of brackets
O – Outside Term in each set of brackets
I – Inside Term in each set of brackets
L – Last Term in each set of brackets.

Write out all of the multiplications you will be performing separated by addition signs. **Be sure to include +/- signs!**

**F O I L**

$$y = (x)(x) + (x)(+3) + (-5)(x) + (-5)(+3)$$

Perform all multiplications, remove brackets.

**F O I L**

$$y = x^2 + 3x - 5x - 15$$

Simplify.

$$y = x^2 - 2x - 15$$

Therefore, the factored form equation $y = (x - 5)(x + 3)$ is equivalent to the standard form equation $y = x^2 - 2x - 15$. Both equations will produce the same parabolic graph!

$Expand: y = (x + 2)(x + 3)$

$y = x^2 + 3x + 2x + 6$

$y = x^2 + 5x + 6$

$Expand: y = (x + 6)(x - 5)$

$y = x^2 - 5x + 6x - 30$

$y = x^2 + x - 30$

$Expand: y = (x - 8)(x + 4)$

$y = x^2 + 4x - 8x - 32$

$y = x^2 - 4x - 32$

$Expand: y = (x + 2)(x - 2)$

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

$y = x^2 - 4$

$Expand: y = (x - 1)(x - 8)$

$y = x^2 - 8x - 1x + 8$

$y = x^2 - 9x + 8$

$Expand: y = (x - 7)(x - 4)$

$y = x^2 - 4x - 7x + 28$

$y = x^2 - 11x + 28$

$Expand: y = (x + 3)(x + 3)$

$y = x^2 + 3x + 3x + 9$

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

$Expand: y = (x - 5)(x - 5)$

$y = x^2 - 5x - 5x + 25$

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