

## Quadratic Relations: Day 5 – Common Factoring

Today, we will learn how to factor quadratics in standard form when the  $a$ -value is not 1.

### Factoring Quadratic Equations in the Form $y = ax^2 + bx + c$

$$\text{Factor: } y = 2x^2 - 4x - 30$$

First, **factor out** the  $a$ -value from every term!

$$y = 2x^2 - 4x - 30 \quad \text{BECOMES} \quad y = 2(x^2 - 2x - 15)$$

List all possible factors of the  $c$  inside the brackets (In this case,  $c = -15$ )

+1, -15

-1, +15

+3, -5

-3, +5

If  $c$  is negative, you must have a negative factor and a positive factor.

If  $c$  is positive **and**  $b$  is positive you must have two positive factors.

If  $c$  is positive **and**  $b$  is negative you must have two negative factors.

Determine which set of factors **sums** to the  $b$  inside the brackets

$$(+1) + (-15) = -14$$

$$(-1) + (+15) = +14$$

$$(+3) + (-5) = -2$$

$$(-3) + (+5) = +2$$

$$r = +3$$

$$s = -5$$

Write the factored-form equation.

Include the common factor!

$$y = 2(x + 3)(x - 5)$$

Therefore, the standard form equation  $y = 2x^2 - 4x - 30$  is equivalent to the factored form equation  $y = 2(x - 5)(x + 3)$ . Both equations will produce the same parabolic graph!

Factor out a  
from each  
term!

Factor:  $y = 2x^2 + 10x + 12$

Use a calculator!

Factor:  $y = 3x^2 + 3x - 90$

Factor:  $y = 3x^2 - 12x - 96$

Factor:  $y = 4x^2 - 4x - 24$

Factor:  $y = 4x^2 - 20x$

Factor:  $y = 2x^2 - 18$