

Key

Converting Quadratic Equations between Standard and Intercept Form

Standard Form: $y = ax^2 + bx + c$

Intercept Form: $y = a(x-p)(x-q)$

Convert from Standard Form to Intercept Form

$y = ax^2 + bx + c \implies y = a(x-p)(x-q)$

Example 1:

$y = 2x^2 + 10x - 28$

$y = 2(x^2 + 5x - 14)$

Factor out the GCF of the coefficients to find a

$y = 2(x+7)(x-2)$

Factor the trinomial using Perfect Square Trinomial or AC

~~$\frac{7}{1} \times \frac{-2}{1} = -14$
 $\frac{14}{5}$~~

$y = 2(x+7)(x-2)$

Example 2:

$y = x^2 - 4x - 96$

$y = (x^2 - 4x - 96)$

Factor out the GCF of the coefficients to find a

$y = (x-12)(x+8)$

Factor the trinomial using Perfect Square Trinomial or AC

~~$\frac{-12}{1} \times \frac{8}{1} = -96$
 $\frac{-4}{1}$~~

$y = (x-12)(x+8)$

Practice: Convert the following quadratics from standard form to intercept form.

1. ~~$f(x) = 2x^2 + 16x + 28$~~

~~$2(x^2 + 8x + 14)$~~

~~14 Not possible, SO NO GCF~~

~~$2x^2 + 16x + 28$~~

~~$\frac{7}{1} \times \frac{2}{1} = 14$
 $\frac{16}{10}$~~

~~$y = (x+7)(x+2)$~~

2. $f(x) = -2x^2 - 12x - 18$

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

~~$\frac{3}{1} \times \frac{3}{1} = 9$~~

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

3. $f(x) = -x^2 - 10x + 24$

$-(x^2 + 10x - 24)$

~~$\frac{12}{1} \times \frac{-2}{1} = -24$
 $\frac{-10}{10}$~~

$y = -(x+12)(x-2)$

Convert from Intercept Form to Standard Form

$$y = a(x-p)(x-q) \implies y = ax^2 + bx + c$$

Example 1:

$$y = 2(x+3)(x-1)$$

$$y = 2(x^2 + 3x - x - 3) \leftarrow \text{FOIL the intercept form and combine like terms}$$
$$2(x^2 + 2x - 3)$$

$$y = 2x^2 + 4x - 6 \leftarrow \text{Distribute a into the trinomial}$$

$$y = 2x^2 + 4x - 6$$

Example 2:

$$y = 3(x-6)(x-2)$$

$$y = 3(x^2 - 6x - 2x + 12) \leftarrow \text{FOIL the intercept form and combine like terms}$$
$$3(x^2 - 8x + 12)$$

$$y = 3x^2 - 24x + 36 \leftarrow \text{Distribute a into the trinomial}$$

$$y = 3x^2 - 24x + 36$$

Practice: Convert the following quadratics from intercept form to standard form.

1. $f(x) = 3(x-4)(x+2)$

$$3(x^2 - 4x + 2x - 8)$$
$$3(x^2 - 2x - 8)$$

$$y = 3x^2 - 6x - 24$$

2. $f(x) = (x+3)(x-5)$

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

3. $f(x) = 2(x-7)(x+2)$

$$2(x^2 - 7x + 2x - 14)$$
$$2(x^2 - 5x - 14)$$

$$y = 2x^2 - 10x - 28$$