

Converting Vertex to Standard Form

$$y = 2(x - 1)^2 + 3 \longrightarrow y = 2x^2 - 4x + 5$$

First, expand (FOIL) the brackets

Then multiply every term in the resulting expression by the number in front

Last, collect like terms

Converting Standard to Factored Form

$$y = x^2 - 2x - 35 \longrightarrow y = (x - 7)(x + 5)$$

First, determine two numbers that multiply to (-35) - one negative, one positive

Those two numbers must also add up to (-2)

Record the resulting expression as a product of two binomials

Determining the x-intercepts

$$y = x^2 - 2x - 35 \longrightarrow y = (x - 7)(x + 5)$$

Given the standard form, it must first be factored (see above)

Then the product of factors must be set to 0

Then solved for x: $(x - 7)(x + 5) = 0$

$$x - 7 = 0 \quad x + 5 = 0$$

$$\text{x-intercepts} \longrightarrow x = 7 \quad x = -5$$

Determining the vertex from standard form

$$y = x^2 - 2x - 35 \longrightarrow y = (x - 7)(x + 5)$$

1. Given the standard form, it must first be factored (see above)
2. Then determine the x-intercepts (see above)
3. To find the x-coordinate of the vertex, add the two x-intercepts and divide by 2
4. To find the y-coordinate of the vertex, sub in the result from step 3 into the equation and evaluate