10P   <u>4.9 Standard and Zeros/Factored Forms</u>
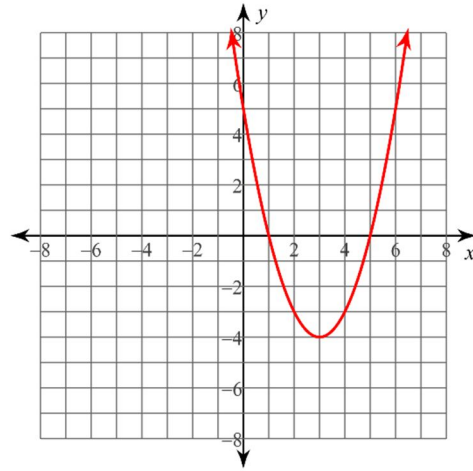
Before we get started, let's recap. Given the following parabola, list the key features:

a) Vertex

b) AoS

c) Direction of opening

d) Max/Min value

e) y-intercept

f) x-intercepts (or zeros)

A parabola can be represented by three forms (or equations). A line has a the form of $y = mx + b$, but how can we represent a parabola?

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

2. Zeros or Factored Form $y = a(x - r)(x - s)$

Note: These forms create the same parabola, but they give us different information.

Example 1: Convert from Zeros Form to Standard form. Then, indicate the direction of opening and the y-int.

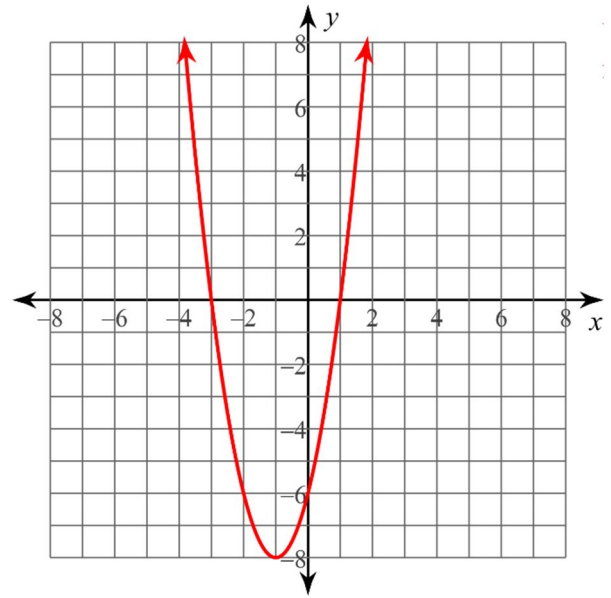a) $y = 3(x - 2)(x + 4)$ b) $y = -0.5(x + 6)(x + 10)$

Before we talk about Zeros Form, let's look at Standard Form and its graph.

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

Zeros are:

Average of the zeros are:

Plug the average into the equation:

Now the big question, without a graph, how do we get the zeros? The other name of Zeros Form is Factored Form. To covert Standard Form to Zeros Form, you factor!

Example 2: Convert to Zeros Form and state the zeros. Then calculate the AoS, Max/Min, and vertex.

a) $y = x^2 - 14x + 45$

b) $y = 5x^2 - 15x - 50$

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4.9 Homework

State the zeros and direction of opening. Then, expand to Standard Form and state the y-int.

1) $y = -(x - 8)(x + 1)$

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

3) $y = 0.5(x - 10)(x - 7)$

4) $y = 3(x - 3)(x + 4)$

State the y-int, then convert to Zeros Form. State zeros, find AoS, Max/Min, and vertex.

5) $y = x^2 - 10x + 21$

6) $y = x^2 - 15x + 50$

7) $y = -2x^2 + 2x + 40$

8) $y = 2x^2 - 8x - 42$

9) $y = 18x^2 + 54x - 1260$

10) $y = 2x^2 - 6x - 20$

11) $y = -6x^2 + 36x + 96$

12) $y = 0.5x^2 + 2x - 16$