L4 –Quadratics in Factored Form Unit 4

MPM2D

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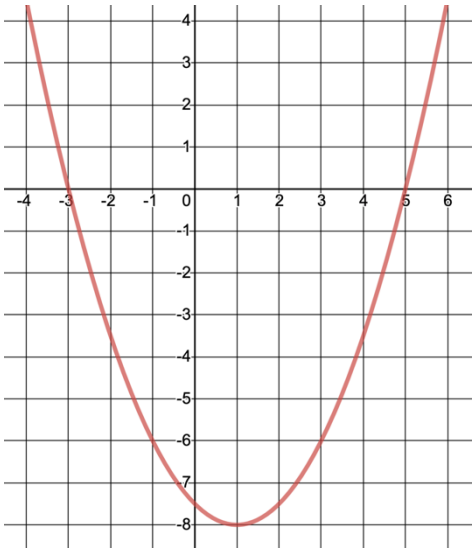
Standard Form: $y = ax^2 + bx + c$

Vertex Form: $y = a(x - h)^2 + k$

Factored Form: $y = a(x - r)(x - s)$

Part 1: Analysis of a Quadratic in Factored Form

Example 1: Given the graph of $y = 2(x + 3)(x - 5)$



a) What are the x-intercepts and how do they relate to the equation?

b) What is the vertex? How does the x-coordinate of the vertex relate to the x-intercepts?

c) What is the equation of the axis of symmetry?

d) What is direction of opening?

Properties of $y = a(x - r)(x - s)$

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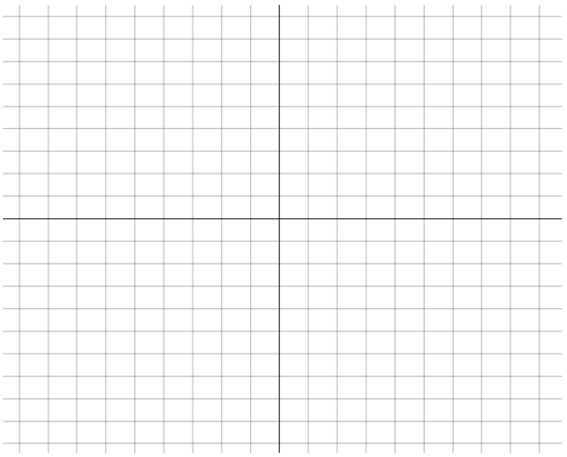
Example 1: Given the following quadratic equations, determine the **i)** x-intercepts using the zero product rule, **ii)** the axis of symmetry, **iii)** the vertex **iv)** graph the quadratic

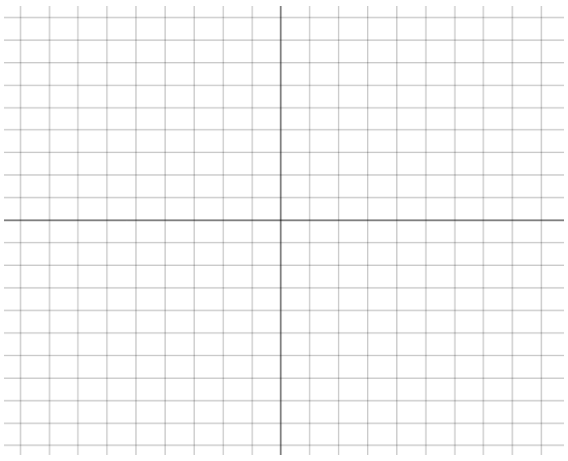
a) $y = 2(x + 1)(x - 3)$

Zero product rule: The product of factors is zero if one or more of the factors are zero.

$ab = 0$ if $a = 0$ or $b = 0$ (or both)

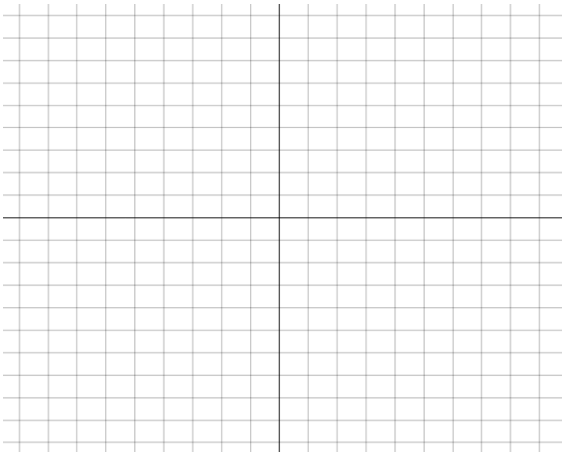


b) $y = \frac{1}{2}(x + 6)(x + 2)$

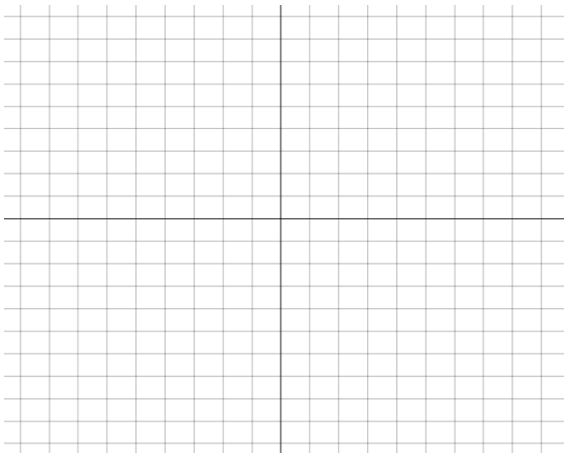


c) $y = x^2 + 2x - 8$

Note: Factor the standard form quadratic in to factored form so that you can more easily find the x-intercepts.



d) $y = x^2 - 9$

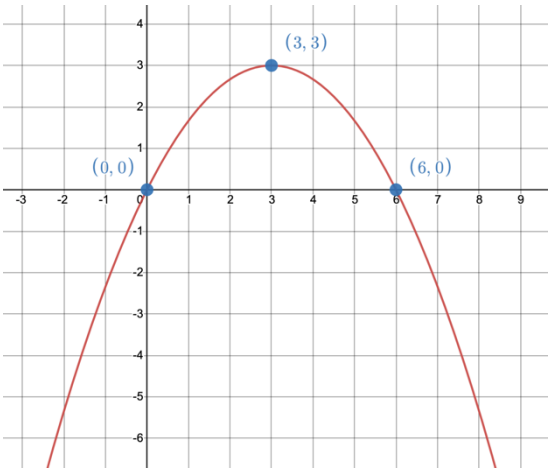


Algorithm for Determining Factored Form Equation from a Graph

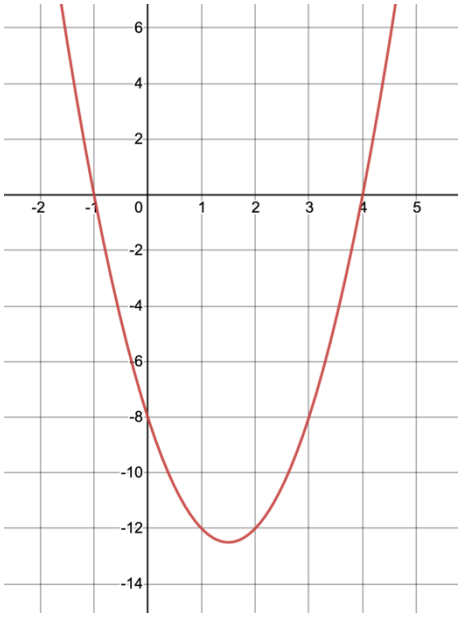
- Find the x-intercepts (r and s)
- Find another point on the graph (x, y)
- Plug the values of r, s, x, and y in to $y = a(x - r)(x - s)$ and solve for a
- Write the final equation by plugging in a, r, and s. NOT x and y.

Example 2: Determine the factored form equation of each of the following quadratic relations.

a)



b)



Example 3: Determine the factored form equation of the parabola with x-intercepts at -3 and -5 and passes through the point $(-4,1)$.