p. 58-59   Graphing Quadratics in Factored Form   4.2

Warm-up - write the following in your notes: p.58

A quadratic equation in Standard Form can be written in Factored Form by writing the expression as a list of factors.

Standard Form ⟷ Factored Form

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

$-4 \cdot 2x$

$\begin{array}{c|c|c} & x & 2 \\ \hline x & x^2 & +2x \\ \hline -4 & -4x & -8 \end{array}$

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

$x(x-4) + 2(x-4)$

$(x-4)(x+2)$

Turn in Homework --

Blue worksheet (Graphing Quad Functions)

<u>Factored Form</u>   p.59

$$y = \pm a (x - p)(x - q)$$

Axis of symmetry   **Vertex**

$$x = \frac{p+q}{2}$$

Plug the x-value into equation

This form is helpful for determining the x-intercepts.

1.) Sketch the Graph   p.59

$$y = (x - 6)(x - 2) \quad p: 6 \quad q: 2$$

x-intercepts $(6, 0)$ & $(2, 0)$

$$y = (4 - 6)(4 - 2)$$

$$x = \frac{p + q}{2} \quad y = (-2)(2)$$
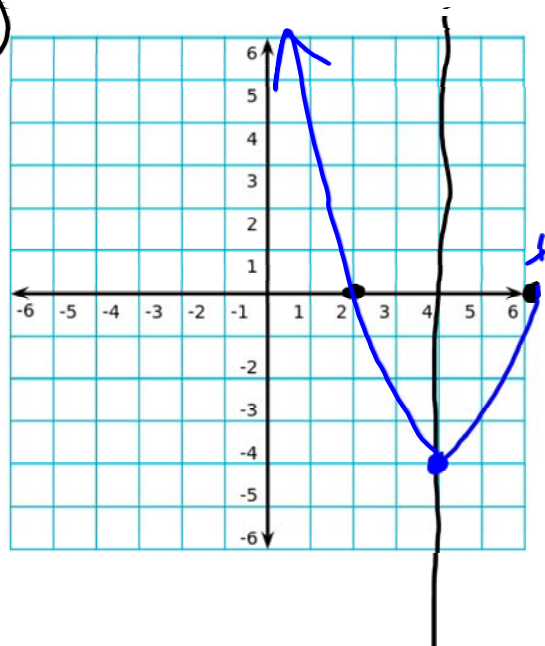
Axis of symmetry: $x = 4$

Vertex: $(4, -4)$

Opens: UP   Max/(Min)

Domain: $(-\infty, +\infty)$

Range: $[-4, +\infty)$

2.) Sketch the graph

y = - (x + 5)(x - 1)   p: -5 q: 1

x-intercepts $(-5, 0)$ & $(1, 0)$

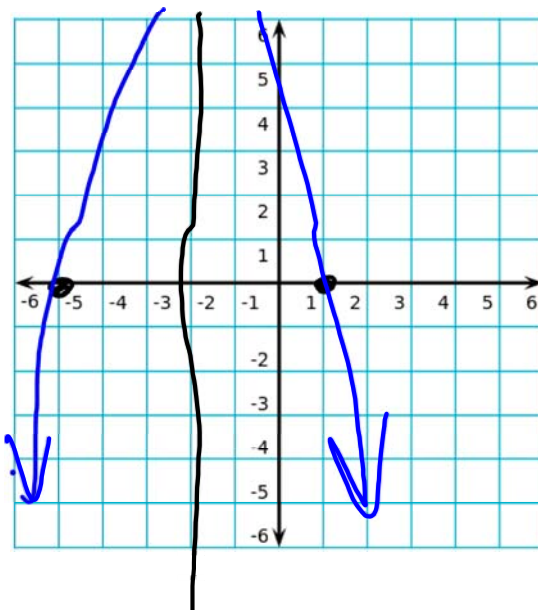$y = -(-2 + 5)(-2 - 1)$

$y = -(3)(-3)$

Axis of symmetry: $X = -2$

Vertex: $(-2, 9)$

Opens: down   Max/Min

Domain: $(-\infty, +\infty)$

Range: $(-\infty, 9]$

3.) A ball being thrown can be modeled using the following equation, where x represents the time (seconds) and y represents the height (feet).
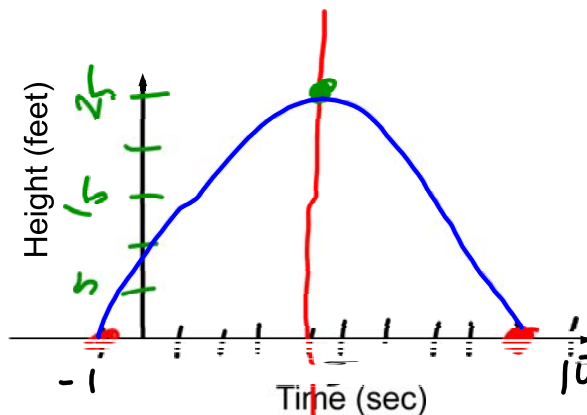
y = - (x + 1)(x - 9)

x-intercepts $(-1, 0)$ & $(9, 0)$

$y = -(4 + 1)(4 - 9)$

$y = 25$

Axis of symmetry: $X = 4$

Vertex: $(4, 25)$

How long does it take for the ball to land on the ground? 9 sec.

How long does it take for the ball to reach its maximum height? 4 sec.

What is the maximum height reached? 25 ft.

Is the ball being thrown from the ground? no

Closing Question   p.58

Find the **x-intercepts** of the following quadratic equation:

$$y = 2(x + 5)(x - 8)$$

Homework Assignment
Graphing Quadratics - Factored Form