Extension

Use after Lesson 10.2

Graph Quadratic Functions in Intercept Form

TEKS A.4.A; 2A.2.A, 2A.6.B

GOAL Graph quadratic functions in intercept form.

Key Vocabulary
- **intercept form**

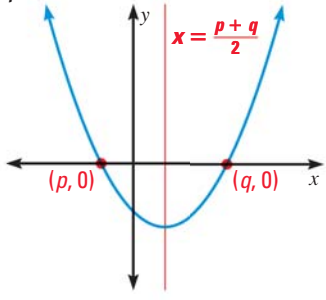
In Lesson 10.2 you graphed quadratic functions written in standard form. Quadratic functions can also be written in **intercept form**, $y = a(x - p)(x - q)$ where $a \neq 0$. In this form, the x-intercepts of the graph can easily be determined.

KEY CONCEPT *For Your Notebook*

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

Characteristics of the graph of $y = a(x - p)(x - q)$:

- The x-intercepts are p and q.
- The axis of symmetry is halfway between $(p, 0)$ and $(q, 0)$. So, the axis of symmetry is $x = \frac{p + q}{2}$.
- The parabola opens up if $a > 0$ and opens down if $a < 0$.



EXAMPLE 1 Graph a quadratic function in intercept form

Graph $y = -(x + 1)(x - 5)$.

Solution

FIND ZEROS OF A FUNCTION
Notice that the x-intercepts of the graph are also the zeros of the function:
$0 = -(x + 1)(x - 5)$
$x + 1 = 0$ *or* $x - 5 = 0$
$x = -1$ *or* $x = 5$

STEP 1 **Identify** and plot the x-intercepts. Because $p = -1$ and $q = 5$, the x-intercepts occur at the points $(-1, 0)$ and $(5, 0)$.

STEP 2 **Find** and draw the axis of symmetry.

$$x = \frac{p + q}{2} = \frac{-1 + 5}{2} = 2$$

STEP 3 **Find** and plot the vertex.

The x-coordinate of the vertex is 2.

To find the y-coordinate of the vertex, substitute 2 for x and simplify.

$$y = -(2 + 1)(2 - 5) = 9$$

So, the vertex is $(2, 9)$.

STEP 4 **Draw** a parabola through the vertex and the points where the x-intercepts occur.