

## Factored Form of Quadratic Functions

*Only use your calculator to check your answers.*

In an equation like  $y = 2(x + 3)(x - 4)$ , one can quickly find the intercepts and the vertex.

1. What is the value of  $x$  at the  $y$ -intercept? Substitute this value for  $x$  in the equation, and find the  $y$ -intercept.
2. What is the value of  $y$  at the  $x$ -intercepts? Substitute this value for  $y$  in the equation, and find the  $x$ -intercepts with the help of the Zero Product Property.
3. If you know the  $x$ -intercepts, how can you find the  $x$ -coordinate of the vertex? Find it.
4. If you know the  $x$ -coordinate of the vertex, how can you find its  $y$ -coordinate? Find it.
5. Find the intercepts and vertex for:
  - a.  $y = .5(x - .4)(x - 1)$
  - b.  $y = 2(x + 3)(x + 4)$
6. Explain in words and symbols how you would find the intercepts and vertex for a function of the form:

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

7. Find the equation and the vertex for a parabola with intercepts:
  - a.  $(3, 0), (6, 0), (0, 36)$
  - b.  $(3, 0), (6, 0), (0, 9)$
  - c.  $(-3, 0), (-6, 0), (0, -9)$
  - d.  $(-3, 0), (6, 0), (0, 6)$
8. The vertex and one of the two  $x$ -intercepts of parabolas are given. Find the equation and the  $y$ -intercept.
  - a. vertex:  $(2, -2)$ .  $x$ -intercept:  $(1, 0)$
  - b. vertex:  $(1, -12)$ .  $x$ -intercept:  $(-1, 0)$
  - c. vertex:  $(3, 4.5)$ .  $x$ -intercept:  $(6, 0)$