Exercise 51

For the following exercises, use the vertex (h, k) and a point on the graph (x, y) to find the general form of the equation of the quadratic function.

$$(h, k) = (0, 1), \ (x, y) = (1, 0)$$

Solution

Start with the vertex form of a general quadratic function.

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

The vertex $(0, 1)$ is given, so h and k are known.

$$y = a(x - 0)^2 + 1$$

$$= ax^2 + 1$$

Now use the fact that $y = 0$ when $x = 1$ to determine a.

$$0 = a(1)^2 + 1$$

$$-1 = a(1)$$

$$a = -1$$

Therefore, the quadratic function is

$$y = -x^2 + 1.$$