Exercise 52

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.

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

Solution

Start with the vertex form of a general quadratic function.

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

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

$$\begin{aligned} y &= a(x - 1)^2 + 0 \\ &= a(x - 1)^2 \end{aligned}$$

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

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

$$1 = a(1)$$

$$a = 1$$

Therefore, the quadratic function is

$$\begin{aligned} y &= (x - 1)^2 \\ &= x^2 - 2x + 1. \end{aligned}$$