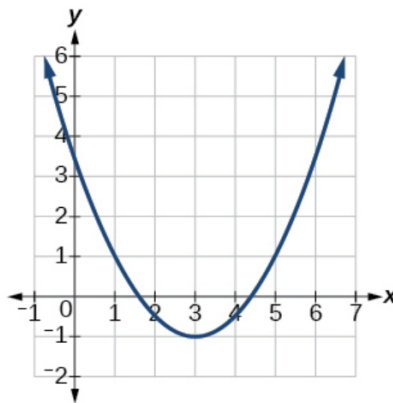


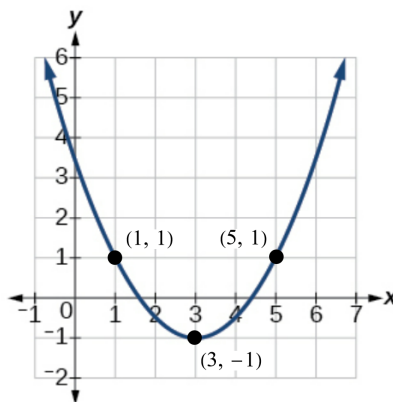
Exercise 63

For the following exercises, write the equation for the graphed function.



Solution

Identify three points on the parabola to write the quadratic function. If one of them is the vertex, then only one other point is needed.



The vertex is known, so it's best to start with the general formula of a quadratic function in vertex form.

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

The vertex is $(3, -1)$, so $h = 3$ and $k = -1$.

$$\begin{aligned} y &= a(x - 3)^2 + (-1) \\ &= a(x - 3)^2 - 1 \end{aligned}$$

Use either of the two points to determine a . For example, $y = 1$ when $x = 1$.

$$\begin{aligned} 1 &= a(1 - 3)^2 - 1 \\ 2 &= a(4) \\ a &= \frac{1}{2} \end{aligned}$$

Therefore, the quadratic function is

$$\begin{aligned}y &= \frac{1}{2}(x - 3)^2 - 1 \\&= \frac{1}{2}(x^2 - 6x + 9) - 1 \\&= \left(\frac{1}{2}x^2 - 3x + \frac{9}{2}\right) - 1 \\&= \frac{1}{2}x^2 - 3x + \frac{7}{2}.\end{aligned}$$