

Exercise 80

For the following exercises, write the equation of the quadratic function that contains the given point and has the same shape as the given function.

Contains $(-1, 4)$ and has the shape of $f(x) = 2x^2$. Vertex is on the y -axis.

Solution

Start with the general vertex form of a quadratic function.

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

The function has the shape of $2x^2$, so $a = 2$.

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

The vertex is on the y -axis, so $h = 0$.

$$y = 2x^2 + k$$

Now use the fact that $y = 4$ when $x = -1$ to determine k .

$$4 = 2(-1)^2 + k$$

$$4 = 2(1) + k$$

$$4 = 2 + k$$

$$k = 2$$

Therefore, the quadratic function is

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