Chapter 1

Basic Classes of Functions

Checkpoint Solution

Checkpoint 1.16: Transforming a Function

Instruction

Describe how the function $f(x) = -(x+1)^2 - 4$ using the graph of $y = x^2$ and a sequence of transformations.

Solution

We start with the graph of $y = x^2$, see figure 1.1.

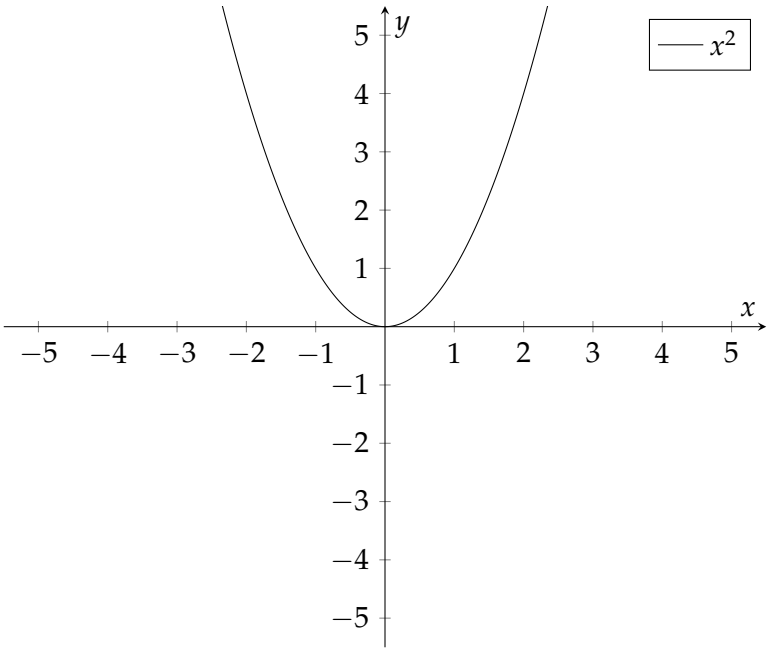

Figure 1.1: Starting point

We shift left by 1 unit, see figure 1.2.

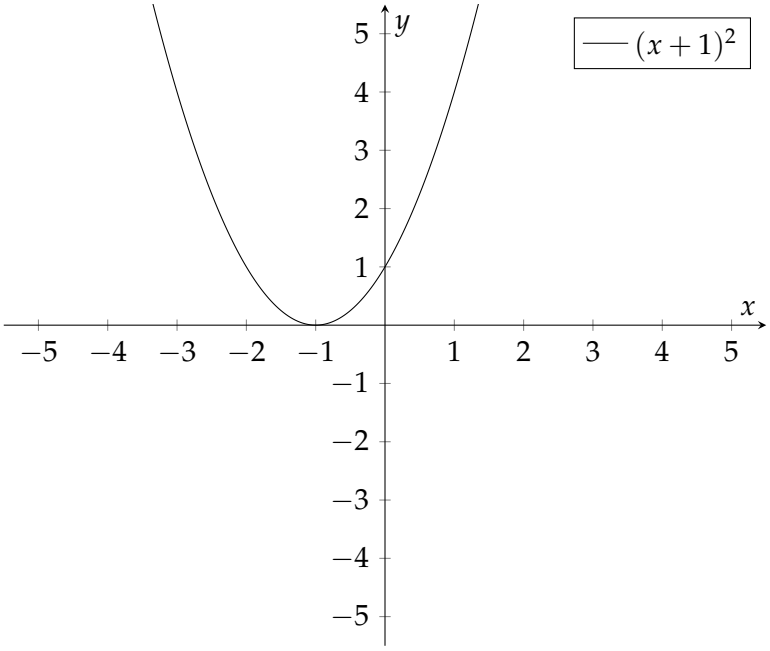

Figure 1.2: Shift left by 1

We apply a factor of -1, making the graph reflected, see figure 1.3.

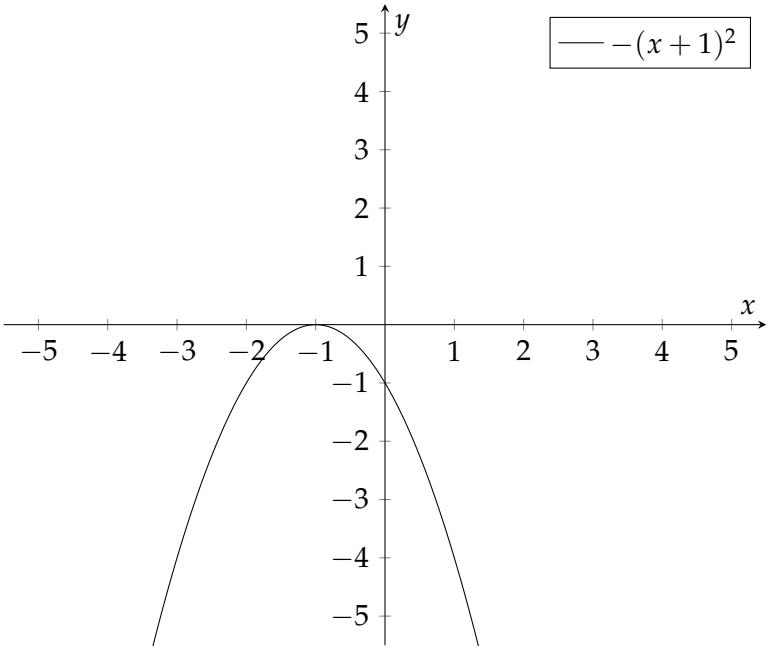

Figure 1.3: Reflect the graph in the x-axis

We shift down by 4 units, see figure 1.4.

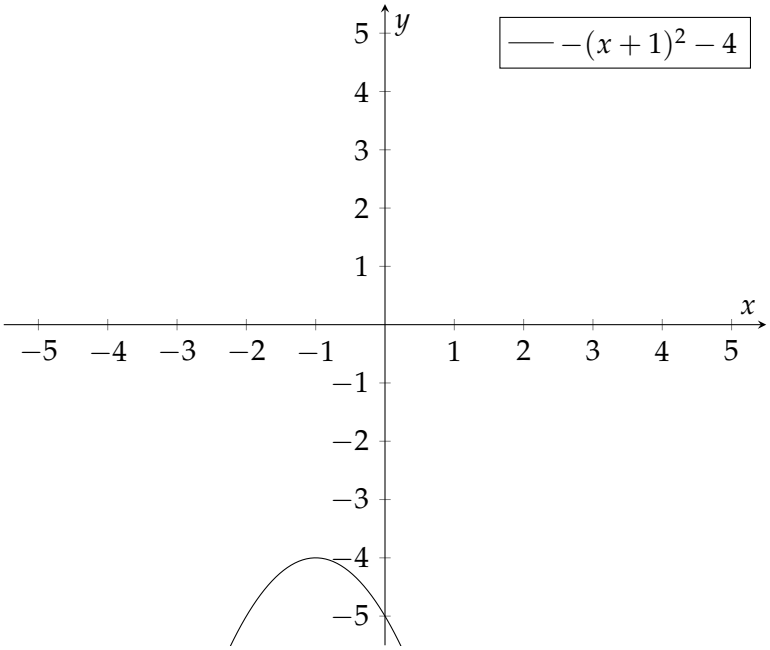

Figure 1.4: Shift down by 4

We have now applied all needed transformations.

Answer

Shift the graph $y = x^2$ to the left 1unit, reflect about the x -axis, then shift down 4 units.