Exercise 189

For the following exercises, a. find the inverse function, and b. find the domain and range of the inverse function.

$$f(x) = x^2 - 4,\ x \geq 0$$

Solution

To find the inverse function, replace x with y and replace $f(x)$ with x.

$$x = y^2 - 4$$

Solve for y.

$$x + 4 = y^2$$

$$\sqrt{x+4} = \sqrt{y^2}$$

$$\pm\sqrt{x+4} = y$$

The positive sign is chosen because y came from x that satisfies $x \geq 0$.

$$y = \sqrt{x+4}$$

The domain of this inverse function is

$$\{x \mid x + 4 \geq 0\},$$

and the range is $\{y \mid y \geq 0\}$.