Exercise 25

For the following exercises, determine whether the relation represents y as a function of x.

$$y^2 = x^2$$

Solution

Take the square root of both sides.

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

Because there are even powers under even roots, and the results are to an odd power (x^1 and y^1), absolute value signs are needed.

$$|y| = |x|$$

Remove the absolute value around y by placing $\pm$ on the right side.

$$y = \pm|x|$$

The relation $y^2 = x^2$ is not a function because for every input x, there are two outputs given by $y = |x|$ and $y = -|x|$. This is reflected in the graph by the fact that there are vertical lines that pass through the curve more than once.