Exercise 23

Graph the following equations and explain why they are not graphs of functions of x.

a. $|y| = x$ **b.** $y^2 = x^2$

Solution

Part (a)

Solve the given equation for y.

$$|y| = x$$

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

$$y = \pm x$$

Since there are two outputs, $y = x$ and $y = -x$, associated with an input x, $|y| = x$ is not the graph of a function.

Part (b)

Solve the given equation for y.

$$y^2 = x^2$$

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 odd powers, absolute value signs are needed around them.

$$|y| = |x|$$

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

$$y = \pm|x|$$

Since there are two outputs, $y = |x|$ and $y = -|x|$, associated with an input x, $y^2 = x^2$ is not the graph of a function.