

Exercise 18

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

$$x^2 + y^2 = 9$$

Solution

Try to solve the given equation for y . Start by isolating the term with y .

$$y^2 = 9 - x^2$$

Take the square root of both sides.

$$\sqrt{y^2} = \sqrt{9 - x^2}$$

Because there's an even power under an even root, and the result is to an odd power (y^1), an absolute value sign is needed.

$$|y| = \sqrt{9 - x^2}$$

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

$$y = \pm\sqrt{9 - x^2}$$

The relation $x^2 + y^2 = 9$ is not a function because for every input x , there are two outputs given by $y = \sqrt{9 - x^2}$ and $y = -\sqrt{9 - x^2}$. This is reflected in the graph by the fact that there are vertical lines that pass through the curve more than once.

