

1. Decide whether  $y$  is a function of  $x$ .

2a.  $x^2 + y^2 = 1$

2b.  $2x + y = 7$

**Solution:**

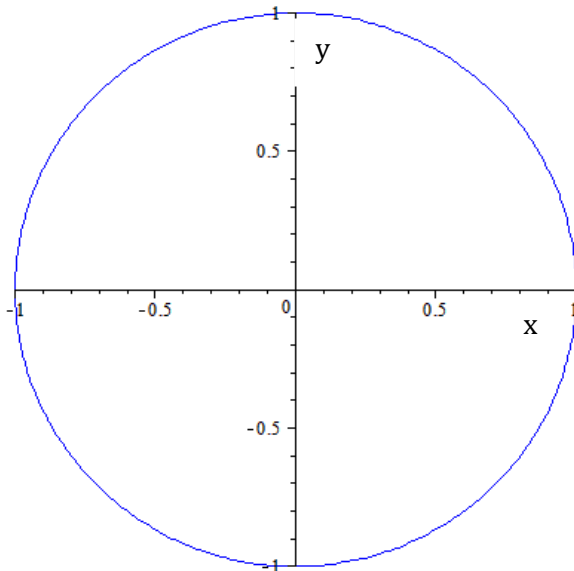
To test to see if each of these equations represents a function, you would need to examine their graphs and do the vertical line on them. The vertical line test just consists of passing a vertical line over the graph from left to right (or vice versa) and checking that the line never crosses the graph at more than one point while doing so. This works because the definition of a function says that it must have only one  $y$  for every  $x$  value put into the function, only one output for every input.

First of all we have to check if  $y$  is a function of  $x$ , we need to solve for  $y$  squared first and then check to see if there is only one output for every input.

$$\begin{aligned}x^2 + y^2 &= 1 \\y^2 &= 1 - x^2 \\y &= \pm\sqrt{(1 - x^2)}\end{aligned}$$

Solving the equation we get two values, because the quadratic equations have two solutions for  $y$  for a valid value of  $x$ . This means that at least one input value is associated with more than one output value, so by definition,  $y$  is not a function of  $x$ .

Graphing equations is as follows:



Reciprocally solve the problem for the second equation. Check if  $y$  is a function of  $x$ , we need to solve for  $y$  first and then check to see if there is only one output for every input:

$$2x + y = 7$$

$$y = 7 - 2x$$

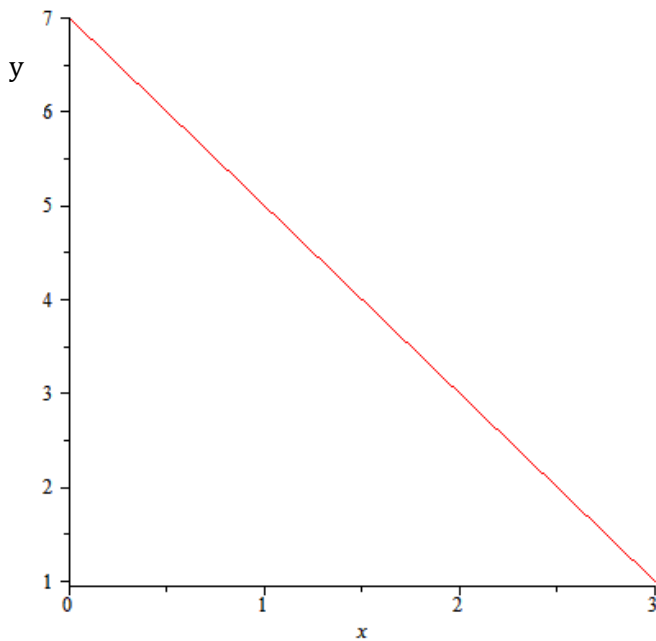
$$y = -2x + 7$$

We get one value for  $y$  if you plug in any value for  $x$ . Obtain a linear function that can be expressed by the formula  $y = ax + b$ , where  $x$  - the argument, and  $a, x$  given numbers. Linear function defined on the set of all real numbers.

For example, if we plugged in a 1 for  $x$ , then  $y$  would only equal one value 5. Since it is solved for  $y$ ,  $y$  is our output value and  $x$  is our input value.

$x$	0	1	2	3
$y = -2x + 7$	7	5	3	1

Graphing equations is as follows:



Since we get one value for  $y$  if you plug in any value for  $x$ , which means by definition,  $y$  is a function of  $x$ .

**Answer:**

2a.  $x^2 + y^2 = 1$  -  $y$  is not a function of  $x$ .

2b.  $2x + y = 7$  -  $y$  is a function of  $x$ .