This equation does not define y as a function of x.

E.g. (a) $x^2 + y = 16 \longrightarrow y = 16 - x^2$

this defines y as function of x

(b) $6x + y = 7 \longrightarrow y = 7 - 6x$

Do these equations define y as a function of x?

Objective #4: Evaluate a function

Function Notation: The notation $f(x)$ is read as f of x represents the value of the function f at the number

f is just the name of the function.

Note: $f(x)$ does not mean f times x.

E.g. $y = 16 - x^2$

↓

we can call this

$$f(x) = 16 - x^2$$

Evaluate this function when $x = 4$, the notation for this is:

$f(4)$. And $f(4) = 16 - (4)^2$

$f(4) = 0$

E.g. Given $g(x) = x^2 + 2x + 3$.

Evaluate each of the following

(a) $g(-4) = (-4)^2 + 2(-4) + 3$

$= 16 + (-8) + 3 = 11$.

(b) $g(z) = z^2 + 2z + 3$

(c) $g(2z) = (2z)^2 + 2\cdot(2z) + 3$

$= 4z^2 + 4z + 3$

(d) $g(-5z) = 25z^2 - 10z + 3$

(e) $g(z+1) = (z+1)^2 + 2\cdot(z+1) + 3$

$= z^2 + 2z + 1 + 2z + 2 + 3$

$= z^2 + 4z + 6$

(f) $g(x+1) = (x+1)^2 + 2\cdot(x+1) + 3$

$= x^2 + 2x + 1 + 2x + 2 + 3$

$= x^2 + 4x + 6$

(g) $g(-2x+1) = (-2x+1)^2 + 2\cdot(-2x+1) + 3$

$= 4x^2 - 4x + 1 - 4x + 2 + 3$

$= 4x^2 - 8x + 6$.

(h) $g(-x) = x^2 - 2x + 3$.

Key: the x in the original formula is just a placeholder

Objective #5: Graph functions by plotting points.

Definition: The graph of a function is the graph of its ordered pairs.

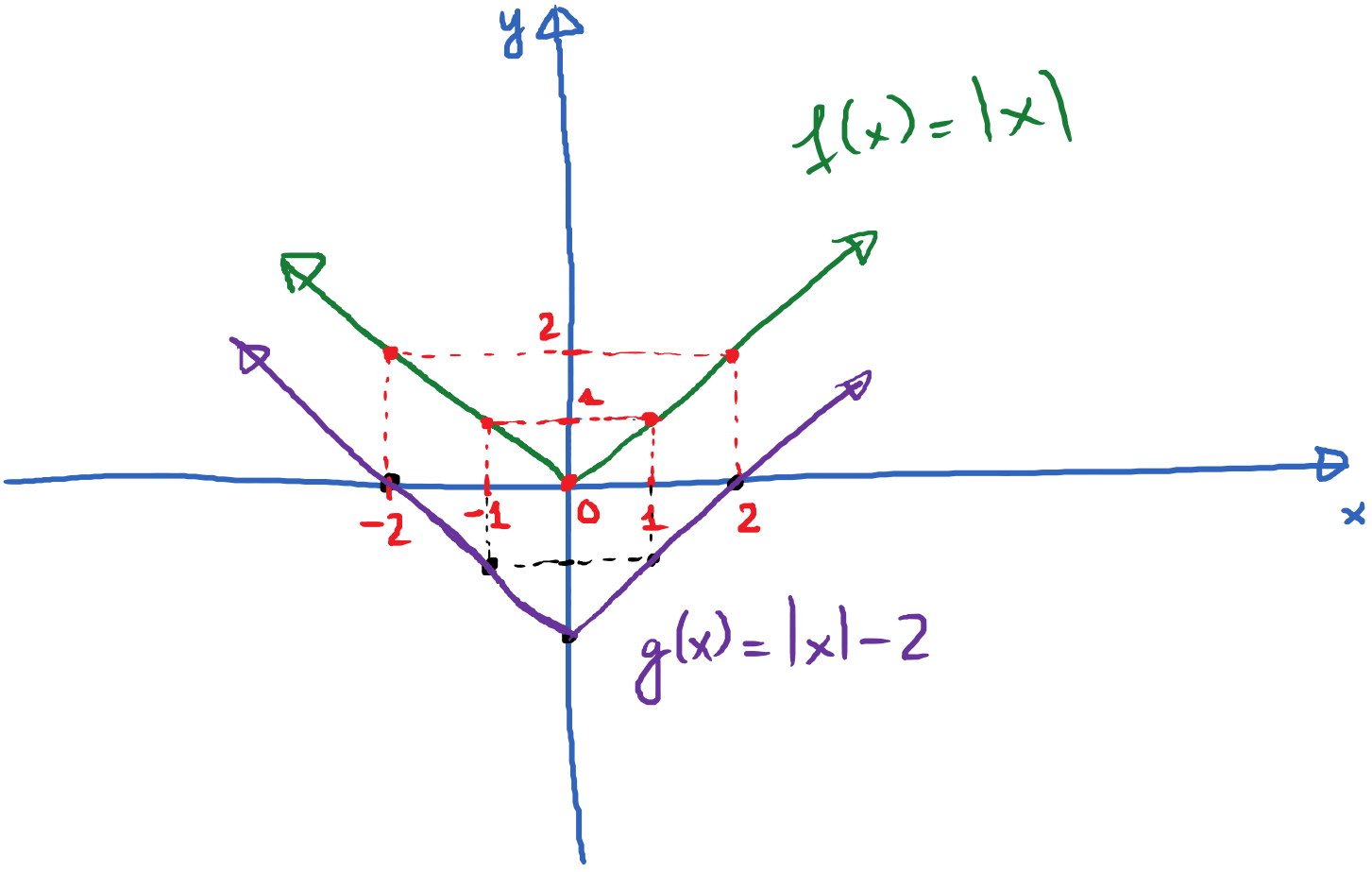
E.g. Graph the functions $f(x) = |x|$ and $g(x) = |x| - 2$ in the same coordinate system. Choose integer values for x starting at -2 and ending with 2.

$f(x) = |x|$

x	$f(x)$
-2	$2 \rightarrow (-2,2)$
-1	$1 \rightarrow (-1,1)$
0	$0 \rightarrow (0,0)$
1	$1 \rightarrow (1,1)$
2	$2 \rightarrow (2,2)$

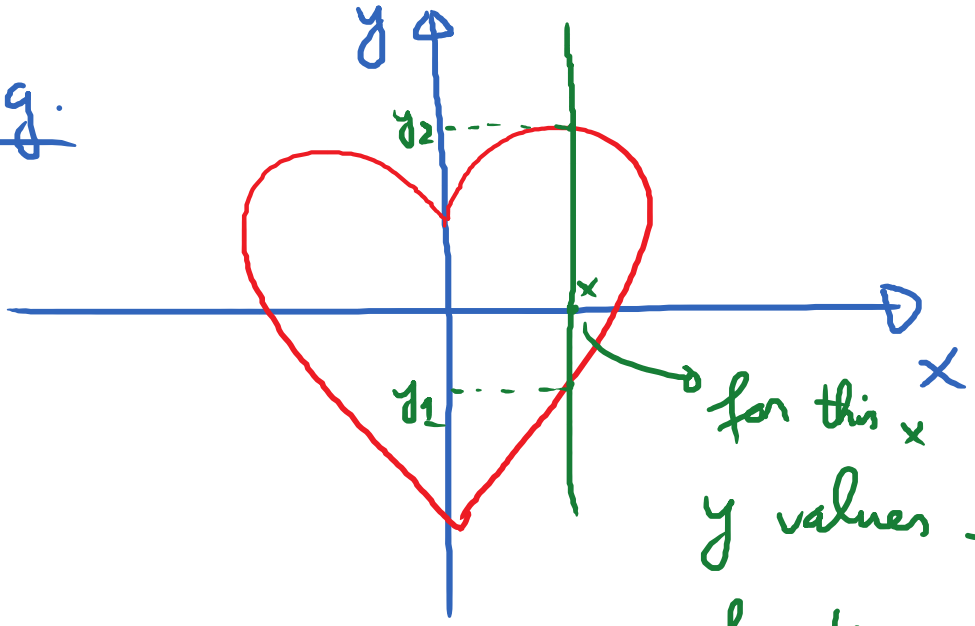
$g(x) = |x| - 2$

x	$g(x)$
-2	$0 \rightarrow (-2,0)$
-1	$-1 \rightarrow (-1,-1)$
0	$-2 \rightarrow (0,-2)$
1	$-1 \rightarrow (1,-1)$
2	$0 \rightarrow (2,0)$



Objective #6: Use the vertical line test to identify graphs of functions

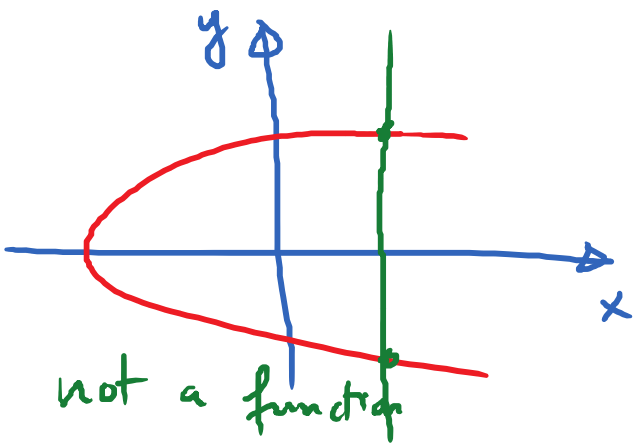
E.g.



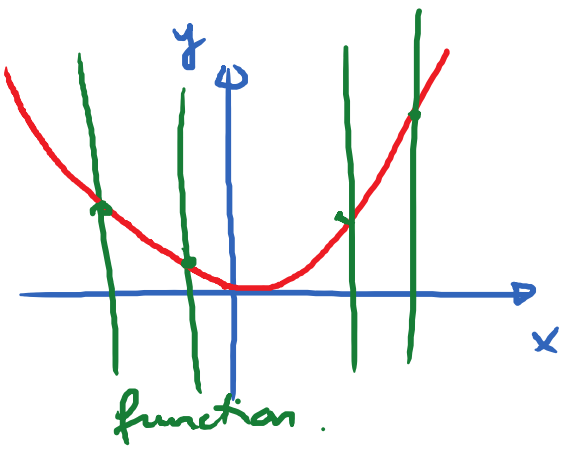
for this x there are 2 y values → not a function.

If you can draw a vertical line that intersects a graph more than once, then the graph is not the graph of a function.

E.g.

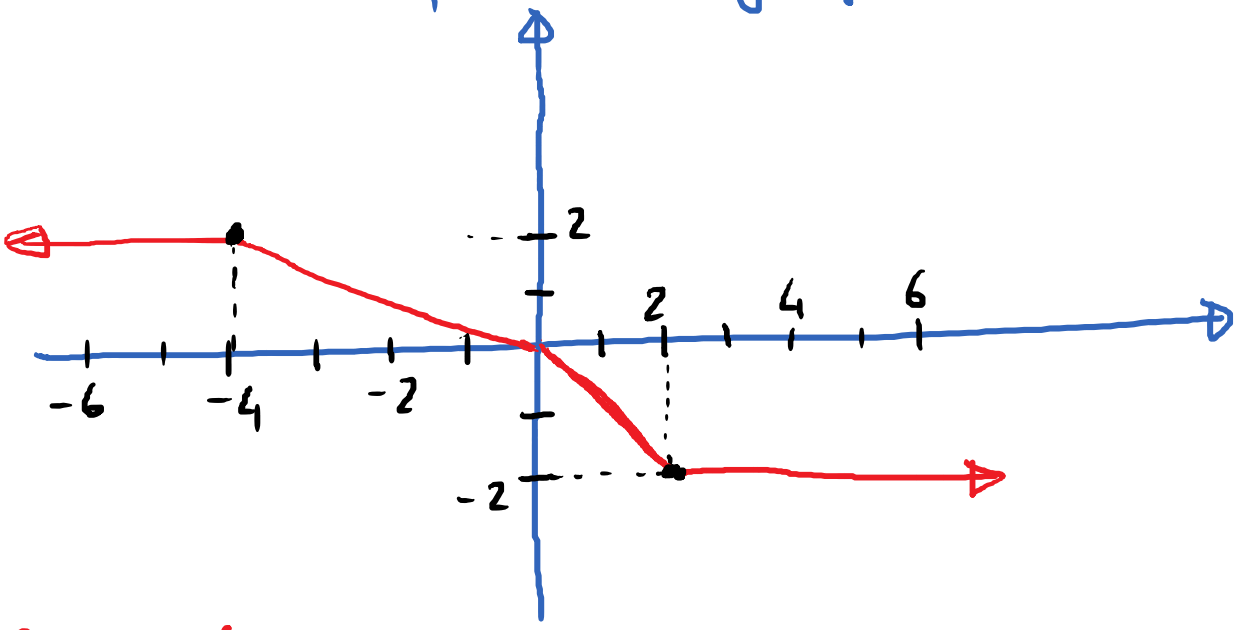


not a function



function.

Objective #7: Obtain information about a function from its graph



Given the graph of $y = g(x)$

Q: (a) $g(2) = -2$. $g(-4) = 2$

$g(4) = -2$; $g(5) = -2$

$g(10000) = -2$. $g(-2017) = 2$

(b) Domain of g? $(-\infty, \infty)$

(c) Range of g ? $[-2, 2]$