

2.4: GRAPHS OF RELATIONS AND FUNCTIONS

OBJECTIVE: Define relations and functions, determine if a relation is a function, and find functional values.

DEFINITIONS

A function a relation that has one output for each input.



- For each input, there is **exactly one** output.
- Two or more inputs can have the same

The collection of all input (x) values is the domain of a function.

The collection of all output (y) values is the range of a function.

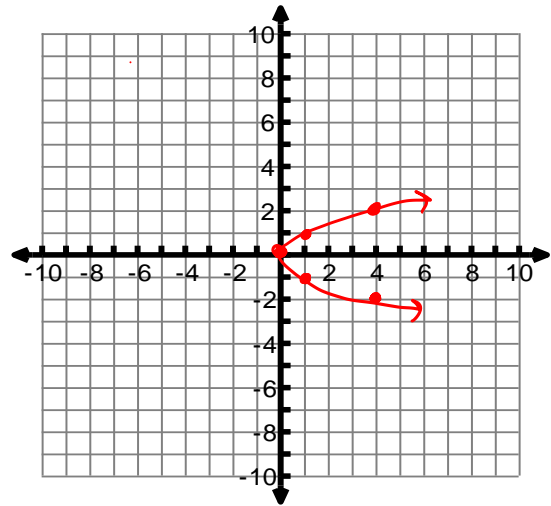
A relation a set of ordered pairs.

1) Graph $y^2 = x$. Decide whether it is a function or a relation. Then list the domain and range.

D: $x \geq 0$

R: \mathbb{R}

x	y
4	-2
1	-1
0	0
1	1
4	2

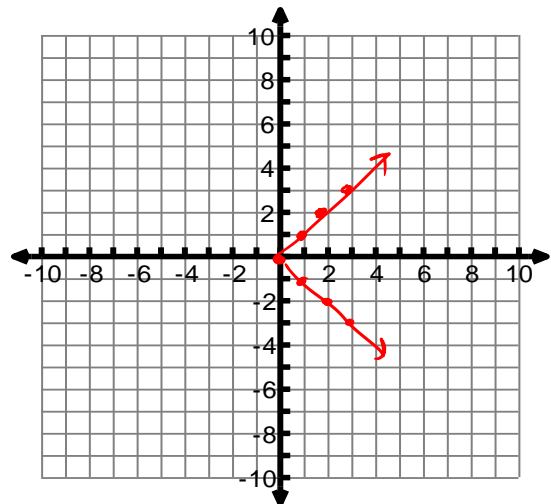


2) Graph $|y| = x$. Decide whether it is a function or a relation. Then list the domain and range.

D: $x \geq 0$

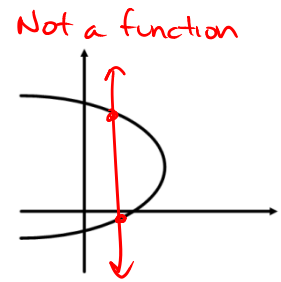
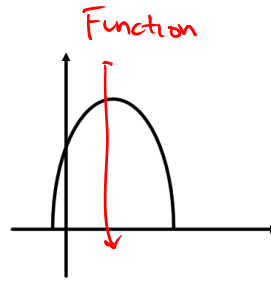
R: \mathbb{R}

x	y
2	-2
1	-1
0	0
1	1
2	2



VERTICAL LINE TEST:

If you can already tell what the graph of a relation looks like, you can tell whether or not it's a function using the vertical line test.



STATE THE DOMAIN, THE RANGE, AND DETERMINE IT IS A FUNCTION:

1)

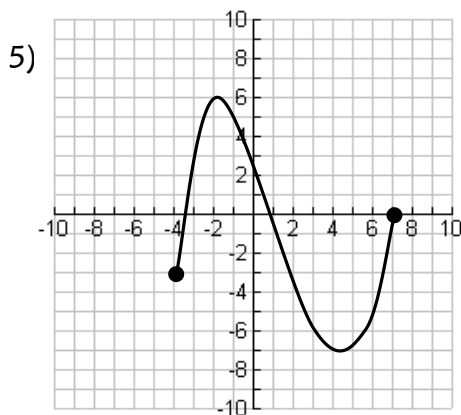
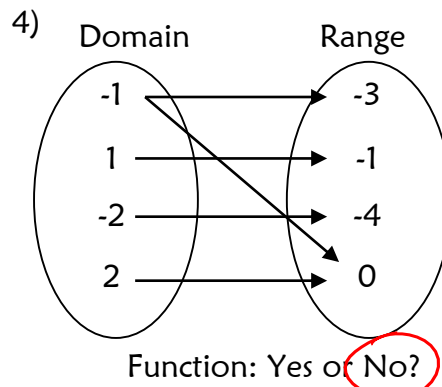
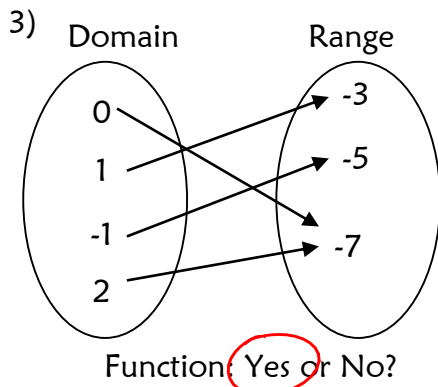
x	y
1	4
2	6
3	-3
4	0

D: $\{1, 2, 3, 4\}$
 R: $\{-3, 0, 4, 6\}$
 Function: Yes or No?

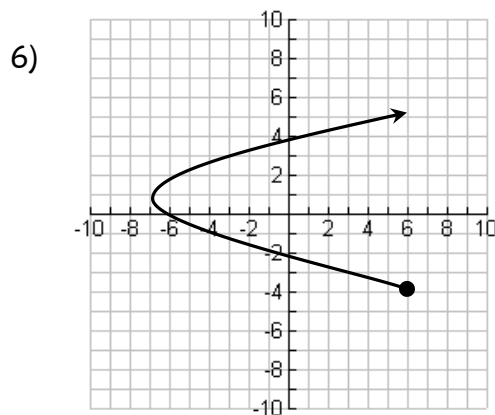
2)

x	y
-1	4
3	-2
-1	1
7	10

D: $\{-1, 3, 7\}$
 R: $\{-2, 1, 4, 10\}$
 Function: Yes or No?



D: $-4 \leq x \leq 7$
 R: $-7 \leq y \leq 6$
 Function: Yes or No?



D: $x \geq -7$
 R: $y \geq -4$
 Function: Yes or No?