

Warm-Up~

1. What is an equation of the line passing through the points $(-1,-3)$ and $(5,6)$?

2. What is the equation of the line that contains point $(3, -5)$ and has a slope of -3 ?

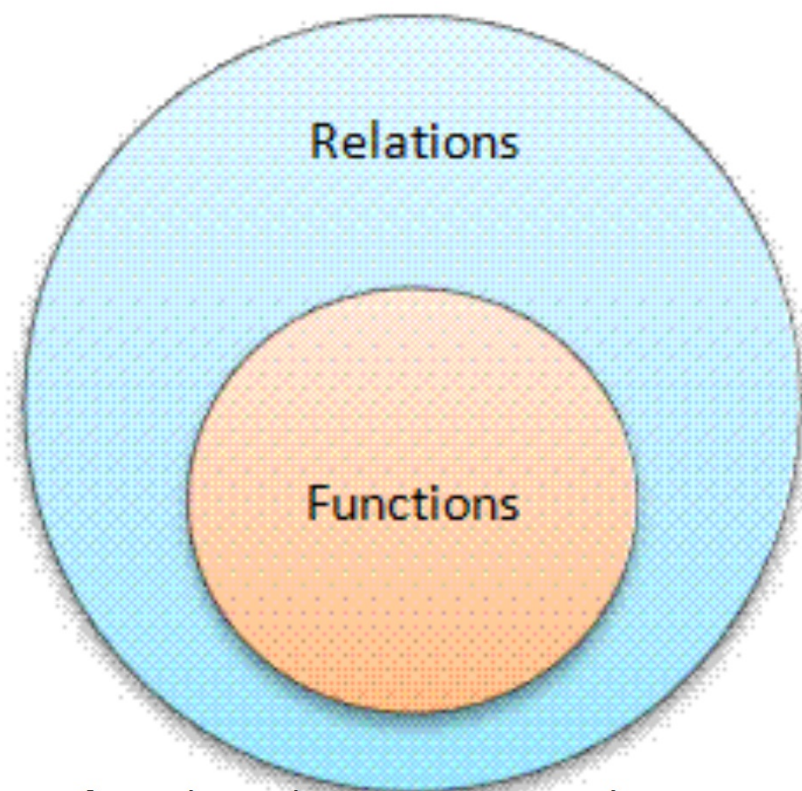
3. What is the slope and y-intercept of the following equation:

$$2x - 3y + 6 = 0$$

4. What is the slope and y-intercept of the following equation:

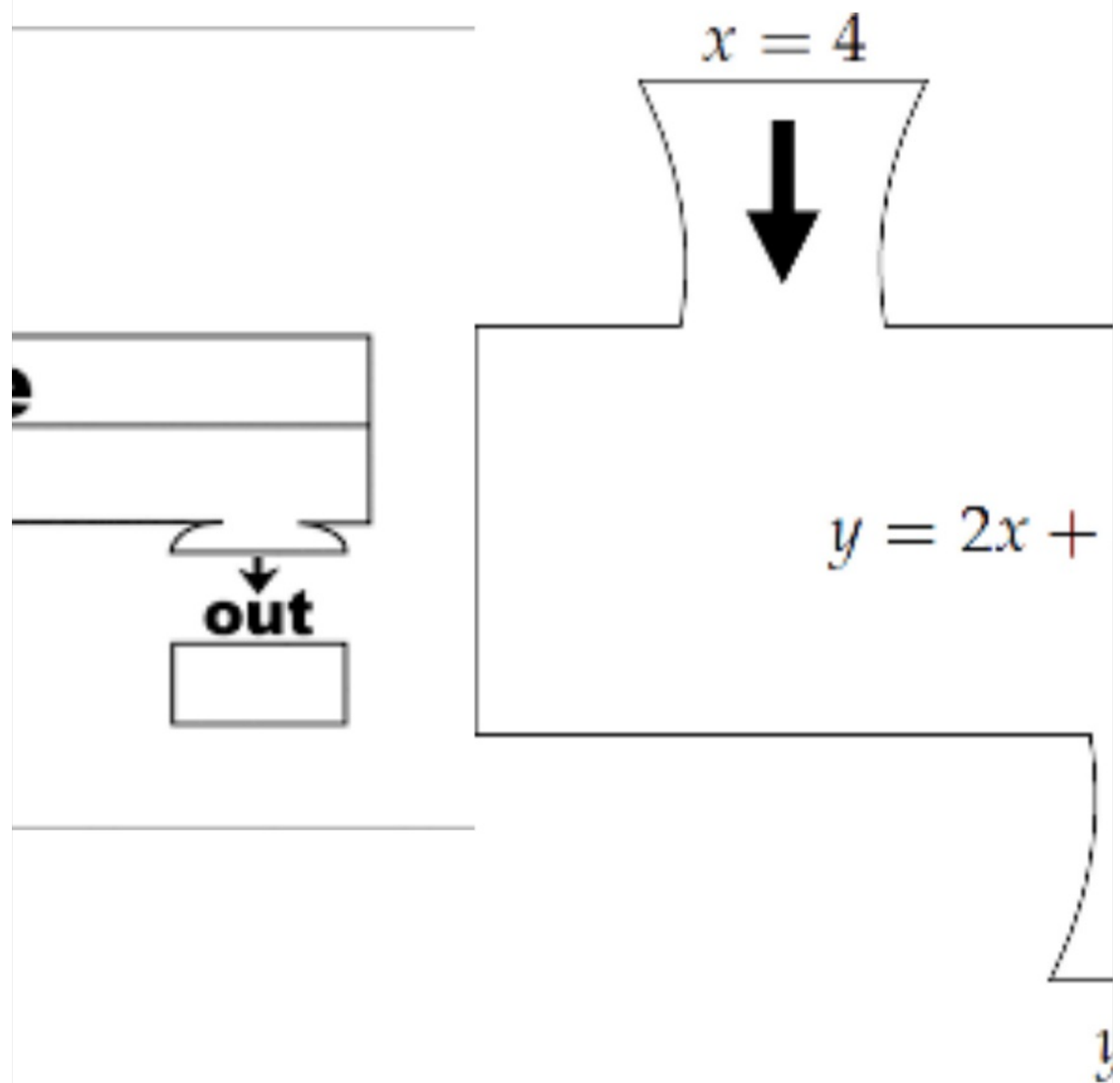
$$4y + 2x = -8$$

FUNCTIONS



Every set of ordered pairs are relations. Only some relations are functions. **ALL FUNCTIONS** are relations.

ns can often be looked at as input
es.



input-output machine

Relation: a set of any ordered pairs.

$\{(1, 5), (3, 4), (5, -2), (7, 0)\}$

Function: **A function** is a rule that relates two quantities so that each **input value (domain)** corresponds to exactly one **output value (range)**.

$\{(1, 5), (3, 4), (5, -2), (7, 0)\}$ is a function

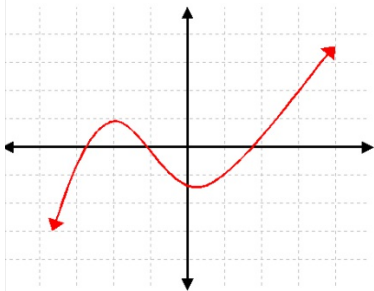
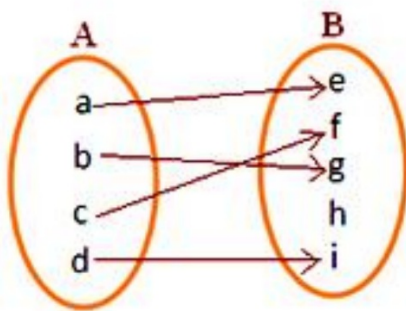
Characteristics of a Function

Mapping, tables, and list (ordered pairs): Look only at the x values...The relation is a function if the x values are all different!

Graphs: If you can draw a vertical line through the graph that touches it more than once, it is NOT a function. We say "the relation does not pass the Vertical line test."

Function

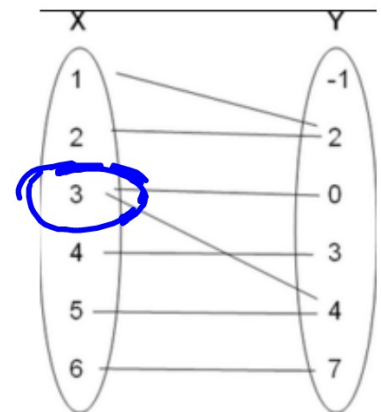
(4,12)
 (5,15)
 (6,18)
 (7,21)
 (8,24)



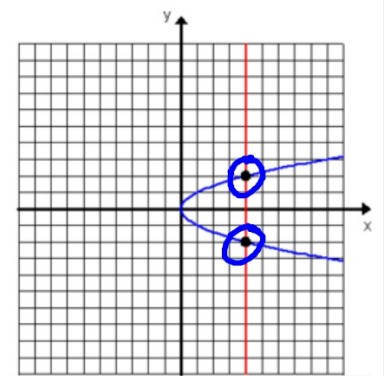
X	Y
1	2
2	4
3	6
4	8
5	10
6	12

Non-Function

(4,12)
 (4,15)
 (5,18)
 (5,21)
 (6,24)



X	Y
1	2
2	4
1	5
3	8
4	4
5	10



Determine if the relation is a function.

1. $\{(2, 3), (4, 5), (5, 6)\}$

Yes



2. $\{(2, 3), (4, 3), (5, 6)\}$

Yes

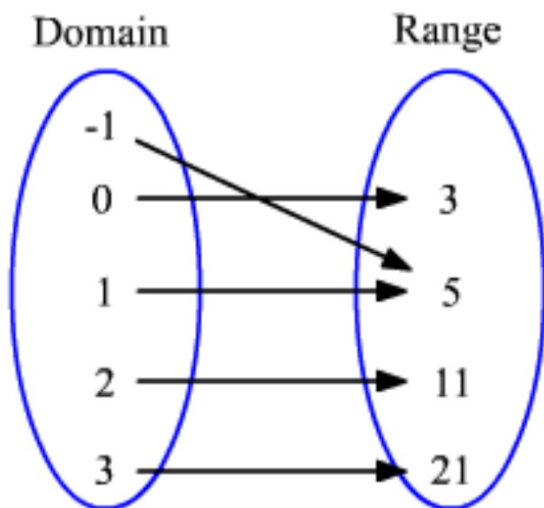


3. $\{(\underline{2}, 3), (\underline{2}, 5), (5, 6)\}$

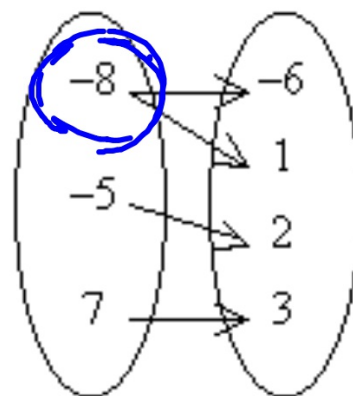
No



Is the relation a function?

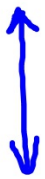


Function

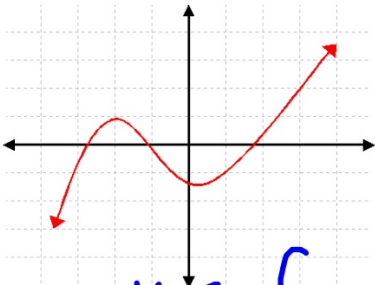


The relation is not a function.

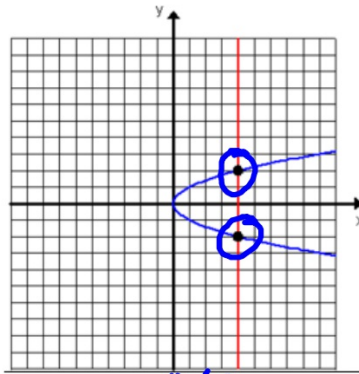




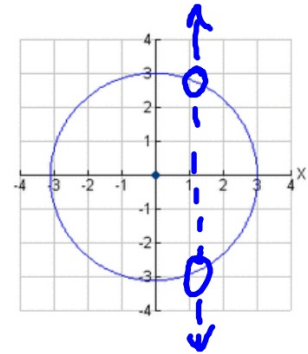
Vertical-Line Test: any vertical line passes through at most one point on the graph of a function.



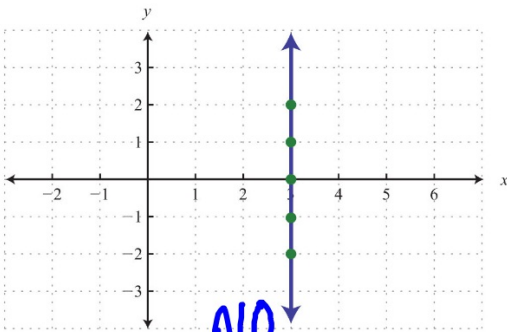
yes function



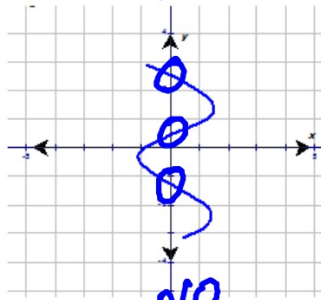
No



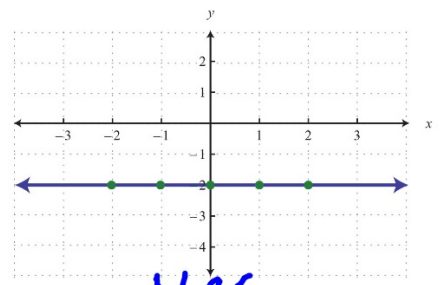
No



NO



NO



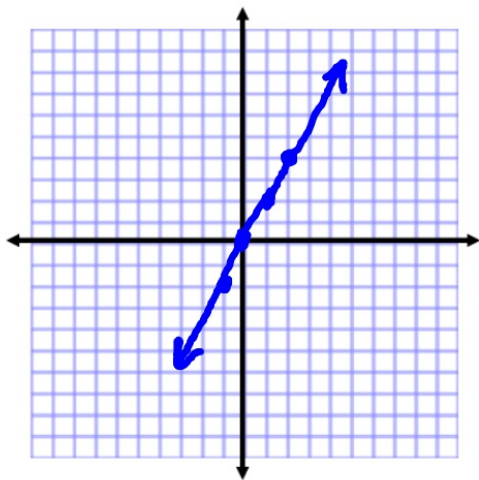
yes

Functions can also be illustrated with input-output tables or x-y tables.

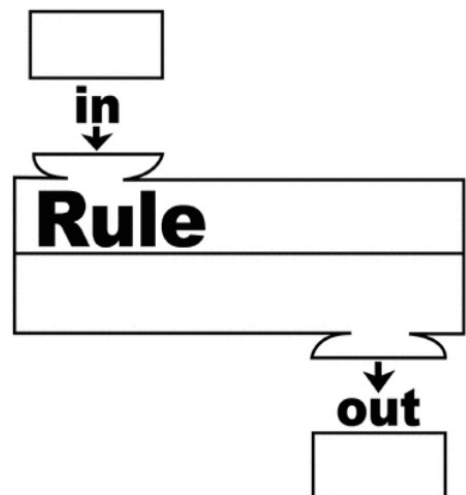
Use the rule $y = 2x$ to complete the table

input	output
-1	-2
0	0
1	2
2	4

Graph the ordered pairs



Does the graph pass the vertical line test? *yes*



Group Practice

Decide if each of the following represents a function.

1. $\{(1, 3), (2, 5), (3, 6), (4, 12)\}$ yes
2. $\{(\underline{0}, 4), (\underline{0}, 5), (1, 5)\}$ no
3. $\{(5, 1), (3, 1), (-2, 1), (4, 1)\}$ yes
4. $y = 2x + 1$, if $x = \{1, 2, 3\}$ yes
5. $y = x - 5$, if $x = \{2, 4, 6\}$ yes

Given the relation: $\{(-1, 2), (0, 5), (1, 3)\}$

Is 0 in the domain? *yes*

Is 1 in the range? *no*

Is this relation a function? *yes*

HW: Functions HW

