5.2 - Relations and Functions

Vocabulary:

- Relation - a set of ordered pairs. Example: age and height
- Function - a relation that assigns exactly one output value (y) for each input value (x)

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

1 EXAMPLE Determine whether each relation is a function.

a. {(4, 3), (2, –1), (–3, –3), (2, 4)}

* least → greatest
* #'s that duplicate – write once

input

x	y
–3	–3
2	–1
2	4
4	3

NO b/c the input 2 has two different output

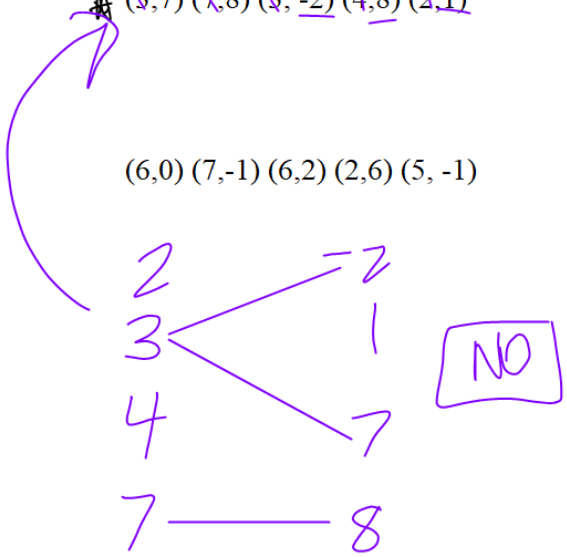
b. {(–4, 0), (2, 12), (–1, –3), (1, 5)}

–4	–3
–1	0
1	5
2	12

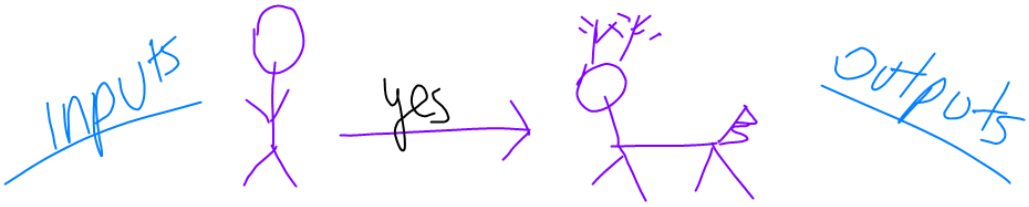
yes

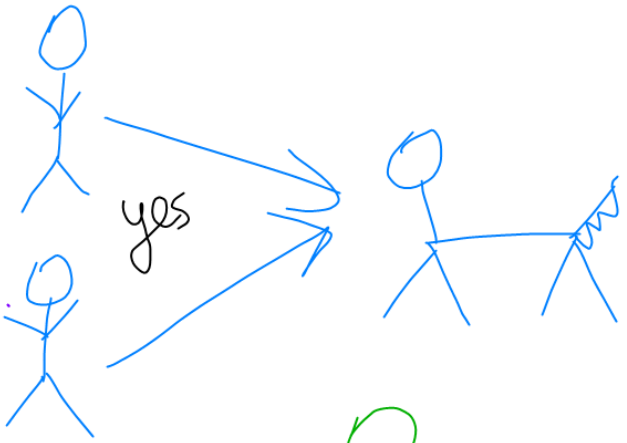
1. Determine whether the reation is a function.

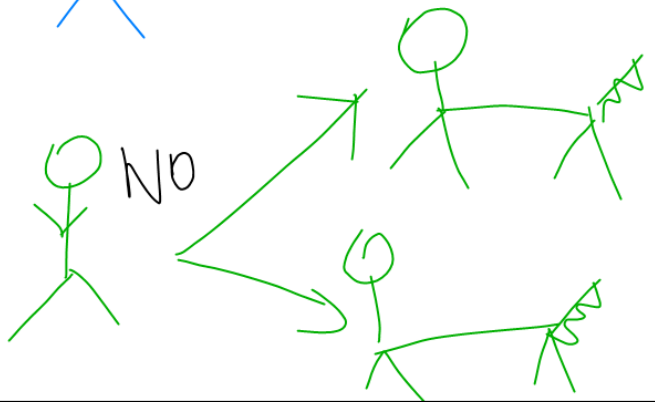
(3,7) (7,8) (3, -2) (4,8) (2,1)



(6,0) (7,-1) (6,2) (2,6) (5, -1)



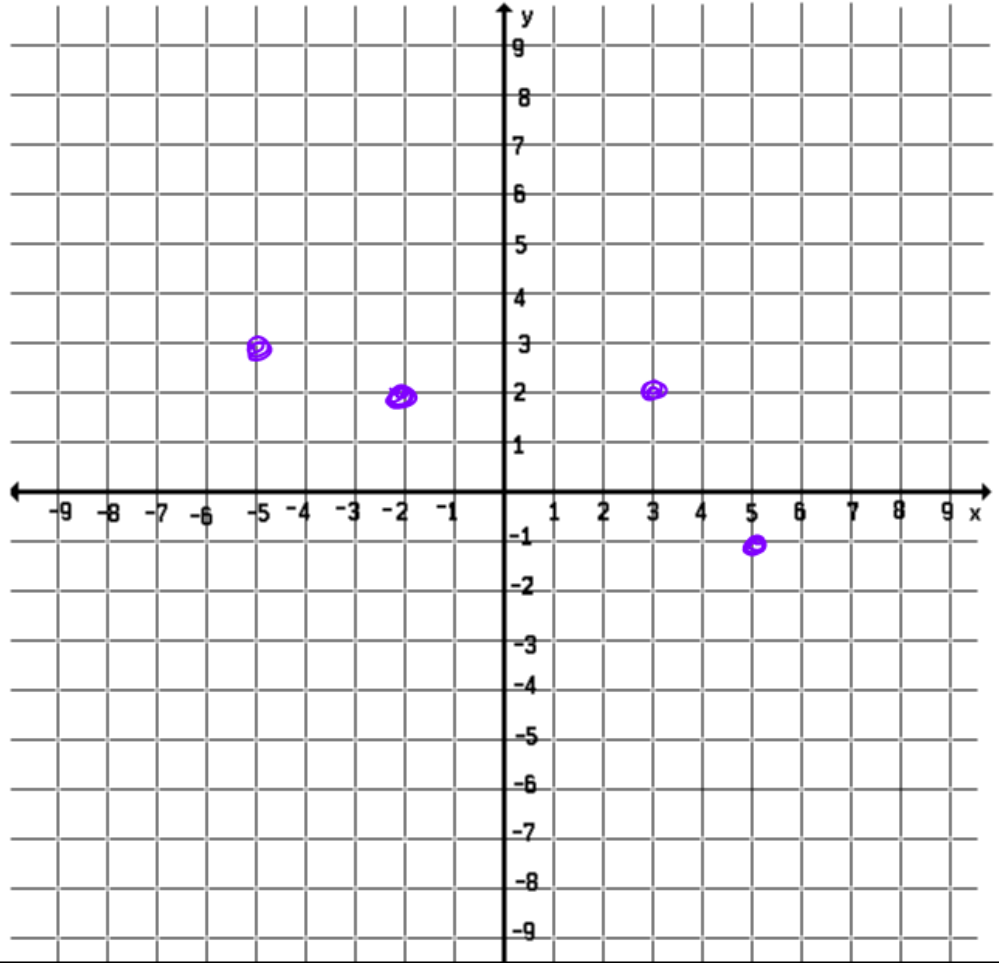




2 EXAMPLE Use the vertical-line test to determine whether the relation {(3, 2), (5, –1), (–5, 3), (–2, 2)} is a function.

Step 1: Graph the ordered pairs on a coordinate plane.

Step 2: Pass a pencil across the graph. Keep your pencil straight to represent a vertical line.

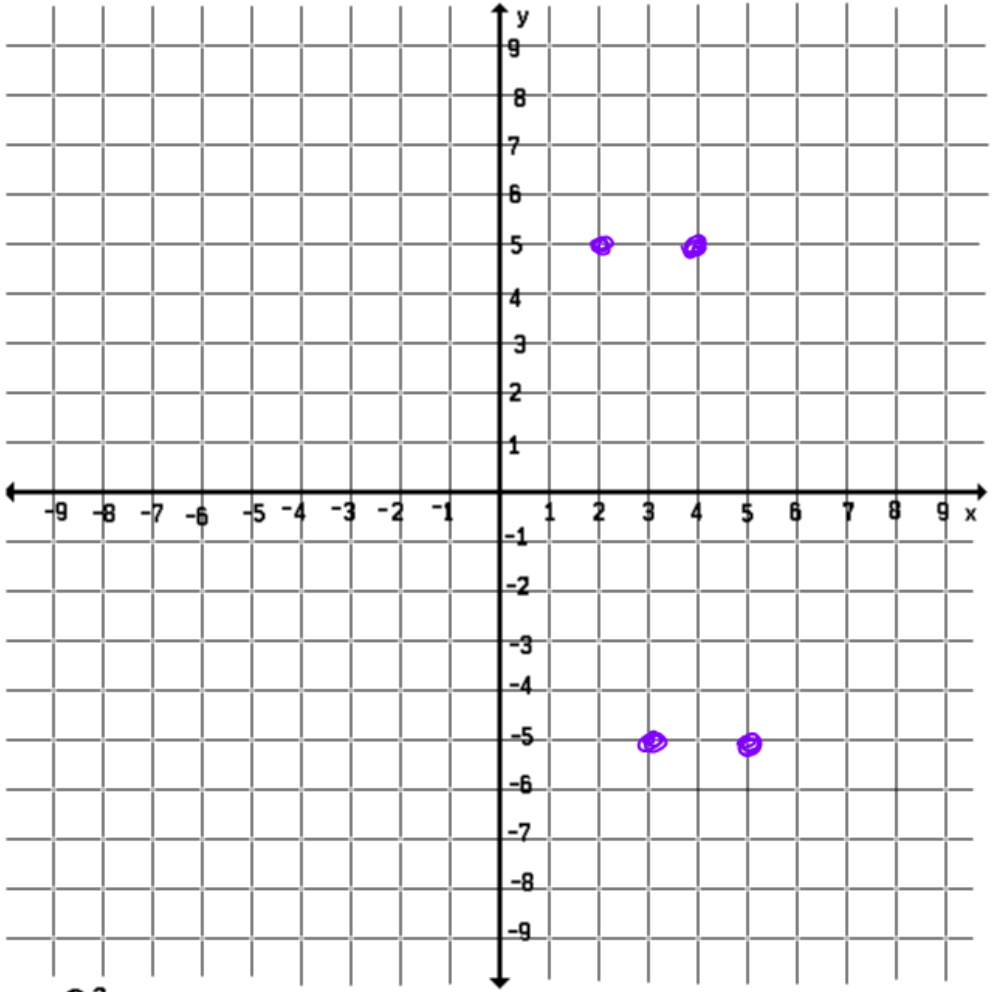


yes

5. Use the vertical line test to determine whether each relation is a function.

(2,5) (3, -5) (4, 5) (5, -5)

yes



3 EXAMPLE Make a table for $f(x) = 0.5x + 1$. Use 1, 2, 3, and 4 as domain values.

domain	$0.5x+1$	range
1	$0.5(1)+1$	1.5
2	$0.5(2)+1$	2
3	$0.5(3)+1$	2.5
4	$0.5(4)+1$	3

x
input
domain

y
output
range

9. Make a table for each function. Use 1, 2, 3, and 4 for the domain.

$f(x) = x + 7$

x	y
1	8
2	9
3	10
4	11

4 EXAMPLE Evaluate the function rule $f(g) = -2g + 4$ to find the range for the domain $\{-1, 3, 5\}$.

$f(-1) = -2(-1) + 4$

$2 + 4$

6

$f(3) = -2(3) + 4$

$-6 + 4$

-2

$f(5) = -2(5) + 4$

$-10 + 4$

-6

$\{-6, -2, 6\}$

17. Find the range of the function rule $y = 5x - 2$ for each domain.

{0.5, 11}

$y = 5(0.5) - 2$

$= 2.5 - 2$

$= 0.5$

$y = 5(11) - 2$

$= 55 - 2$

$= 53$

range: $\{0.5, 53\}$

Homework: pg. 259 #2-20even, 24, 34