

Relations and Functions

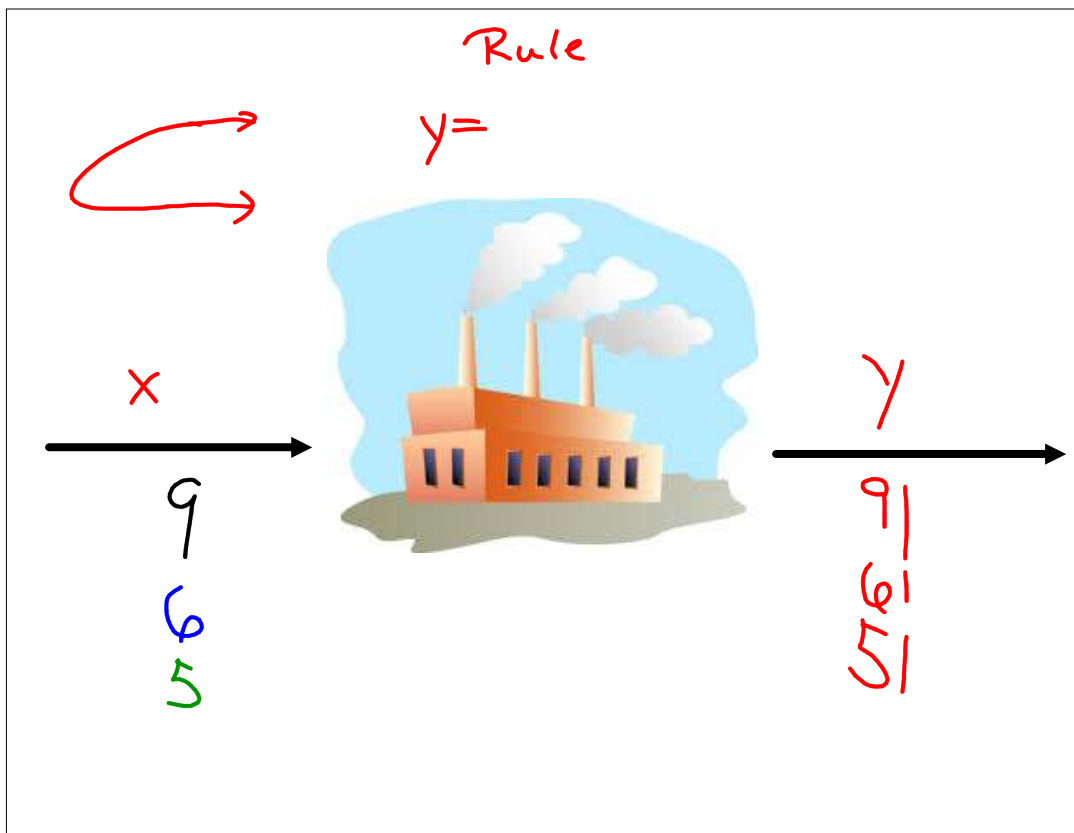
What is the difference?




Relation	Function
Any set of ordered Pairs	Relations where every input has 1 output



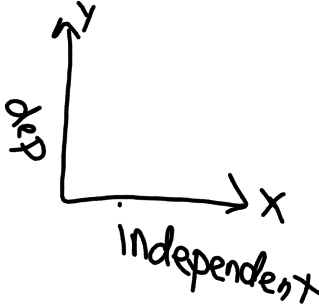
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 Terms associated with x and y


x	y
<p style="color: red; font-size: 1.2em;">input</p> <p style="color: blue; font-size: 1.2em;">domain</p> <p style="color: green; font-size: 1.2em;">independent</p>	<p style="color: red; font-size: 1.2em;">output</p> <p style="color: blue; font-size: 1.2em;">range</p> <p style="color: green; font-size: 1.2em;">dependent</p>



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 Let's talk about functions

- Functions you have used: $A = lw$ Area is a function of length and width.
 $D = rt$ Distance is a function of rate and time.
- Remember: A function has exactly one output for each input.



No input can have two different outputs.

All inputs must be different, but outputs can be the same.
- Ways to describe a function: Words, input/output table, set of ordered pairs, mapping diagram, graph

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Practice: Which are functions? Why?

Yes

Input	Output
2	5
4	6
6	5
8	6

(2,5)
(4,6)
(6,5)
(8,6)

Yes

Domain	Range
5	0
4	0
3	0
2	0

No

x	y
1	1
1	2
2	3
2	4

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No

x	y
1	1
1	.5
1	2
1	0

...


x	y
3	1
6	1
9	1
13	1

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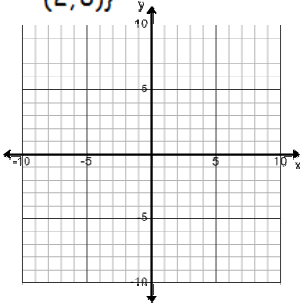
Do these ordered pairs represent a function?

$\{(4, 3), (5, 6), (3, 6), (2, 8)\}$

X	Y
4	3
5	6
3	6
2	8




Yes

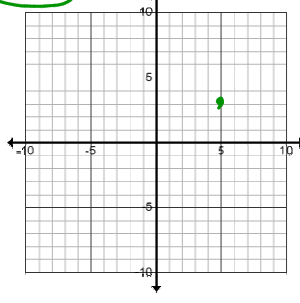


Do these ordered pairs represent a function?

$\{(5, 10), (4, 8), (5, 3), (6, 1)\}$



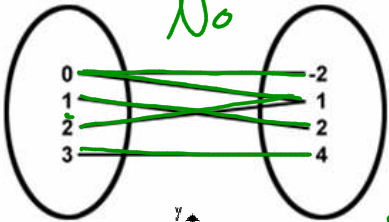
No



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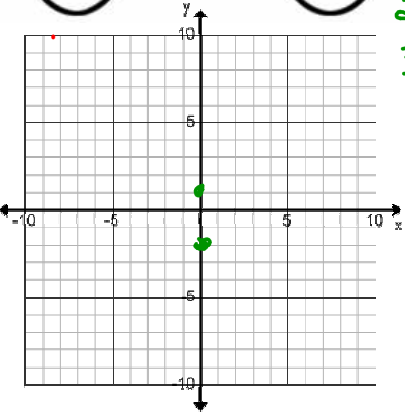
Which of the following Mapping Diagrams represent functions?

INPUT OUTPUT

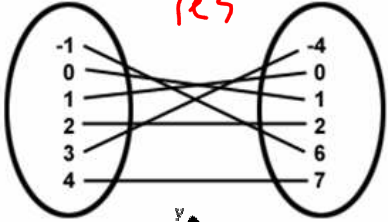


No

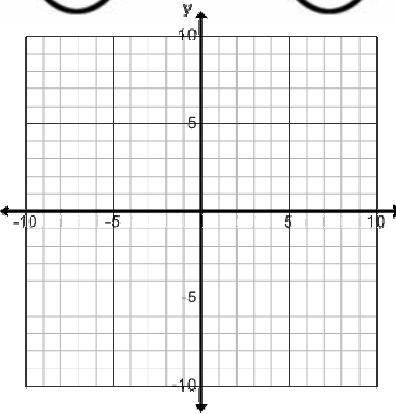
X	Y
0	-2
0	1
1	1
1	2
2	2
2	4
3	4



X Y



Yes



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X Y

X Y

Yes

$(4, 0)$
 $(4, 2)$
 $(4, 4)$

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Vertical Line Test

- If a vertical line passes through more than one point on the graph then it is not a function.
- If the vertical line hits more than one point on the graph than it is not a function.

$(0,0)$ $(2,1)$

Yes

No

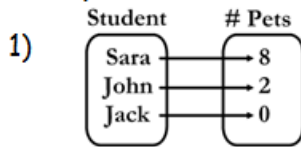
$(0,4)$
 $(0,2)$

No

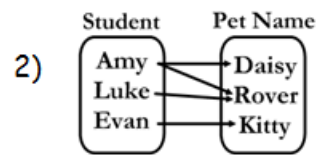
No

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Group Practice:



Function (yes/no) **yes**
 Domain: $\{Sara, John, Jack\}$
 Range: $\{8, 2, 0\}$
 Independent Variable: **students**
 Dependent Variable: **# of pets**



Function (yes/no) **no**
 Domain: $\{Amy, Luke, Evan\}$
 Range: $\{Daisy, Rover, Kitty\}$
 Independent Variable: **stu**
 Dependent Variable: **Pet Name**



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3) $\{(2,3), (4,5), (4,8), (6,9), (7,1)\}$

Function (yes/no) **no**
 Domain: $\{2, 4, 6, 7\}$
 Range: $\{1, 3, 5, 8, 9\}$
 Independent Variable: **x**
 Dependent Variable: **y**

4)

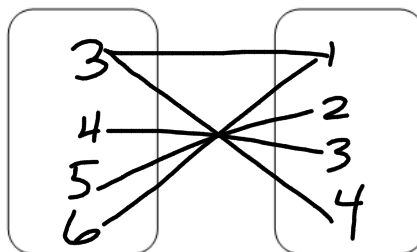
Input	5	6	7	8
Output	8	7	6	5

Function (yes/no) **no**
 Domain: $\{5, 6, 7, 8\}$
 Range: $\{4, 7, 6, 5\}$
 Independent Variable: **input**
 Dependent Variable: **output**

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5) Make a mapping diagram from...

Input	3	4	3	5	6
Output	4	3	1	2	1



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