Name: Key Date: _____

7/8A Classwork 9.1

Intro to Functions

A relation is a set of ordered pairs. A **function** is a relation in which each input value, or *x*-value, corresponds to exactly one output value, or *y*-value. A function or other relation can be represented as a set of ordered pairs in a table, as an equation, or by a graph.

The relationship represents a function if each input value is paired with only one output value.

** x can't repeat *

x

y

Example 1: Determine whether each relationship is a function. Justify.

a:

Input	Output
5	7
10	6
15	15
20	2
25	15

Yes, this is a function b/c no x values (input) repeat.

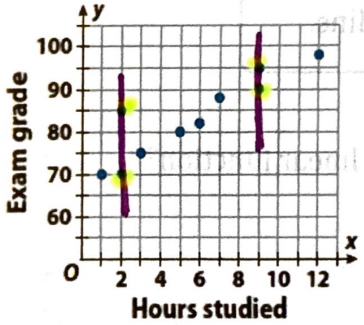
b:

x	y
1	10
5	8
4	6
1	4
7	2

No, this is NOT a function b/c an x value repeats. 1 (input) has more than 1 output.

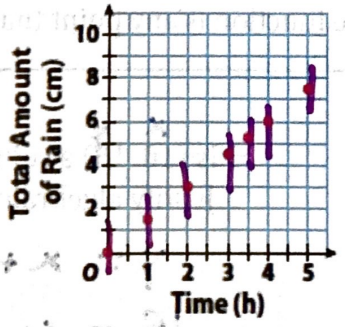
Example 2: Determine if the relationships below represent the graph a function? Justify.

Hours Studied and Exam Grade

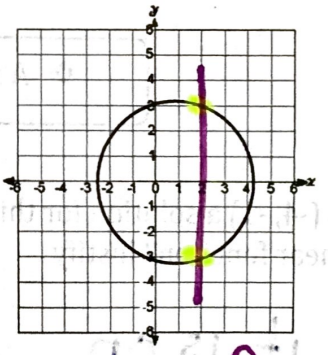


NOT a function does NOT pass VLT

Heavy Rainfall



This is a function. It passes VLT.



NOT a function does NOT pass VLT

❖ ***VERTICAL LINE TEST:*** If the line hits the graph more than once, it is not a function.

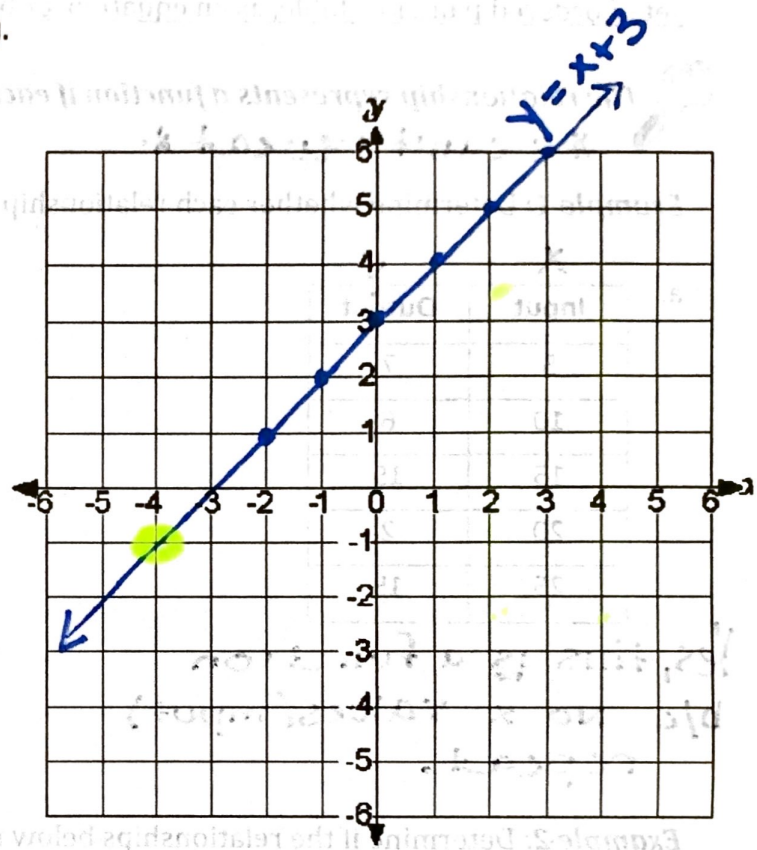
Graphing Linear Functions

When the graph of a relationship is a **line**, the equation is a **linear equation**. Since there is exactly one value of y for each value of x, the relationship is a ***function***. It is a **linear function** because its graph is a non-vertical line.

Example 3: Graph the function y = x + 3

Step 1: Create a table.
Step 2: Pick input values (x) to find the output values (y).
Step 3: Graph the ordered pairs.

x	y = x + 3	y	(x, y)
-2	(-2) + 3	1	(-2, 1)
-1	(-1) + 3	2	(-1, 2)
0	(0) + 3	3	(0, 3)
1	(1) + 3	4	(1, 4)
2	(2) + 3	5	(2, 5)



❖ A ***solution*** to the function is any point that lies on the line.

→Is (-4, -1) a solution for this linear function? Justify.

Yes, it is on the line.

→Is (10, 15) a solution for this linear function? Justify algebraically.

$y = x + 3$

$15 = (10) + 3$

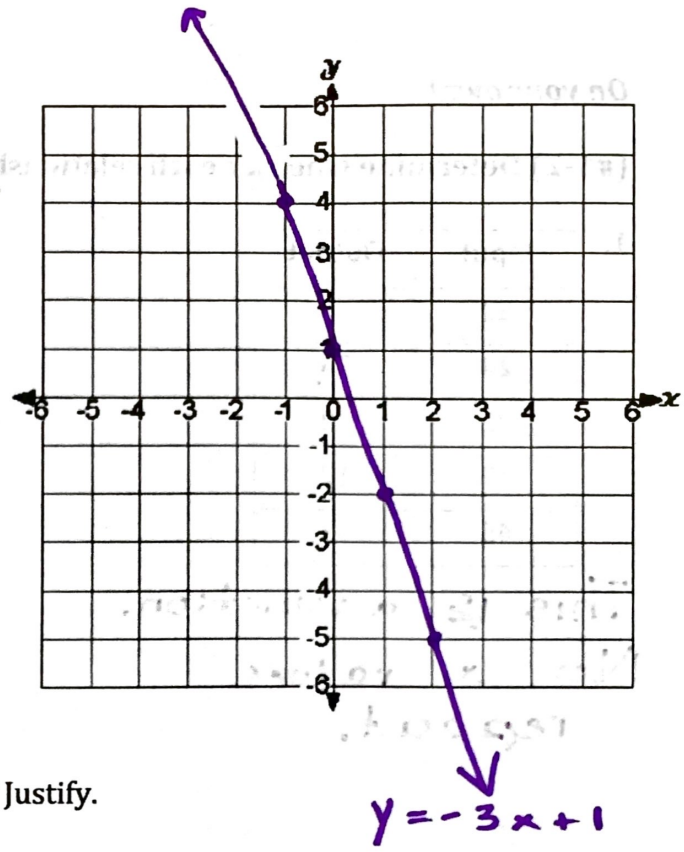
$15 \neq 13$

Not a solution.

Examples:

1. Complete the table and graph the function $y = -3x + 1$.

x	y = -3x + 1	y	(x, y)
-2	-3 (-2) +1	7	(-2, 7)
-1	-3 (-1) + 1	4	(-1, 4)
0	-3 (0) + 1	1	(0, 1)
1	-3 (1) + 1	-2	(1, -2)
2	-3 (2) + 1	-5	(2, -5)



2. Is (−12, 35) a solution to the previous linear function? Justify.

x y

$y = -3x + 1$

$35 = -3(-12) + 1$

$35 = 36 + 1$

$35 \neq 37$

Not a solution.

3. Tell whether each relationship is a function. Justify.

a:

Input	Output
1	6
2	7
3	7
4	6

This is a function.

No x values repeat.

b:

x	y
−1	14
0	15
1	16
−1	17

Not a function.

A value (-1) repeats.

c: { (2, 1), (4, 2), (6, 3) }

This is a function.

No x values repeat.