

# 4-3 Reteaching

## Patterns and Nonlinear Functions

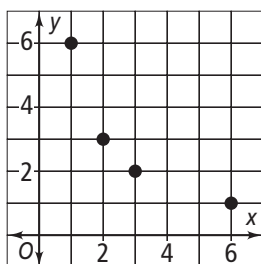
If the points of the graph of a function are in a straight line, the function is a **linear function**. If the points of the graph of a function are not in a straight line, the function is a **nonlinear function**.

### Problem

Is the function given by the table at the right *linear* or *nonlinear*?

$x$	$y$
1	6
2	3
3	2
6	1

Graph the function.



The points are not in a straight line, so the function is nonlinear.

Do you like to solve puzzles? When you are given a list of function values and you are asked to find the rule for the function, you are solving a puzzle. You are looking for a rule that works for all pairs of numbers.

### Problem

What is a rule that represents the function given by the table below?

$x$	$y$
6	3
8	5
9	6
12	9

Try a rule. Is there an operation or sequence of operations that relates the values in the first column of the table to the values in the second column?

Try division:  $6 \div 2 = 3$ , but  $8 \div 2 \neq 5$ .

Try another rule.  $6 - 3 = 3$  and  $8 - 3 = 5$ .

Check to make sure this works for all pairs of numbers.

$9 - 3 = 6$  and  $12 - 3 = 9$ .

The function can be represented by the rule  $y = x - 3$ .

# 4-3 **Reteaching** (continued)

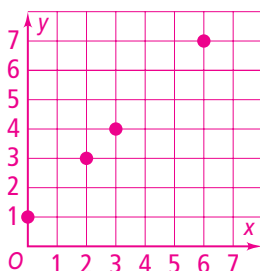
## Patterns and Nonlinear Functions

Graph the function shown by each table. Tell whether the function is *linear* or *nonlinear*.

1. 

x	y
0	1
2	3
3	4
6	7

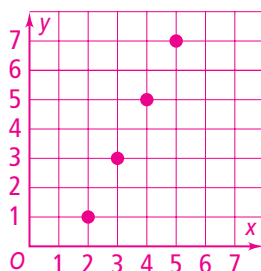
**linear;**



2. 

x	y
2	1
3	3
4	5
5	7

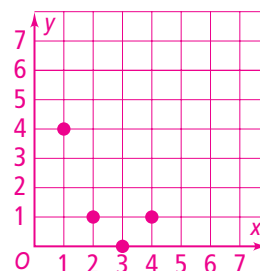
**linear;**



3. 

x	y
1	4
2	1
3	0
4	1

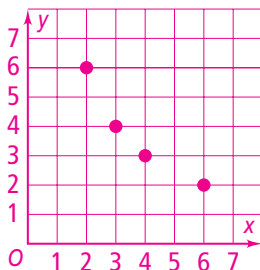
**nonlinear;**



4. 

x	y
2	6
3	4
4	3
6	2

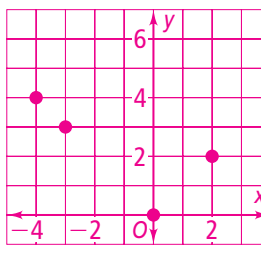
**nonlinear;**



5. 

x	y
-4	4
-3	3
0	0
2	2

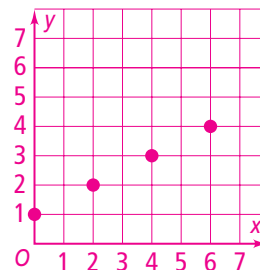
**nonlinear;**



6. 

x	y
0	1
2	2
4	3
6	4

**linear;**



Each set of ordered pairs represents a function. Write a rule that represents the function.

7. (2, 10), (4, 20), (5, 25), (7, 35), (9, 45)  
 **$y = 5x$**

8. (2, 5), (4, 9), (5, 11), (7, 15), (10, 21)  
 **$y = 2x + 1$**

9. (0, 0), (1, 1), (2, 8), (3, 27), (4, 64)  
 **$y = x^3$**

10. (2, 5), (3, 10), (4, 17), (5, 26), (6, 37)  
 **$y = x^2 + 1$**