

Linear function

~constant rate of change

~graph is a line

Nonlinear function

~NOT a constant rate of change

~graph is NOT a line

EXAMPLE 1 Identifying Functions from Tables

Does the table represent a *linear* or *nonlinear* function? Explain.

		+3	+3	+3	
<i>x</i>	3	6	9	12	
<i>y</i>	40	32	24	16	

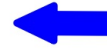


-8 -8 -8

LINEAR, because it has a constant rate of change.

		+2	+2	+2	
<i>x</i>	1	3	5	7	
<i>y</i>	2	11	33	88	

+9 +22 +55



NONLINEAR, because it does not have a constant rate of change.

Extra Example 1

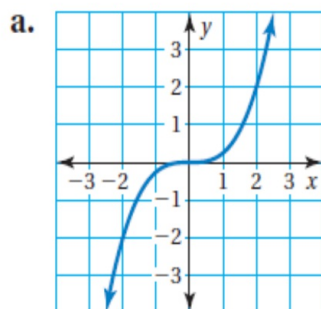
Does the table represent a *linear* or *nonlinear* function? Explain.

		+1	+1	+1	
x	3	4	5	6	
y	1	2	3	4	
		+1	+1	+1	←

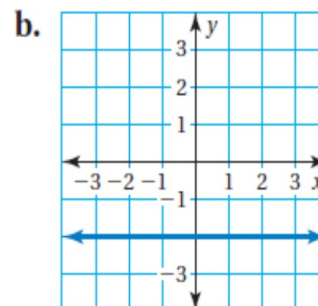
LINEAR, because it has a constant rate of change.

EXAMPLE 2 Identifying Functions from Graphs

Does the graph represent a *linear* or *nonlinear* function? Explain.



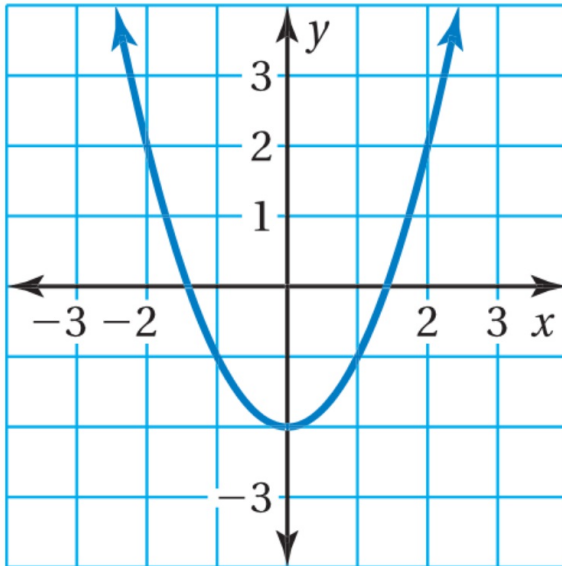
NONLINEAR, because it is not a straight line.



LINEAR, because it is a straight line.

Extra Example 2

Does the graph represent a *linear* or *nonlinear* function? Explain.



NONLINEAR, because it is not a straight line.

● On Your Own

Does the table or graph represent a *linear* or *nonlinear* function? Explain.

1.

	x	y
	0	25
+7	7	20
+7	14	15
+7	21	10

↓

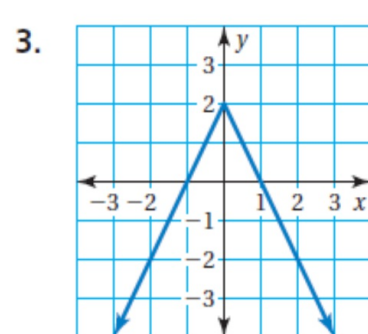
LINEAR, because it is a constant rate of change

2.

	x	y
	2	8
+2	4	4
+2	6	0
+2	8	-4

↓

LINEAR, because it is a constant rate of change



NONLINEAR, because it is not a straight line.

Which equation represents a *nonlinear* function?

Ⓐ $y = 4.7$

Ⓑ $y = \pi x$

Ⓒ $y = \frac{4}{x}$

Ⓓ $y = 4(x - 1)$

The equations $y = 4.7$, $y = \pi x$, and $y = 4(x - 1)$ can be rewritten in slope-intercept form. So, they are linear functions.

The equation $y = \frac{4}{x}$ cannot be rewritten in slope-intercept form. So, it is a nonlinear function.

❖ The correct answer is Ⓒ.

Does the equation represent a linear or nonlinear function?

$$y = x^2 + 1$$

NONLINEAR, because it cannot be written in slope intercept form (it has an exponent!).

Extra Example 3

Does $y = 6x - 3$ represent a *linear* function?

LINEAR, because it can be written in slope intercept form. (It already is!)

Does $4x + 2y = 8$ represent a linear function?

LINEAR, because it can be written in slope intercept form: $y = -2x + 4$ (minus $4x$ then divide everything by 2)

On Your Own

Does the equation represent a *linear* or *nonlinear* function? Explain.

4. $y = x + 5$

LINEAR, because it can be written in slope intercept form. (It already is!)

5. $y = \frac{4x}{3}$

LINEAR, because it can be written in slope intercept form. ($y = \frac{4}{3}x + 0$)

6. $y = 1 - x^2$

NONLINEAR, because it cannot be written in slope intercept form (it has an exponent!).

Homework:

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#3-14

**you do not need to graph #3-6,
just explain why you chose your answer