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
x	3	6	9	12
y	40	32	24	16
		−8	−8	−8

LINEAR, because it has a constant rate of change.

		+2	+2	+2
x	1	3	5	7
y	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.

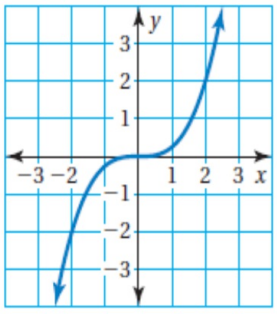
		+1	+1	+1
x	3	4	5	6
y	1	2	3	4
		+1	+1	+1

LINEAR, because it has a constant rate of change.

EXAMPLE 2 Identifying Functions from Graphs

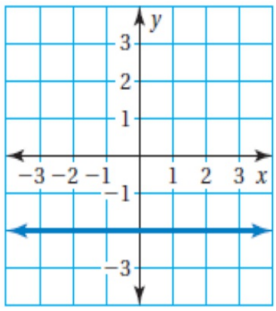
Does the graph represent a *linear* or *nonlinear* function? Explain.

a.



NONLINEAR, because it is not a straight line.

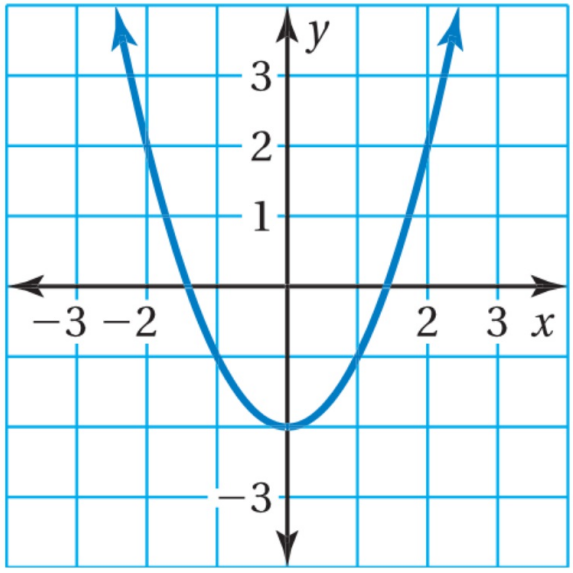
b.



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, −5
7	20	
		+7, −5
14	15	
		+7, −5
21	10	

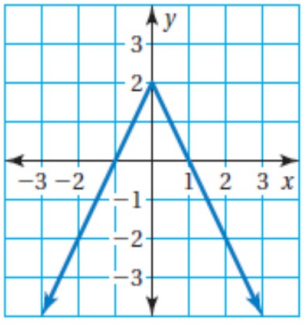
LINEAR, because it is a constant rate of change

2.

x	y	
2	8	
		+2, −4
4	4	
		+2, −4
6	0	
		+2, −4
8	−4	

LINEAR, because it is a constant rate of change

3.



NONLINEAR, because it is not a straight line.

LE 3 Standardized Test Practice

Which equation represents a *nonlinear* function?

(A) $y = 4.7$ (B) $y = \pi x$

(C) $y = \frac{4}{x}$ (D) $y = 4(x - 1)$

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

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

∴ The correct answer is (C).

Does the equation represent a linear or nonlinear function?

$$y = x^2 + 1$$

NONLINEAR, because it cannont 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 = 4/3 x + 0)

6. $y = 1 - x^2$

NONLINEAR, because it cannont be written in slope intercept form (it has an exponent!).

Homework:
pg. 172-173
#3-14

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