
Functions - Day 3

Linear & Nonlinear

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.

x	3	6	9	12
y	40	32	24	16

x	1	3	5	7
y	2	11	33	88

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.

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

<i>x</i>	3	4	5	6
<i>y</i>	1	2	3	4

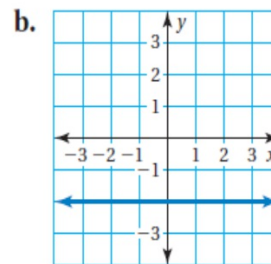
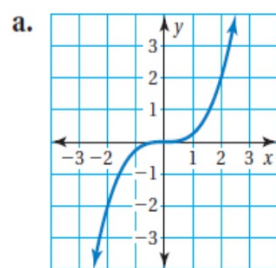
Does the table represent a *linear* or *nonlinear* function? Explain.

		+1	+1	+1	
<i>x</i>	3	4	5	6	
<i>y</i>	1	2	3	4	
		+1	+1	+1	←

LINEAR, because it has a

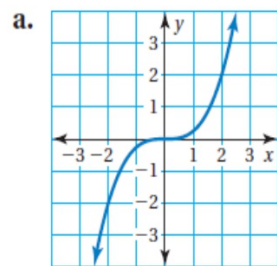
EXAMPLE 2 Identifying Functions from Graphs

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

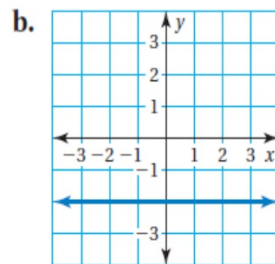


EXAMPLE 2 Identifying Functions from Graphs

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

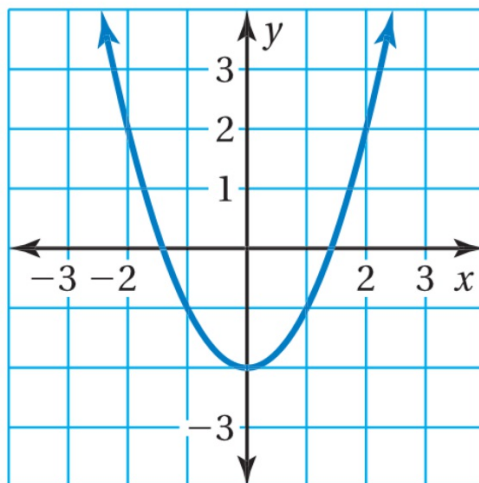


NONLINEAR, because it is not a straight line.

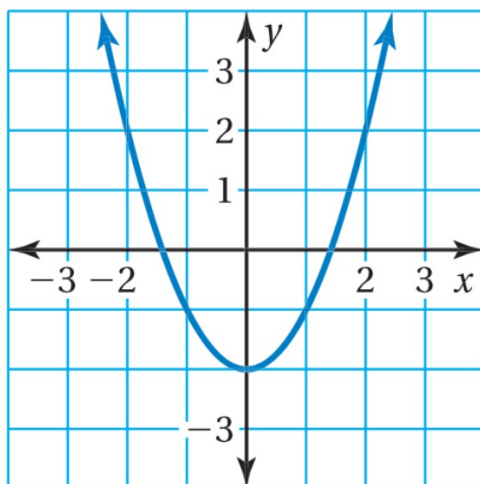


LINEAR, because it is a straight line.

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



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.

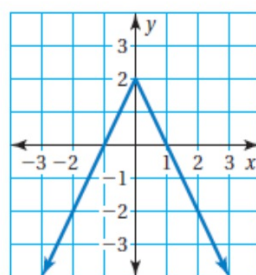
1.

x	y
0	25
7	20
14	15
21	10

2.

x	y
2	8
4	4
6	0
8	-4

3.



● **On Your Own**


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

Explain.

1.

x	y
0	25
7	20
14	15
21	10

+7 -5
+7 -5
+7 -5




LINEAR, because it is a constant rate of change

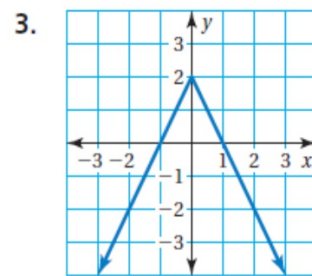
2.

x	y
2	8
4	4
6	0
8	-4

+2 -4
+2 -4
+2 -4



LINEAR, because it is a constant rate of change



NONLINEAR, because not a straight line.

Linear Equation

Variables have exponents equal to 1 or 0.

Examples:

$$y = 2x + 4$$

$$3x + 4y = 12$$

$$y = 7$$

Nonlinear Equation

Equation has exponents or variable is in the denominator.

Examples:

$$y = 3x^2 + 6$$

$$y = \frac{3}{x}$$

$$y = 2^x$$

Does the equation represent a linear or nonlinear function?

$$y = x^2 + 1$$

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!).

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

Does $y = 8$ represent a linear function?

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

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

Does $y = 8$ represent a linear function?

LINEAR, because it can be written in slope intercept form: $y = 0x + 8$
(the graph would be a horizontal line)

● On Your Own

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

4. $y = x + 5$

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

6. $y = 1 - x^2$

● 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:

**Linear & Nonlinear
Worksheet**