

SEL

- 10 morning habits geniuses use to restart the brain

Warmup 9/ (# letters in the Spanish phrases for: “sit down” + “stand up” – “yes”)

Created by Ms. Marlin

1. Complete the table using the function $f(x) = 5 - 2x$:

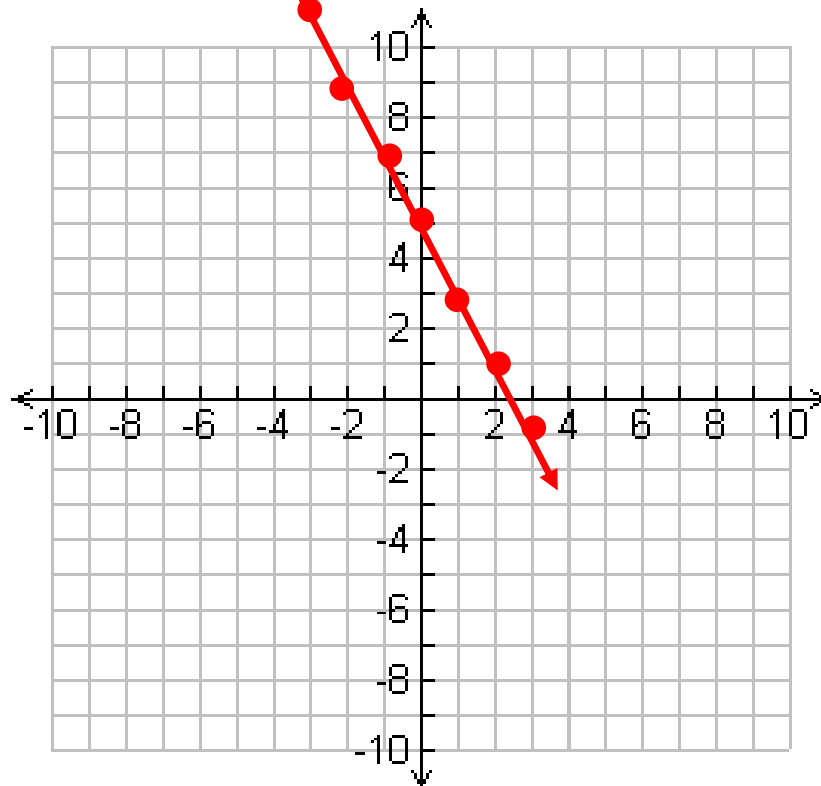
x	-3	-2	-1	0	1	2	3
y							

2. Draw your own coordinate plane (you don't have to make it super detailed – just an x and y-axis and some tick marks) and use your table to draw the graph.
3. Is your graph a FUNCTION? Explain why or why not.

Is this a function?

- $f(x) = 5 - 2x$

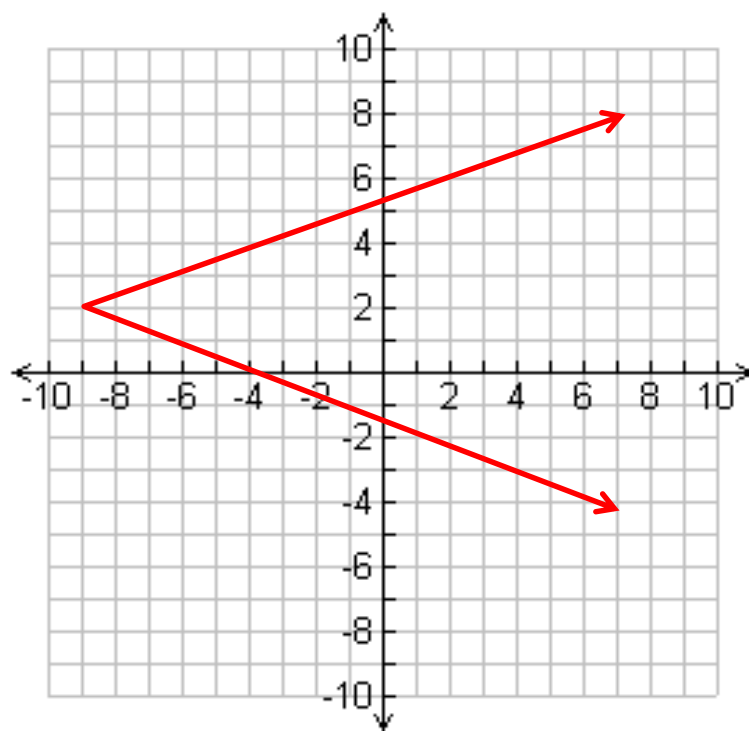
x	-3	-2	-1	0	1	2	3
y	11	9	7	5	3	1	-1



ONE IMPORTANT THING TO NOTICE...

- Any mathematical rule $f(x) = \underline{\hspace{2cm}}$ will be a function because you will always get **ONE** answer when you plug a number in for x .
- You will never get any points directly on top of each other in an $f(x) = \underline{\hspace{2cm}}$ graph because each x will only have **ONE** y !

Is this a function?



Unit I Test Retake deadline is Friday!

- Must turn in corrections/extra practice by **THURSDAY.**
- May want to turn in EARLIER so that you have enough time to fix/improve them.
- May always ask me for help on these!


Table of Contents

- p. 1 Converting Fractions and Decimals (1.1)
- p. 2 Roots (1.8 & 1.9)
- p. 3 Solving x^2 and x^3 Equations (1.8)
- p. 4 Rational vs. Irrational (1.1)
- p. 5 What is a function?
- p. 6 Function Notation: $f(x)$
- p. 7 Linear vs. Nonlinear Functions**

Linear vs. Nonlinear Functions

Objectives:


- Predict if an equation will be linear or nonlinear
- Predict if a table will be linear or nonlinear
- Learn a strategy to help figure out a rule



When will an equation be linear, and when will it be nonlinear???

- **Theories???**
- **Let's explore more in desmos...**

COPY:

Linear Equations	Nonlinear Equations
Anything using the pattern $f(x) = \underline{\hspace{1cm}}x + \underline{\hspace{1cm}}$ $f(x) = \underline{\hspace{1cm}}x - \underline{\hspace{1cm}}$	Exponents other than 1
Anything without any of that stuff 	Variable inside a square root
	Variable in a denominator
	Variable inside an absolute value

These all look like

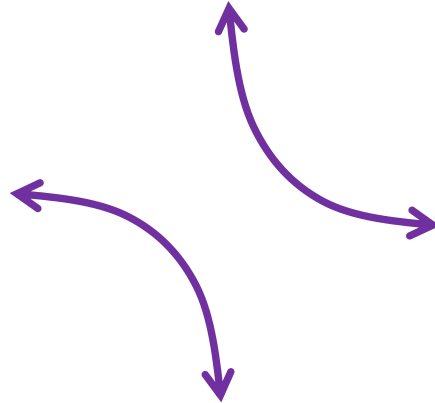
x^2 graphs look like

Absolute value graphs look like

- Square root graphs look like:



- Variable in the denominator graphs look like:



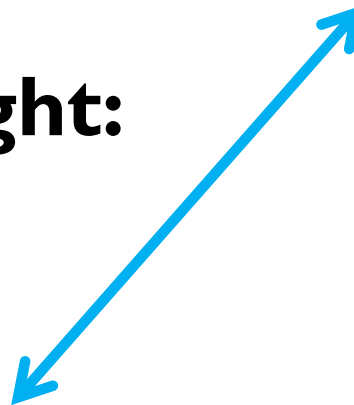
- There ARE other, more complicated things that also make nonlinear graphs. (sin, cos, logarithms, etc.)
You will learn about these in later math classes.

IMPORTANT:

- **Diagonal lines ARE considered “straight lines!!!”**

- **Straight:** 

- **Also straight:**



Linear or Nonlinear?

$$f(x) = 4x + 3$$

Linear



Linear or Nonlinear?

$$f(x) = x^2 - 4$$

Nonlinear

Linear or Nonlinear?

$$f(x) = \frac{x}{5} + 4$$

Linear

Linear or Nonlinear?

$$f(x) = \frac{6}{x} - 2$$

Nonlinear

Linear or Nonlinear?

$$f(x) = x^3 + 4x - 3$$

Nonlinear



Linear or Nonlinear?

$$f(x) = 100 - x$$

Linear



Linear or Nonlinear?

$$f(x) = 5x - 2x$$

Linear

Linear or Nonlinear?

$$f(x) = -\frac{3}{4}x + \frac{1}{7}$$

Linear

Linear or Nonlinear?

$$f(x) = 4\sqrt{x} - 3$$

Nonlinear

Linear or Nonlinear?

$$f(x) = |2x + 10|$$

Nonlinear



Linear or Nonlinear?

$$f(x) = 6$$

Linear



Linear or Nonlinear?

$$f(x) = (4x - 3)^2$$

Nonlinear

Linear or Nonlinear?

$$6 - \frac{3}{4}x = f(x)$$

Linear

Linear or Nonlinear?

$$f(x) = x(x - 4)$$

Nonlinear

(turns into $f(x) = x^2 + 4x$)

Linear or Nonlinear?

$$f(x) = 2x^3 - \sqrt{x} + |x - 4| + \frac{3}{x}$$

Nonlinear



Linear or Nonlinear?

$$2x + 4y = 5$$

Linear



Linear or Nonlinear?

$$y = 3x + \sqrt{2}$$

Linear

PATTERNS...

$$f(x) = 4x$$

x	f(x)
1	
2	
3	
4	
5	

$$g(x) = 4x + 5$$

x	g(x)
1	
2	
3	
4	
5	

$$h(x) = 4x - 2$$

x	h(x)
1	
2	
3	
4	
5	

$$j(x) = -5x + 20$$

x	j(x)
1	
2	
3	
4	
5	

$$k(x) = 7x - 3$$

x	k(x)
1	
2	
3	
4	
5	

$$l(x) = 100x + 5$$

x	l(x)
1	
2	
3	
4	
5	

Multiplication table...

Multiplication

X	0	1	2	3	4	5	6	7	8	9	10	11	12
0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9	10	11	12
2	0	2	4	6	8	10	12	14	16	18	20	22	24
3	0	3	6	9	12	15	18	21	24	27	30	33	36
4	0	4	8	12	16	20	24	28	32	36	40	44	48
5	0	5	10	15	20	25	30	35	40	45	50	55	60
6	0	6	12	18	24	30	36	42	48	54	60	66	72
7	0	7	14	21	28	35	42	49	56	63	70	77	84
8	0	8	16	24	32	40	48	56	64	72	80	88	96
9	0	9	18	27	36	45	54	63	72	81	90	99	108
10	0	10	20	30	40	50	60	70	80	90	100	110	120
11	0	11	22	33	44	55	66	77	88	99	110	121	132
12	0	12	24	36	48	60	72	84	96	108	120	132	144

NOTICE: The numbers in the “4s” row are all 4 apart.

So the outputs of “ $y = 4x$ ” would all be 4 apart.

If I added one to each number in the 4’s row, would they still all be 4 apart?

Therefore, the outputs of $y = 4x + 1$ would still all be 4 apart.

HOMEWORK

- Create your own functions WS