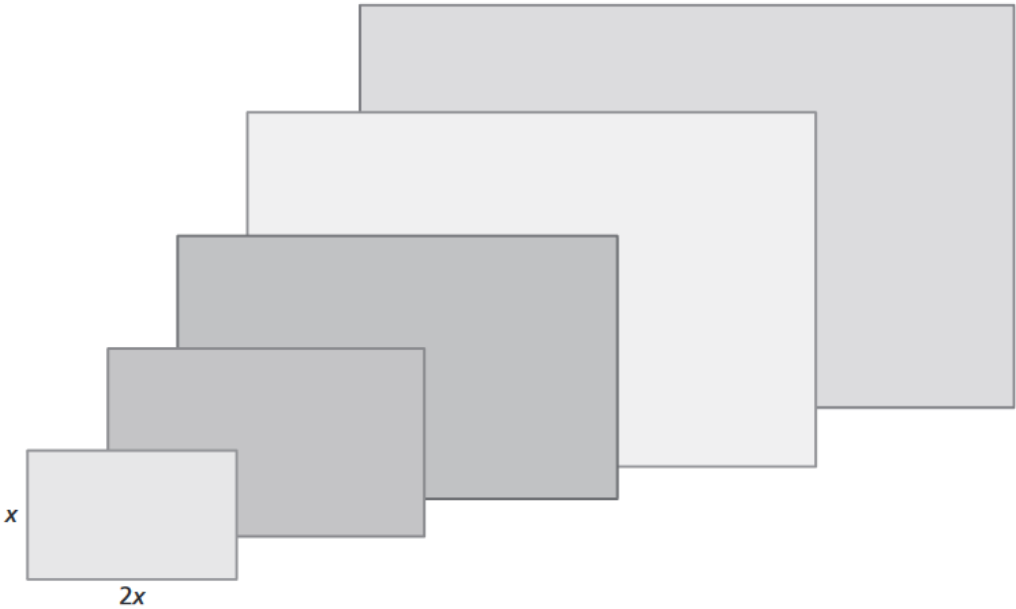


Do Now:

Look at Activity 1 and 2 on page 133-134 that you did for homework.

What do you think it means when a function is linear?



a. Perimeters of similar rectangles

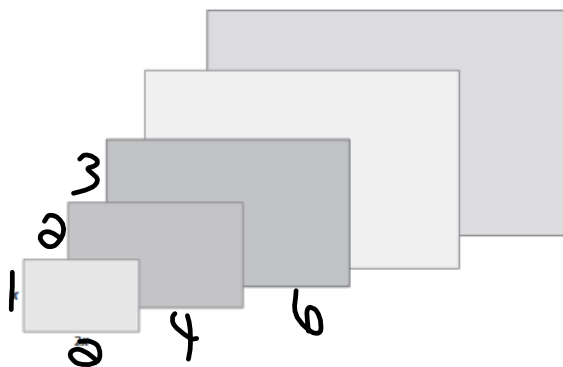
x	1	2	3	4	5
P					

b. Areas of similar rectangles

x	1	2	3	4	5
A					

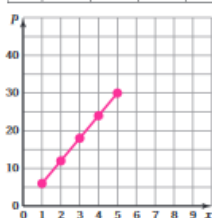
1 ACTIVITY: Finding Patterns for Similar Figures

Work with a partner. Complete each table for the sequence of similar rectangles. Graph the data in each table. Decide whether each pattern is linear or nonlinear.



a. Perimeters of similar rectangles

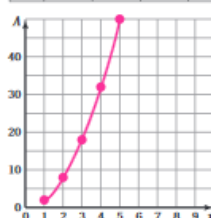
x	1	2	3	4	5
P	6	12	18	24	30



linear

b. Areas of similar rectangles

x	1	2	3	4	5
A	2	8	18	32	50



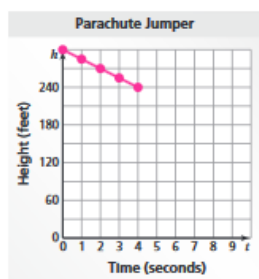
nonlinear

Work with a partner. Each table shows the height h (in feet) of a falling object at t seconds.

- Graph the data in each table.
- Decide whether each graph is linear or nonlinear.
- Compare the two falling objects. Which one has an increasing speed?

a. Falling parachute jumper

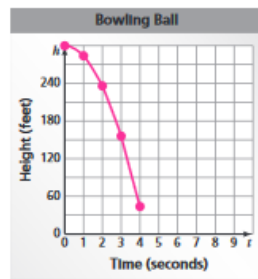
t	0	1	2	3	4
h	300	285	270	255	240



linear

b. Falling bowling ball

t	0	1	2	3	4
h	300	284	236	156	44



nonlinear

The bowling ball has an increasing speed.

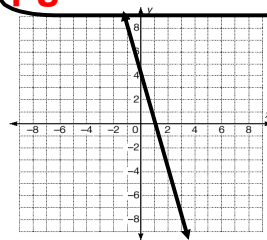
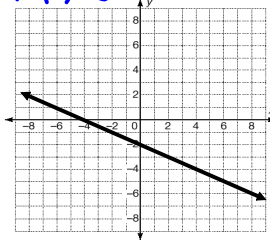
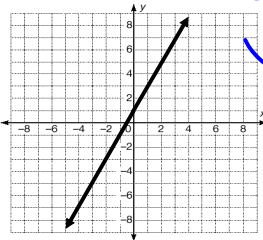
6.4 Comparing Linear and Nonlinear Functions 8.F.3

Goal

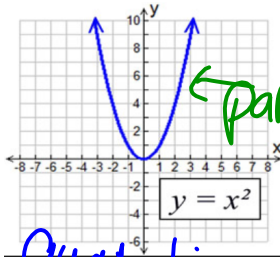
Today's lesson is comparing linear and nonlinear functions

HW: Textbook pg 270 #1-15 all

Linear : $y = mx + b$

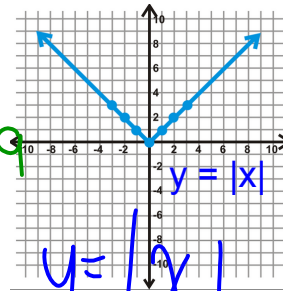


Nonlinear :

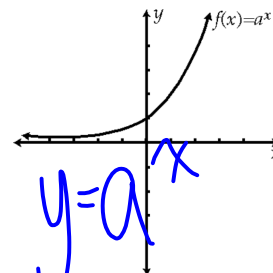


quadratic

parabola



$y = |x|$

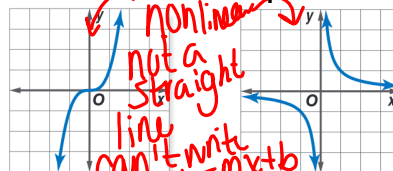
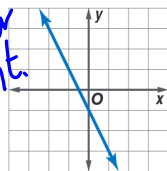


$y = a^x$

Exponential

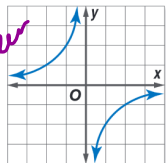
Linear or Nonlinear? Explain!

$y = mx + b$
linear
straight
line

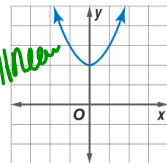


nonlinear
not a
straight
line
can't write
 $y = mx + b$

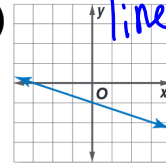
1) nonlinear



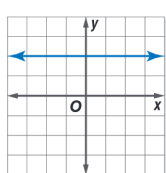
2) nonlinear



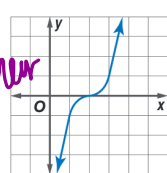
3) linear



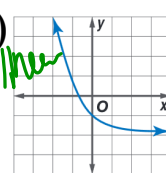
4) linear



5) nonlinear



6) nonlinear



Linear can be written in $y = mx + b$
Non linear can not be written in
must state!!! $y = mx + b$

Linear Function- a function whose graph is a **non vertical** straight line, with a constant rate of change.

Nonlinear Function- Does **NOT** have a constant rate of change, so its graph is **NOT** a line.

Linear Equation- an equation that represents a line and can be written in $y = mx + b$.

****For linear, the variables can not have exponents larger than 1 AND x and y must be in the numerator when the equation is in simplified form.**

Slope Intercept Form

$$y = mx + b$$

$$y = -4x + 9$$

$$y = \frac{2}{5}x - \frac{12}{5}$$

Standard Form

$$ax + by = c$$

$$-5x + 3y = 10$$

$$\frac{1}{3}x - \frac{4}{7}y = 15$$

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

$$y = mx + b$$

$$y = -2x + 7$$

linear can be written in $y = mx + b$

$$y + 3 = -x$$

$$y = -x - 3$$

linear $y = mx + b$

$$y = \frac{2}{x} + 6$$

nonlinear
x is in

denominator

$$y' = x^2 - 12$$

nonlinear
exponent greater than 1

$$\frac{2y}{2} = \frac{x}{2}$$

$$y = \frac{1}{2}x$$

$$y = mx + b$$

$$y = \frac{1}{2}x$$

$$y = mx + b$$

$$y - x = 3x + 1$$

$$+x + x$$

$$y = 4x + 1$$

linear

$$y = mx + b$$

Let's look at the tables from Activity 1 and 2!

perimeter

1a)

<i>x</i>	1	2	3	4	5
<i>p</i>	6	12	18	24	30

constant rate of change
linear

rate of change
 $\frac{\Delta y}{\Delta x}$

1b)

<i>x</i>	1	2	3	4	5
<i>A</i>	2	8	18	32	50

Area
nonlinear nonconstant rate of change

2a)

<i>t</i>	0	1	2	3	4
<i>h</i>	300	285	270	255	240

linear
constant rate of change

2b)

<i>t</i>	0	1	2	3	4
<i>h</i>	300	284	236	156	44

bowling balls
nonlinear
not a constant rate of change

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

<i>x</i>	2	5	8	11
<i>y</i>	4	7	12	19

<i>x</i>	<i>y</i>
0	25
7	20
14	15
21	10

<i>x</i>	<i>y</i>
2	8
4	4
6	0
8	-4

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

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

x	2	5	8	11
y	4	7	12	19

Nonlinear, NOT a constant rate of change

x	y
0	25
7	20
14	15
21	10

Linear, a constant rate of change

Linear, a constant rate of change

x	y
2	8
4	4
6	0
8	-4

x	3	4	5	6
y	1	2	3	4

Linear, a constant rate of change

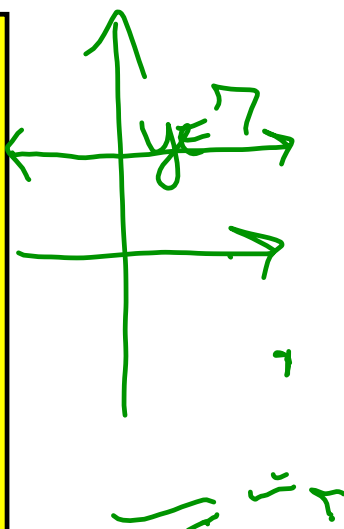
linear

$$y = 2x + 5$$

$$y = mx + b$$

$$ax + by = c$$

$$y = 7$$



nonlinear

$$|x| = 16$$

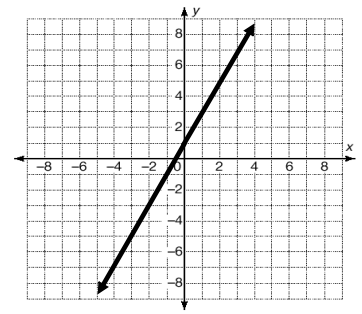
$$r^2 = x^2 + y^2$$

$$y = 5^x$$

$$y = ax^2 + bx + c$$

Wrap Up:
Discuss this with your group!

How do we determine if a graph, table, or equation represents a linear or nonlinear function?



x	y
0	25
7	20
14	15
21	10

$$y = mx + b$$

$$Ax + By = C$$