

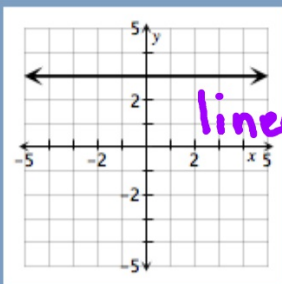
Day 5~
Linear vs. Non-Linear
Functions

Warm-up

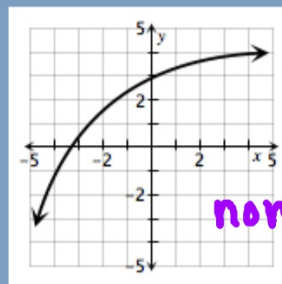
Consider the functions below.

Write a conjecture about what you think makes a function linear and what makes a function non-linear.

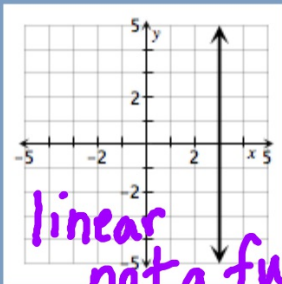
(a)



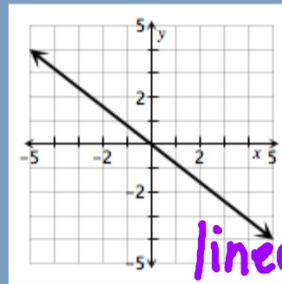
(b)



(c)



(d)



Explore these equations by sketching each graph:

*Remember equations must be solved for y before typing them into the y= screen.

1. $y = x^2 - 2x$
non-linear

2. $y = \left(\frac{1}{3}\right)x - 2$
linear

3) $A = \pi r^2$
 $y = \pi x^2$ non-linear

4) $y = -2x^2 + 3$ non-linear

5. $5x + 3y = 0$
 $y = -\frac{5}{3}x$ linear

6. $y - 4x = -5$
 $y = 4x - 5$ linear

7. $y = \sqrt{x + 9}$ non-linear

8. $y = 3^x - 2$ non-linear

9. $y = x^3 - x^2$ non-linear

10) $y = 0.25 + 0.5(x - 2)$
linear

Discuss- What conclusions can you make from your exploration?

Linear Function

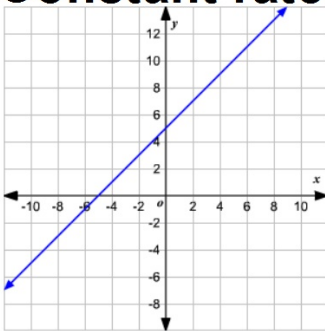
*Makes a straight line, but non-vertical.

*One independent variable(x) and one dependent variable (y).

*Can be put in the form of $y=mx+b$

*The exponent for x and y is 1.

*Constant rate of change

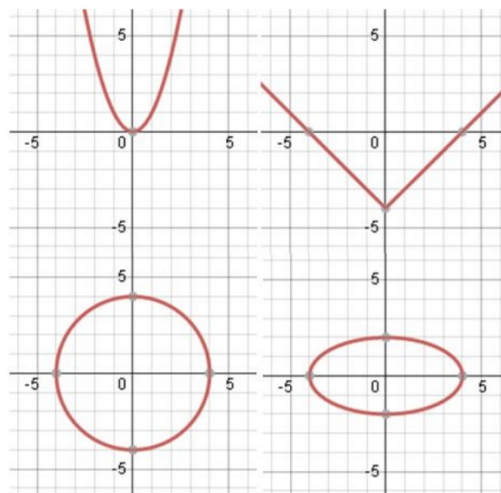


Non-Linear Function

*Does not make a straight line.

*The exponents for x and/or y is NOT 1.

*Not a constant rate of change

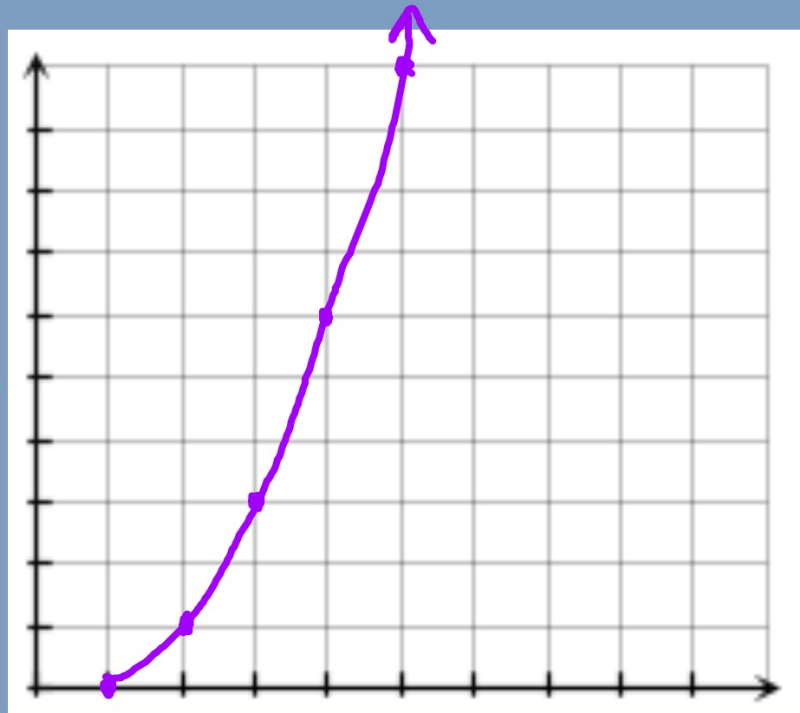


Plot the points from the given table. State whether the graph represents a linear function.

Ex.1

x	1	2	3	4	5
y	0	1	3	6	10

non-linear

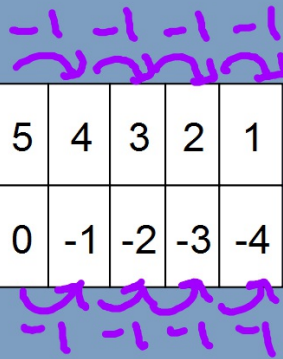


Discuss

Explain how you can determine if a function is linear just by looking at its data table.

linear

x	5	4	3	2	1
y	0	-1	-2	-3	-4



Is this a linear or non-linear function? If linear, write a function(equation) to relate the independent and dependent variables.

Ex.2

A boat company charges \$100 to rent a boat for 1 day plus an additional fee of \$10 an hour.
begin
rate

$$m = 10$$
$$b = 100$$

$$y = mx + b$$
$$y = 100x + 10$$

linear

Determine if the numerical pattern is linear:

a) 4, 7, 10, 13

b) 5, 10, 20, 25, 30, 40

We Do - You Do

Use the equation to complete the table.

$$y=3x-8$$

x	0	1	2	3	4
y					

Is this equation linear?
Why or why not?

HW: Linear part 1 WS