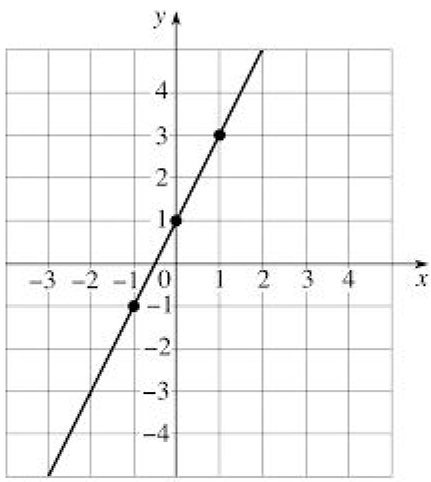
Teacher: Leanne Evans
Subject: Algebra 2
Lesson Plan April 6-10

Week 3	**Assignment**	**Instructions**
April 6-10	1.) Problems 1-7	Review the information from last week to complete this week's homework problems. Additional online resources: https://www.ck12.org/algebra/identifying-function-models/lesson/Linear-Exponential-and-Quadratic-Models-BSC-ALG/ https://www.youtube.com/watch?v=gtJKcs-jmug
April 6-10	2.) Covid-19 Documentation Journal	Write an additional 3-5 sentences each day in your journal about updates and statistics on the virus and related information. Be sure to explain where you got the information so you don't plagiarize.

Review - Linear Functions

Examples of linear functions:



To write an equation for this graph,look at the y-intercept and the slope. The y-intercept will be the b in the equation y=mx+b and m will be the slope (rise over run).

The line intercepts the y-axis at +1 so b is +1.

To go from the first point to the second point, I have to go up 2 and over 1 to the right. So rise over run is 2/1 which is the same as 2. M is 2.

So the equation for this graph would be Y=2X+1.

The domain (all possible x's) for this graph is all real numbers because the graph goes on forever to the left and right. The range (all possible y's) is also all real numbers because the graph continues forever up and down.

To write an equation for this table, look at the y-intercept and slope again.

$y = 4x$

	Input = x	Output = y	
	0	0	
+1 <	1	4	> +4
+1 <	2	8	> +4
+1 <	3	12	> +4
+1 <	4	16	> +4

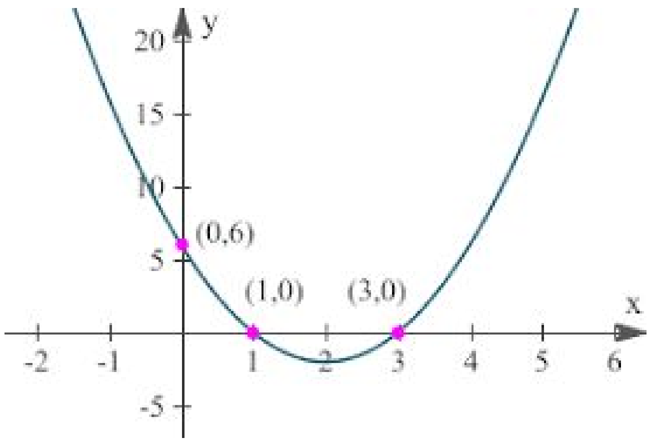
Remember that the line intercepts the y-axis when x is 0. So when x is 0 on this table, y is also 0 so my y-intercept is 0.

For slope (rise over run), remember that rise is the change in y and run is the change in x. So the rise is +4 because the y's go up four every time. The run is +1 because the x's go up 1 every time. So the rise over run is 4/1 or just 4 because 4/1=4.

So your equation will be Y=4X+0 or just Y=4X.

The domain (all possible x's) for this function is all real numbers because the line goes on forever to the left and right. The range (all possible y's) is also all real numbers because the graph continues forever up and down.

Review: Quadratic Functions



Quadratic graphs have the shape of a U.

When you plug in 0 for y and solve for x, you will get 2 answers. These 2 answers will be your x-intercepts.

Example:

Take the function $y = x^2 - 4x + 3$

Plug in 0 for y. Now you have

$0 = x^2 - 4x + 3$

In order to solve for X, we can either factor or use the quadratic equation. For this worksheet, you can factor. Since the leading coefficient is 1, you are looking for two numbers that multiply to the last term, +3, and add up to the middle term, -4. Those two numbers are -3 and -1. So your equation factored is (x-3)(x-1)=0. To check your work, you can FOIL these together and get your original equation. Next, set each factor equal to 0 separately like so x-3=0 and x-1=0. Then, solve for X. Your answers are X=3 and X=1. This is where your graph will cross the x-axis.

<u>In order to write an equation for this graph</u>, work backwards. Write your x-intercepts in parenthesis like so y=(x-1)(x-3). **Don't forget to change the signs of the x-intercepts!!** Then, FOIL to get $y = x^2 - 4x + 3$

<u>To complete a table</u>, take your equation and plug in different x points and solve for y.
Here is an example of solving for y when x=2.

$y = x^2 - 4x + 3$

1. Plug in 2 everywhere there is an x. $y = 2^2 - 4(2) + 3$
2. Solve for Y using PEMDAS. $y = 4 - 4(2) + 3$
3. $y = 4 - 8 + 3$
4. $y = -4 + 3$
5. $y = -1$

<u>Domain and Range:</u>

Domain is all possible x's. This graph continues on forever going left (towards negative numbers) and right (towards positive numbers) so the domain is all real numbers.

Range is all possible y's. In this example, the lowest point on the graph is where x=2 and we solved for this in the paragraph above. When x=2, y=-1 so the lowest point on the graph is -1. The graph goes on forever towards the positive numbers on the y-axis so our range is y>-1. No matter what number we plug in for x, we can never get an output less than -1.

Review: Exponential Functions

X	Y
0	5
1	25
2	50
3	100
4	150

An exponential function is written in the form $y = ab^x$.
y represents the output
a represents the initial value of the function (the y value when x=0)
b represents the rate of growth
x represents the input

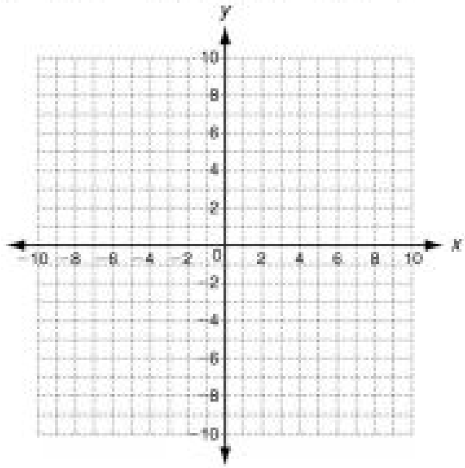
Using the table above, let's write this function in exponential form. All you need to do is identify a and b, because we want to leave x and y as variables.

A represents the initial value of the function (the y value when x=0). In the table above, when x equals 0, y is 5 so a is 5.

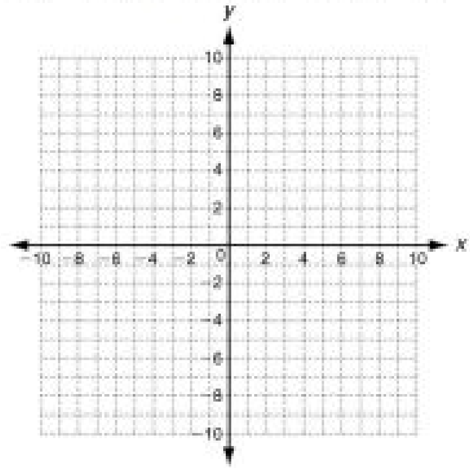
B represents the rate of growth. Look at the y values. What is happening to them. How do we get from 5 to 25 to 50? They are doubling! So our growth rate is 2.
Let's Plug it in. Our formula is $y = 5 \cdot 2^x$

Graph each data set. Determine if it is *linear*, *quadratic*, or *exponential*.

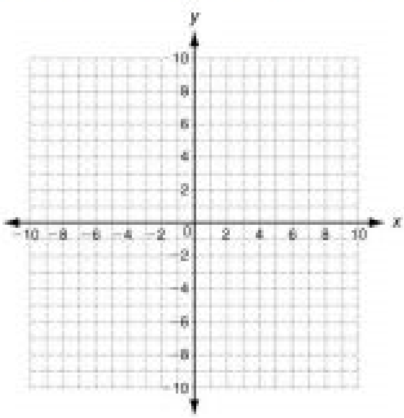
1. {(0, –4), (1, –2), (2, 0), (3, 2), (4, 4)}



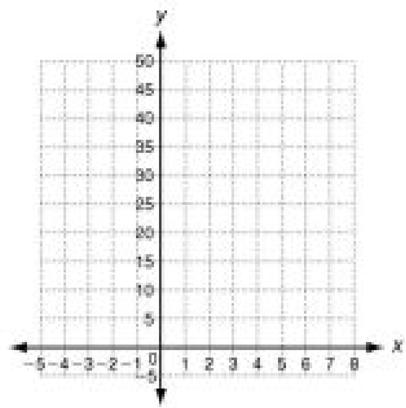
2. {(–2, –5), (–1, –8), (0, –9), (1, –8), (2, –5)}



3. {(–2, 0), (–1, –3), (0, –4), (1, –3), (2, 0)}



4. {(0, 3), (1, 6), (2, 12), (3, 24), (4, 48)}



Look for a pattern in each data set. Determine if it is *linear*, *quadratic*, or *exponential*.

5.

x	*y*
0	3
1	6
2	12
3	24

6.

x	*y*
–2	–10
–1	–8
0	–6
1	–4

7.

x	*y*
0	2
1	6
2	12
3	20