Algebra I **Name**_____
Module 2 **Period**____
Lesson 8: Determining an Exponential Function from a Table or Graph **Date**_____

LESSON
Day #1

Ok, so we spent a lot of time focusing on exponential growth and decay problems and how to write a function to model each situation. We used those functions to then determine future values for each situation. But what happens if you don't know the function? Specifically, how can we determine the function for a problem if all we have is a table or a graph?

Determining an exponential function from a table

Ex #1: Write an exponential function to model the given data.

x	1	2	3	4	5	6
$f(x)$	2	6	18	54	162	486

- What is the pattern for the values of $f(x)$? _____
- Would this sequence be arithmetic or geometric? _____

Since this sequence is _____, the formula would be $a_n = a_1(r)^{n-1}$

We need to tweak this a little so it matches the table. Instead of a_n, let's just use $f(x)$.

- What is the initial value? _____
- What is the ratio? _____

So, our exponential function for this table of values is _____

How can we check to see if this is correct? _____

Ex #2: Write an exponential function to model the given data.

x	1	2	3	4	5	6
$f(x)$	5	10	20	40	80	160

- What is the initial value? _____
- What is the ratio? _____

So, our function for this table would be: _____

Ex #3: Write an exponential function to model the given data.

x	1	2	3	4	5	6
$f(x)$	800	400	200	100	50	25

- What is the initial value? _____
- What is the ratio? _____

So, our function for this table would be: _____

Ex #4: Write an exponential function to model the given data.

x	1	2	3	4	5
$f(x)$	80	120	180	270	405

- What is the initial value? _____
- What is the ratio? _____

This ratio isn't so obvious now, is it? Don't forget that, when you have an exponential function, you easily find the common ratio if you get stuck. Pick any two ***consecutive*** values and divide the ***second*** by the ***first***. BOOM…there is your common ratio.

So…pick two consecutive values.

- Which ones did you pick? _____and _____

Now divide the second number by the first number. What did you get? _____
THAT is your common ratio. Go and fill in the blank above.

NOW that we know the common ratio, we can write our function.

So, our function for this table would be: _____

From the June 2015 Algebra 1 Common Core Regents Exam….

An application developer released a new app to be downloaded. The table below gives the number of downloads for the first four weeks after the launch of the app.

Number of Weeks	1	2	3	4
Number of Downloads	120	180	270	405

- Write an exponential equation that models these data.

- Use this model to predict how many downloads the developer would expect in the 26th week if this trend continues. Round your answer to the nearest download.

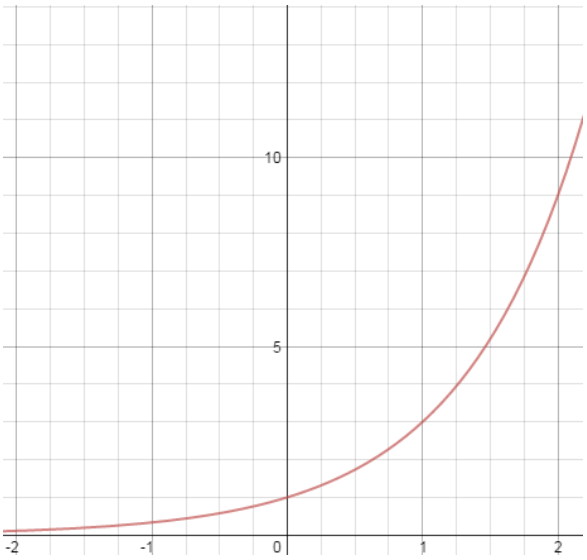
- Would it be reasonable to use this model to predict the number of downloads past one year? ***Explain*** your reasoning.

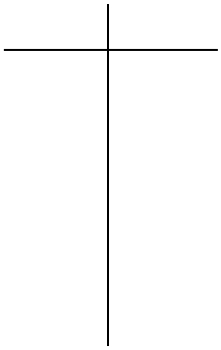
LESSON
Day #2

We spent a couple days learning how to write an exponential function based on a description of the problem. Then we spent a day learning how to write an exponential function if we are given a table. But what if you were asked to write an exponential function based on a graph? How in the world could we ever figure out something so tricky? [Hint: It's not that tricky!!!]

Ex #1: Write an exponential equation for the graph below.

Take a look at the graph. Do you see some "nice points" on the graph? Let's put those points into a table.





What is the y-intercept of the graph? _____ What is the common ratio? _____

Let's plug it into this formula $y = a(b)^x$

So, the equation that models our graph is: _____

There you go. Done. Want to check your answer? Plug it into your calculator.

Press GRAPH Look familiar? _____

Press 2nd then GRAPH Does those values in the table match the values you wrote in our table above? _____

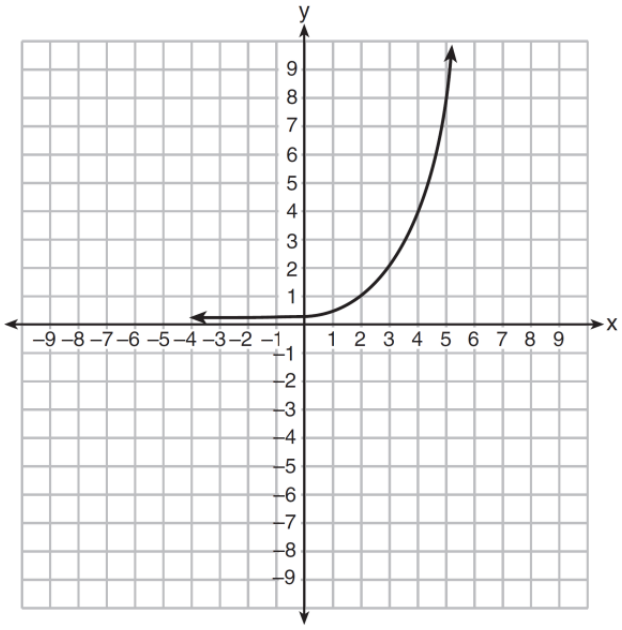
Ex #2:

Let's find some "nice points" again and put them into a table.

What is the y-intercept of the graph? _____ What is the common ratio? _____

So, the equation that models our graph is: _____

Ex #3: Write an exponential equation for the graph shown below.



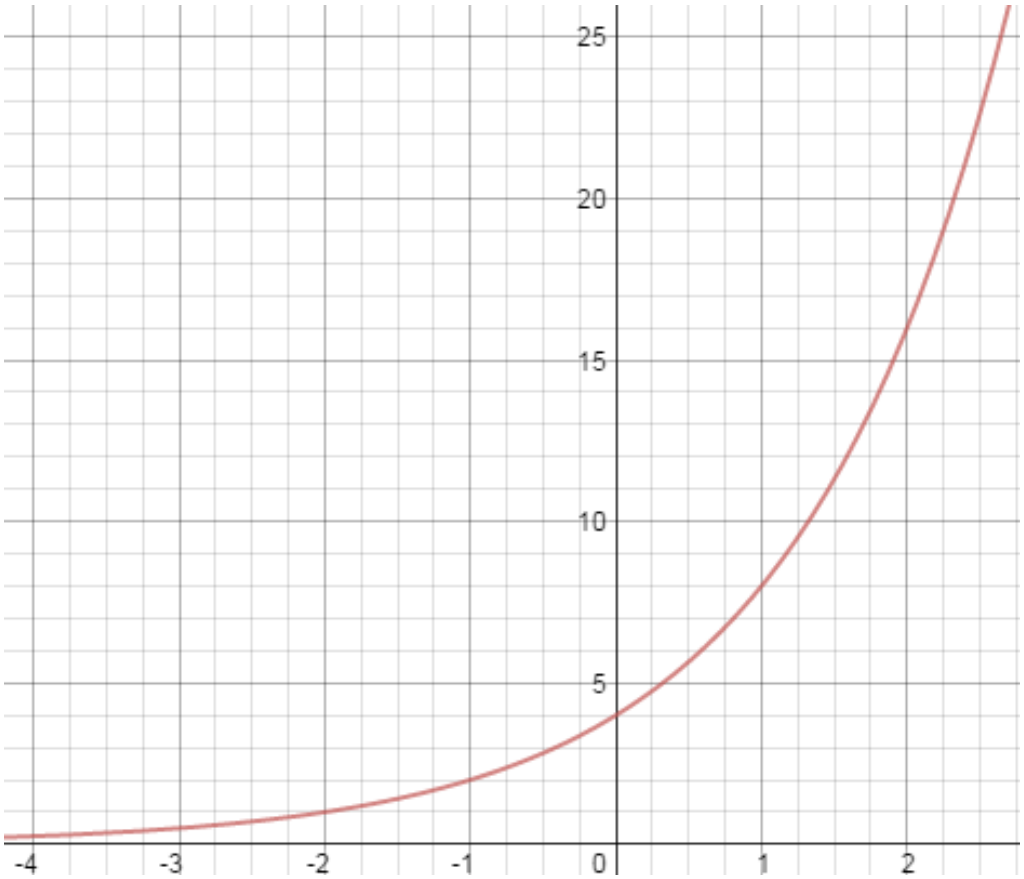
Whoa. Now ***THAT*** looks different. Don't freak out! It's not that tricky. Take a look at the graph….specifically, look at the y-axis. Can you see what the y-intercept is?

The answer is ***no***! It's not so easy to see the y-intercept on this graph.

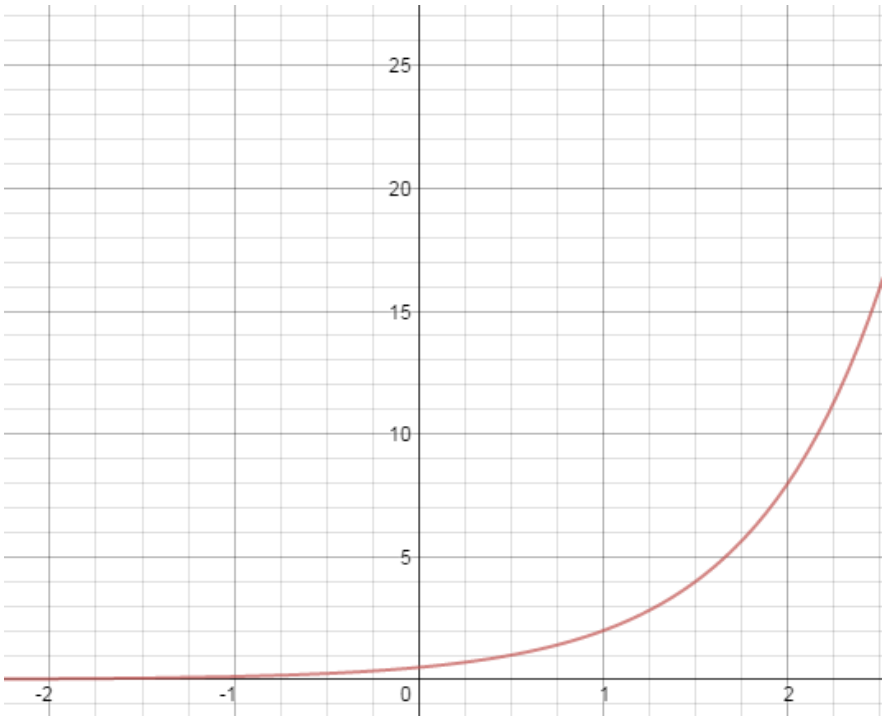
Write an exponential equation for the following graphs.

#1.

#2.



#3.



#4.