Essential Questions: What does the equation of an exponential function look like? How do we graph exponential functions?

Do Now: A piece of paper is one layer thick. If we place another piece of paper on top of it, the stack is two layers thick. If we place another piece of paper on top, the stack is three layers thick.

x *# of sheets added*	0	1	2	3
f(x) *# of layers of paper*	1	2	3	4

Is the relationship displayed by the table *linear*? Write a function rule that models the relationship.

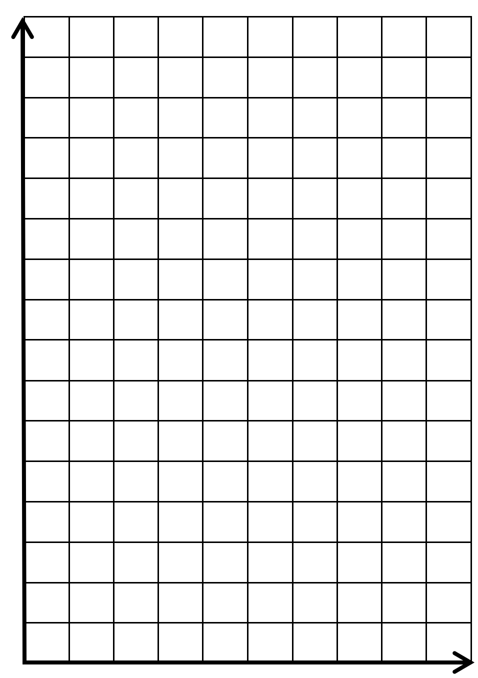
What if we explored another relationship using a single piece of paper?

A piece of paper is one layer thick. If the paper is folded in half, the piece of paper is 2 layers thick. If the paper is folded again, the piece of paper becomes 4 layers thick. If the paper is folded a third time, it becomes 8 layers thick.

x *# of folds*	0	1	2	3	4
f(x) *# of layers of paper*	1	2	4	8	16

Is this relationship *linear*?

Is there a function rule that describes this relationship?



What does the graph of this relationship look like?

Exponential Function

$y = ab^x$ *or* $f(x) = ab^x$

In an exponential function, as the input values (**x**) increase by 1, the output values (**y *or* f(x)**) increase or decrease by a ***common ratio***, ***b***. The ratio represented by ***b*** is known as the **multiplying factor**. It is also known as the ***growth*** or ***decay*** factor.

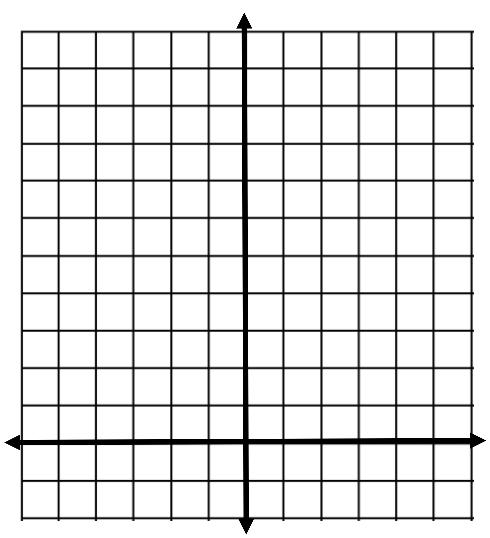
How do we graph exponential functions?

1) Create a table of values. *Suggested domain if not specified:* {-3, -2, -1, 0, 1, 2, 3}
2) Plot the ordered pairs and create a curve. *It is not necessary to plot all the ordered pairs to show the shape of the graph.*
3) Label the graph with the equation.

Examples:

a.) $y = 2^x$

x	**y**



Direction: ________________________

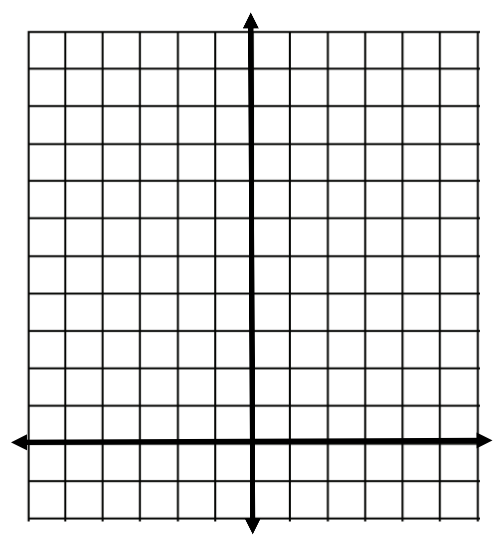
a: ______

b: ______

y-intercept: ________

b.) $y = (\frac{1}{2})^x$

x	**y**



Direction: ________________________

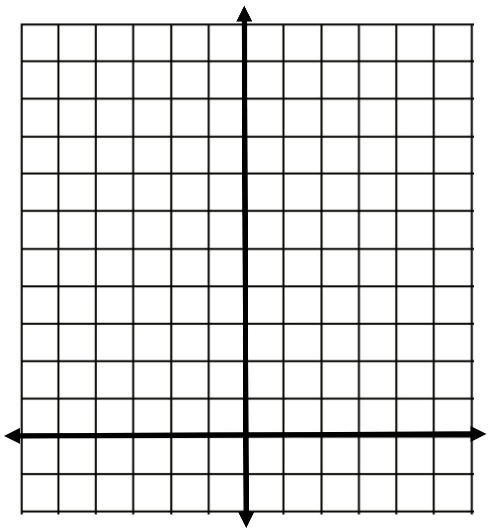
a: ______

b: ______

y-intercept: ________

c.) $y = 3^x$

x	y



Direction: ________________________

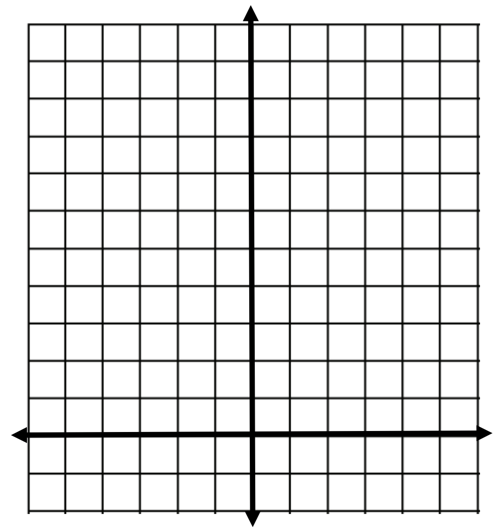
a: ______

b: ______

y-intercept: ________

d.) $y = (\frac{1}{3})^x$

x	y



Direction: ________________________

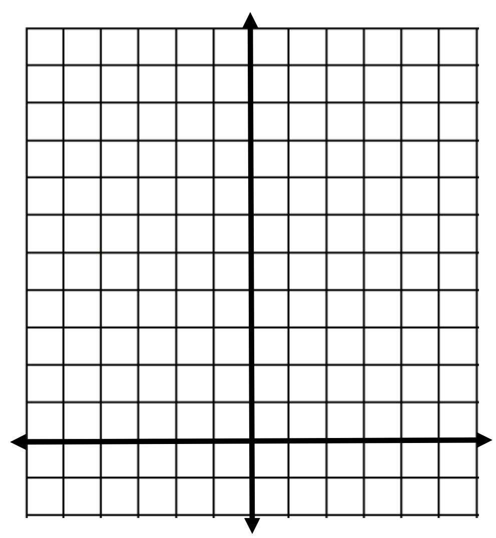
a: ______

b: ______

y-intercept: ________

e.) $y = \frac{1}{2}(4)^x$

x	y



Direction: ________________________

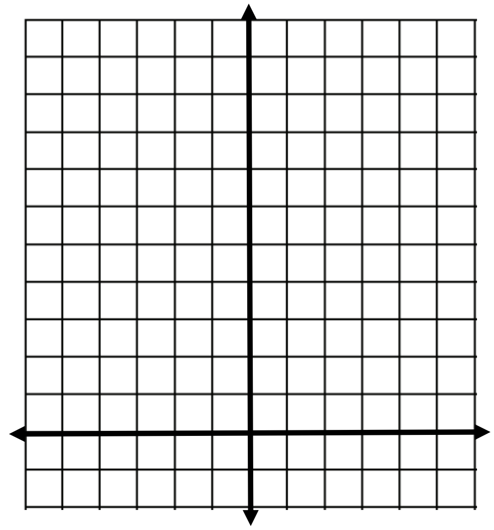
a: ______ **b:** ______ **y-intercept:** ________

8 Algebra CC HW # _______

1. Graph the exponential function below using a table of values.

f.) $y = 2(\frac{3}{2})^x$

x	y



Direction: _______________________

a: ______ **b:** ______ **y-intercept:** ________

2. Using today's notes and the HW example, complete the following table and complete the Take Away.

y = ab^x	a	b	y-intercept	Increasing *or* Decreasing
$y = 2^x$				
$y = (\frac{1}{2})^x$				
$y = 3^x$				
$y = (\frac{1}{3})^x$				
$y = \frac{1}{2}(4)^x$				
$y = 2(\frac{3}{2})^x$				

*The graph of an **Exponential Function** is a curve. These curves are created by the equation **y = ab^x**.*

TAKE AWAY

- The graph of **y = ab^x** *will increase if* ____.
- The graph of **y = ab^x** *will decrease if* ____.
- The **a** in **y = ab^x** *represents the* ____.