Algebra 2 **Notes Exploring Exponential Models** **Date:**

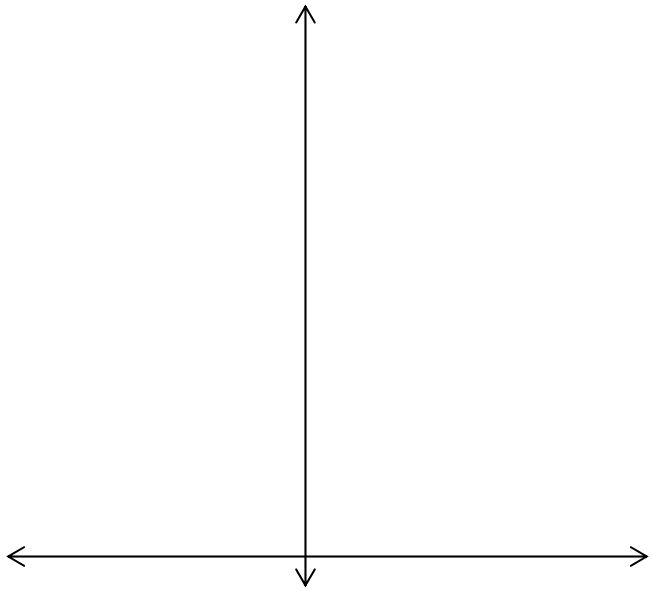
Exponential Function

$$y = a \cdot b^x$$

$a \neq 0$ $b > 1$ *growth* factor $0 < b < 1$ *decay* factor

Ex. 1 Graph: $y = 3^x$

x	$y = 3^x$
-3	
-2	
-1	
0	
1	
2	
3	



Ex 2: *The population of the U.S. in 1994 was about 260 million people with an average annual increase of about 0.7%.*

Find the growth factor for that year.

Suppose the rate of growth has continued to be 0.7%.
Write a function to model this population growth.

Use this model to predict the U.S. population in 2018.

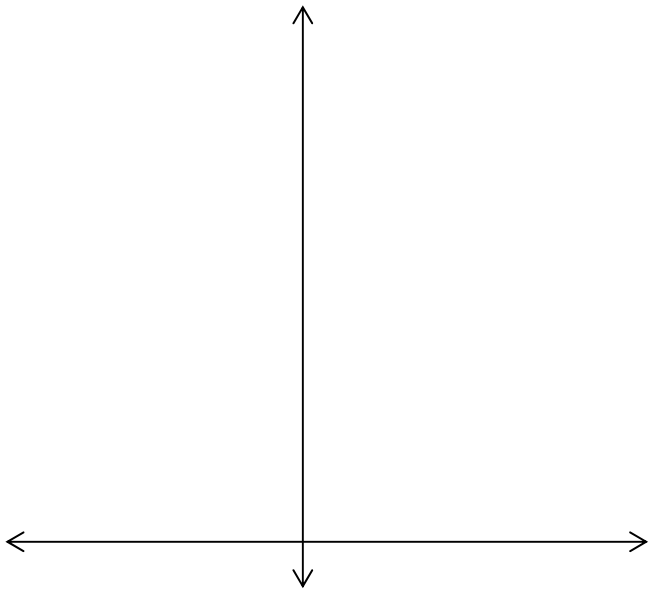
Finding an Exponential Function

Ex 3: Write an exponential function $y = a \cdot b^x$ for a graph that includes the points $(1, 6)$ and $(0, 2)$.

Exponential Decay: $y = a \cdot b^x$ (when $0 < b < 1$)

Ex 4. Graph: $y = 30 \cdot (0.5)^x$

x	$y = 30 \cdot (0.5)^x$
-3	
-2	
-1	
0	
1	
2	
3	



Ex. 5 Compare the graphs of $y = 3 \cdot (0.1)^x$ and $y = 3 \cdot (0.9)^x$ and $y = 3 \cdot (1.1)^x$ on your calculator.

Ex. 6 Without graphing, determine if the function is an exponential growth or an exponential decay.

$y = 5 \cdot 2^x$

$y = \frac{2}{3} \cdot 3^x$

$y = 6 \cdot \left(\frac{2}{5}\right)^x$

$y = 5 \cdot (1.003)^x$

$y = 2.6 \cdot (0.85)^x$

Ex. 7. *Suppose you buy a used car for $11,800. The expected depreciation is 20% per year. Estimate the depreciated value of your car after 6 years.*