Name _____ Class _____ Date _____

Reteaching 8-2

Properties of Exponential Functions

OBJECTIVE: Graphing exponential functions

MATERIALS: Graphing calculator, graph paper

Example

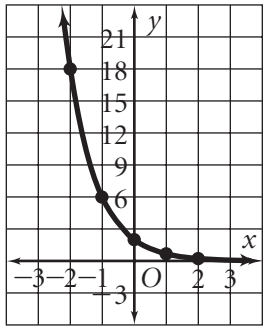
Sketch the graph of $y = 2\left(\frac{1}{3}\right)^{x+1} - 4$ as a translation of $y = 2\left(\frac{1}{3}\right)^{x}$.

Step 1: Detemine the base of the function $y = 2\left(\frac{1}{3}\right)^{x}$. Since $b < 1$, the graph will represent exponential decay.

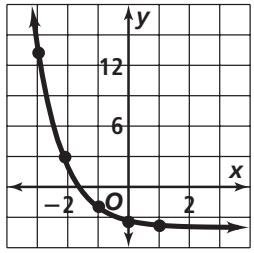
Step 2: Make a table. Find more values if necessary to get a good picture of the graph.

x	$y = 2\left(\frac{1}{3}\right)^{x}$	y
-2	$2\left(\frac{1}{3}\right)^{-2} = 2(9)$	18
-1	$2\left(\frac{1}{3}\right)^{-1} = 2(3)$	6
0	$2\left(\frac{1}{3}\right)^{0} = 2(1)$	2
1	$2\left(\frac{1}{3}\right)^{1} = 2\left(\frac{1}{3}\right)$	$\frac{2}{3}$
2	$2\left(\frac{1}{3}\right)^{2} = 2\left(\frac{1}{9}\right)$	$\frac{2}{9}$

Step 3: Use the values for x and y from the table to graph the function.



Step 4: For $y = 2\left(\frac{1}{3}\right)^{x+1} - 4$, $h = -1$ and $k = -4$. Shift the graph of the parent function above 1 unit left and 4 units down. The horizontal asymptote shifts down as well, from $y = 0$ to $y = -4$.



Step 5: Use a graphing calculator to check your graph.

Exercises

Graph each exponential function.

1. $y = \left(\frac{1}{5}\right)^{x}$
2. $y = 3^{x} + 1$
3. $y = 5^{x}$
4. $y = -\left(\frac{1}{2}\right)^{x}$
5. $y = -\left(\frac{1}{2}\right)^{x} + 4$
6. $y = \left(\frac{1}{4}\right)^{x}$
7. $y = \left(\frac{1}{4}\right)^{x-1}$
8. $y = 4^{x} + 1$
9. $y = -(2)^{x}$