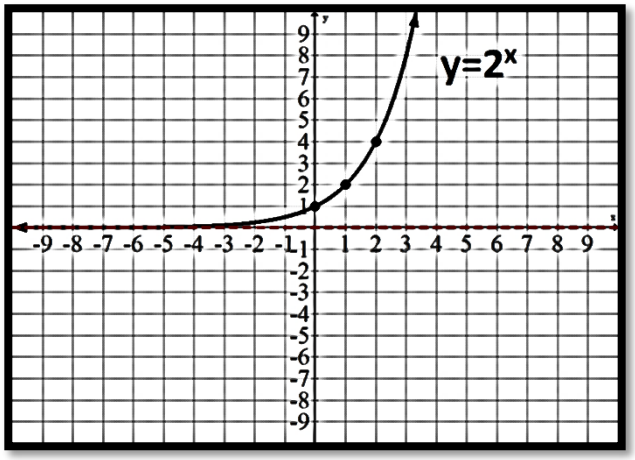
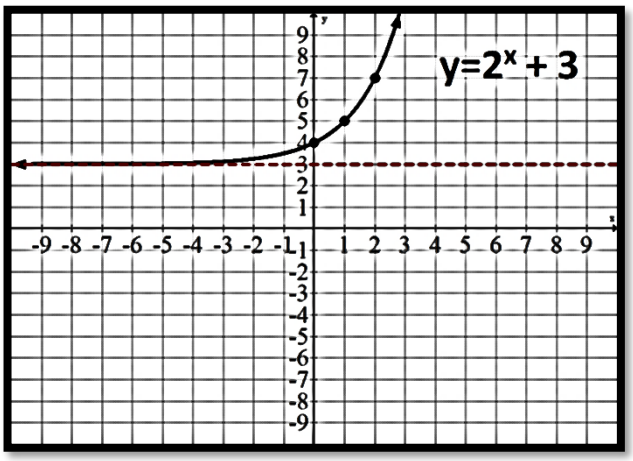
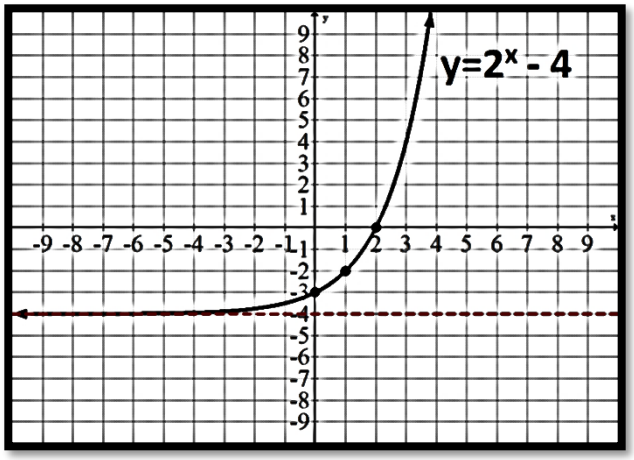
Transformations of Exponential Functions Name:_____ Date:_____

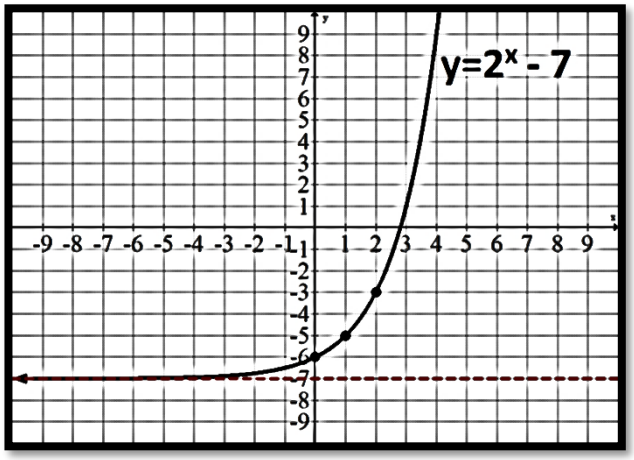
Now that we have explored EXPONENTIAL functions we are going to manipulate the equation to show different transformations. These transformations have specific rules that need to be followed in order to correctly write the equation of the transformed functions. See if you can follow the patterns below, to generate the rule.

PART 1:









Looking at the graphs can you describe what happens when you see a "+"?

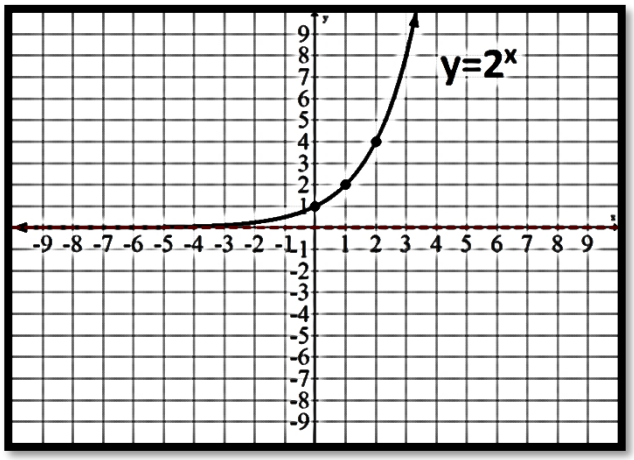
Looking at the graphs can you describe what happens when you see a "-"?

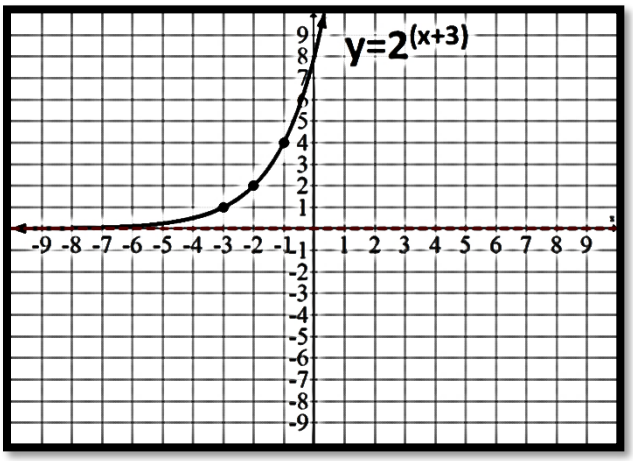
Write a rule for a transformation that has a shift of "+ k":

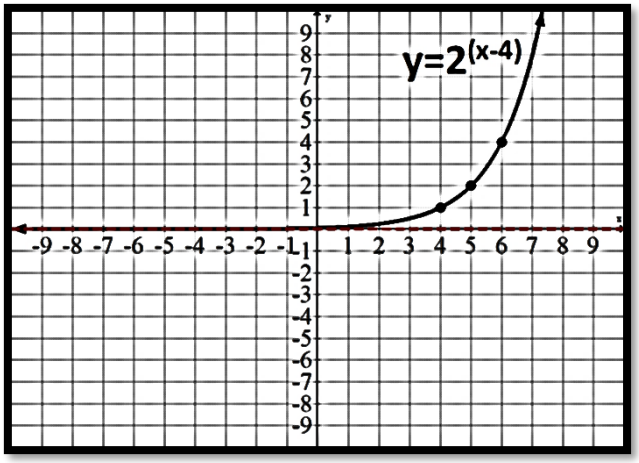
Describe the transformations for the functions below:

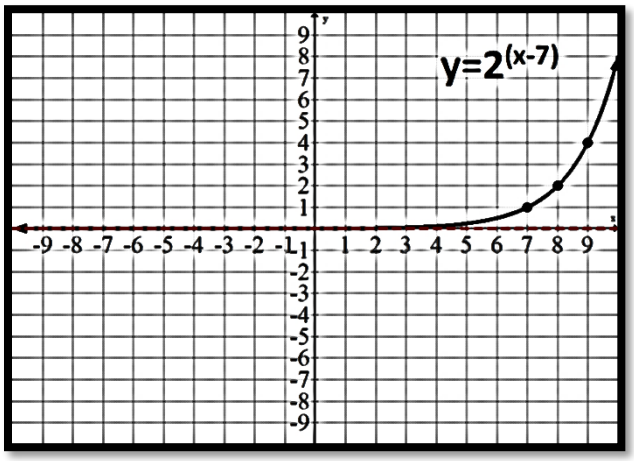
a. $y = 2^x + 5$ b. $y = 2^x - 9$ c. $y = 3^x - 1$ d. $y = 4^x + 17$

PART 2:









Looking at the graphs can you describe what happens when you see a "+"?

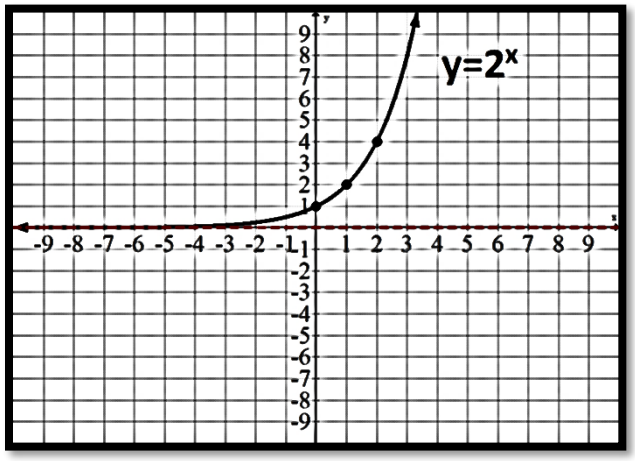
Looking at the graphs can you describe what happens when you see a "-"?

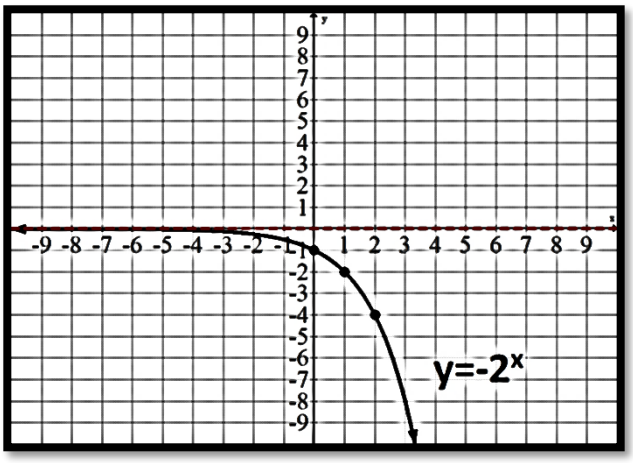
Write a rule for a transformation that has a shift of "- h, and + k":

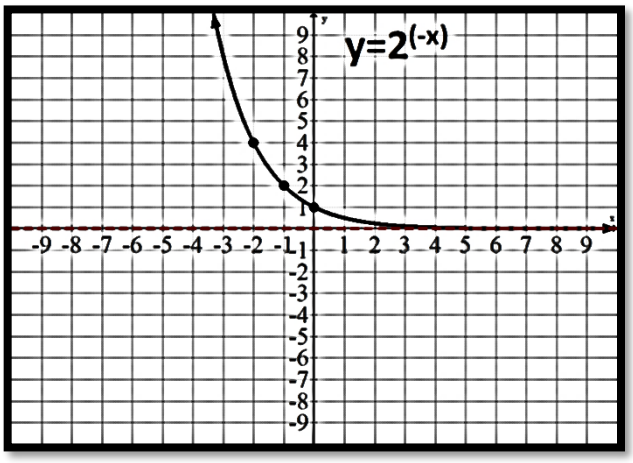
Describe the transformations for the functions below:

a. $y = 2^{x+9}$ b. $y = 2^{x-8}$ c. $y = 3^{x+12}$ d. $y = 4^{x-14}$

PART 3:







Looking at the graphs can you describe what happens when you see a "-" in front of the parent function?

Looking at the graphs can you describe what happens when you see a "-" in the exponent of a parent function?

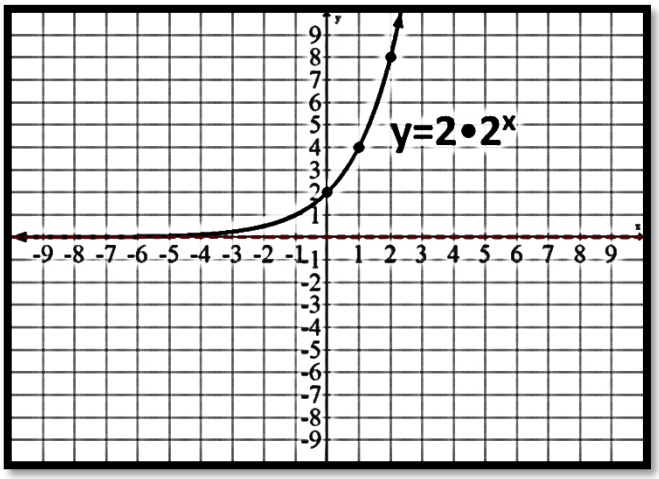
Describe the transformations for the functions below:

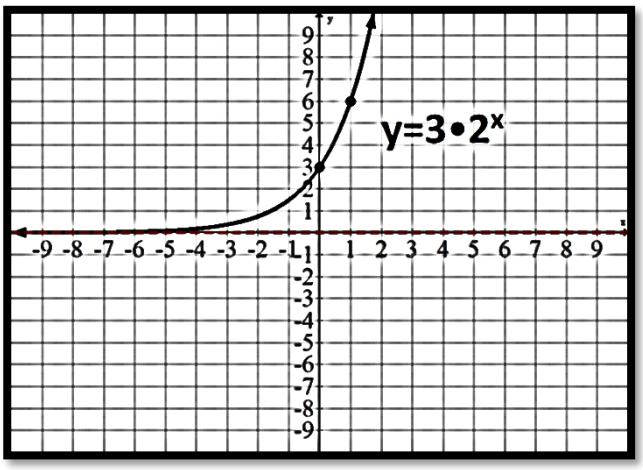
a. $y = -7^x$ b. $y = 8^{-x}$ c. $y = 3^x$ d. $y = -4^x$

Lets try some harder transformations:

a. $y = -7^{x+2}$ b. $y = 8^{-x} + 3$ c. $y = -3^x + 7$ d. $y = -4^{x-5} - 6$

PART 4:

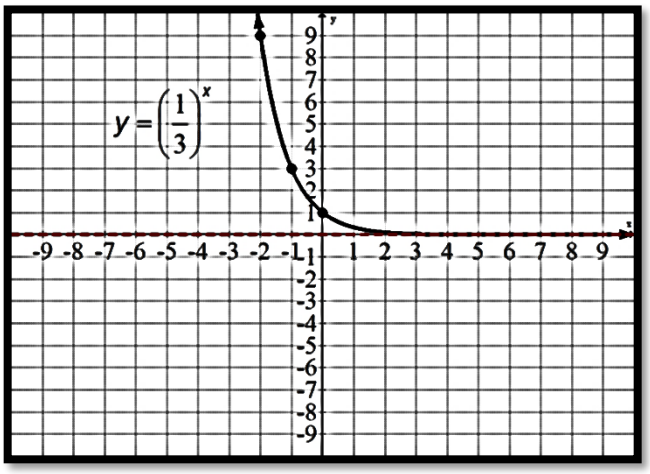


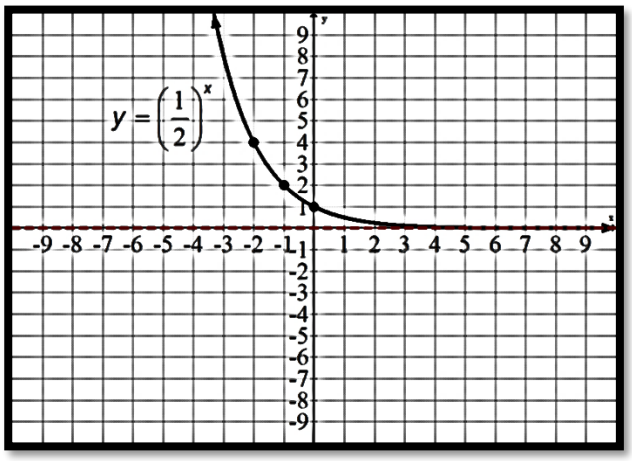


Looking at the graphs can you describe what happens when you see a "#" in front of the parent function?

Write a rule for a transformation that has a shift of "a, -h, and a +k":

PART 5:





Looking at the graphs can you describe what happens when you see a "fraction" as the parent function?

Describe the transformations for the functions below:

a. $y = 4 \bullet 7^x - 2$ b. $y = \left(\frac{1}{5}\right)^{x-6}$ c. $y = -9 \bullet 6^x$ d. $y = -\left(\frac{1}{2}\right)^{x+4}$

e. $y = -2 \bullet 7^x$ f. $y = 7^{x+4} - 9$ g. $y = -6^{x-1}$ h. $y = 4 \bullet \left(\frac{1}{2}\right)^x + 10$