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Precalculus
Purpose: In this problem set, you will continue to explore exponential functions through algebraic manipulation.

1. Suppose the exponential function $y=a b^{x}$ passes through the points $\left(-1, \frac{3}{2}\right)$ and $(1,24)$. Find a formula for the function.
2. Suppose the exponential function $y=a b^{x}$ passes through the points $(0,3)$ and $(2,75)$. Find a formula for the function.
3. Suppose the exponential function $y=a b^{x}$ passes through the points $(1,4)$ and $(2,2)$. Find a formula for the function.
4. Graph the function $y=2^{x}$ including any asymptotes (using technology if you want, but eventually you'll need to do it without technology). What is the range?

5. Graph the function $y=3 \cdot 2^{x}-4$ including any asymptotes. What is the range?

6. Change the function $y=3 \cdot 2^{x}-4$ so that the range is $(-\infty,-4)$.
7. Find the domain and range of the function $y=-\frac{1}{2} \cdot 3^{x}+1$.
8. Find the domain and range of the function $y=2\left(\frac{1}{5}\right)^{x}-1$.
9. Use function transformations with the parent function $y=2^{x}$ to sketch the graphs of the following functions.
(a) Sketch $y=2^{x}$ and $y=4 \cdot 2^{x}$ on the same axes. What transformation is this?

(b) Sketch $y=2^{x}$ and $y=2^{x+2}$ on the same axes. What transformation is this?

10. Sketch the graph of $y=-2\left(\frac{1}{3}\right)^{x}-3$ and sketch the parent function and any intermediate functions also.

