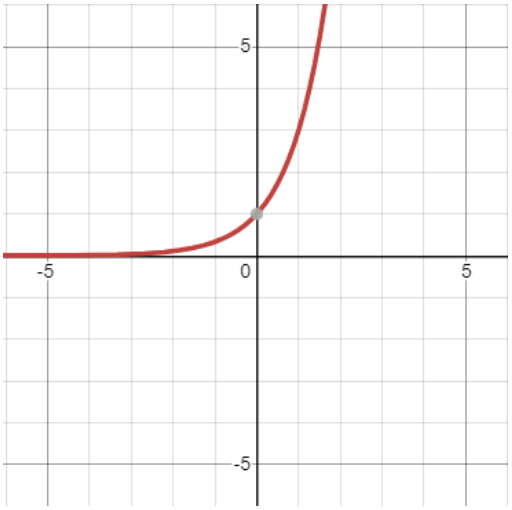
EXPONENTIAL FUNCTIONS

Standard Form: $y = Ca^{x-h} + k$

$$y = Ca^{x-h} + k$$

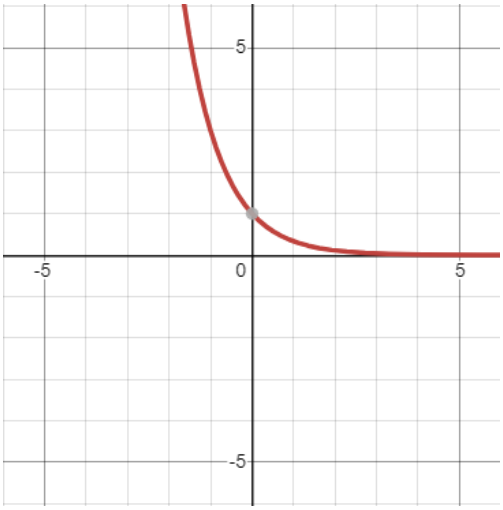
If $a > 1$

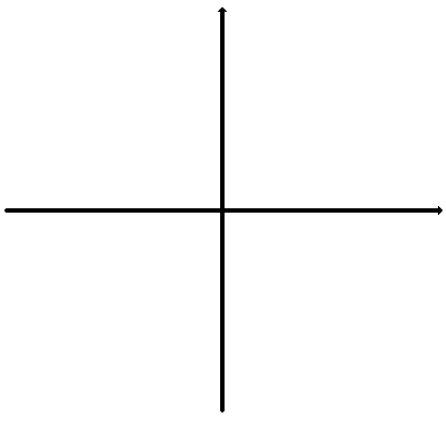
Exp. Growth



If $0 < a < 1$

Exp. Decay





FINDING THE KEY POINT ALGEBRAICALLY

$$y = 3^{x+7} + 4$$

1ST set the exponent equal to 0, and solve for x.

2nd substitute the value found in step 1 into the function for x. Now solve for y.

FINDING THE KEY POINT USING THE SHORTCUT

$$y = 3^{x+7} + 4$$

Using the shortcut, when $y = Ca^{x-h} + k$,

begin at $(0, C)$. From this point, apply

any transformation necessary.

$$y = Ca^{x-h} + k$$

EXAMPLES

A. Identify the following as being either exponential growth or decay.

B. Find the key point of the following.

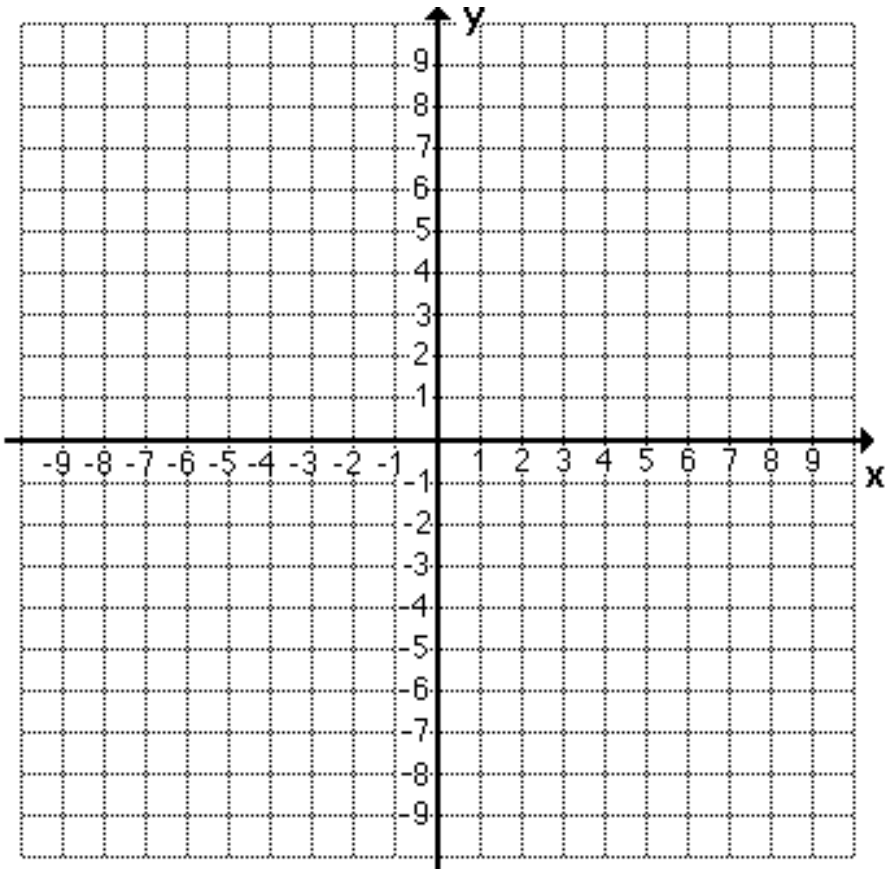
1) $y = 4^{x+2} - 6$ 2) $y = 2\left(\frac{1}{3}\right)^{x-5} + 1$ 3) $y = -2^{x-7} - 2$

Watch for tricks such as the following

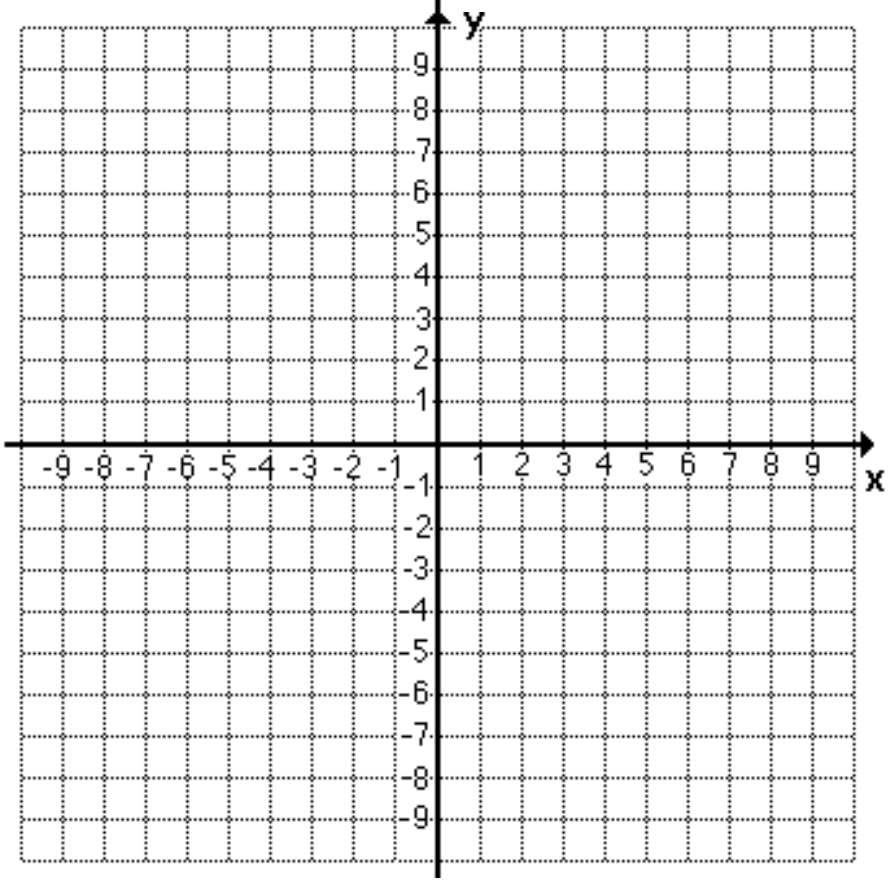
$y = 2\left(\frac{4}{3}\right)^{x-2} + 3$ $y = 2^{4-x} + 5$ $y = e^{x} + 4$

Graph the following

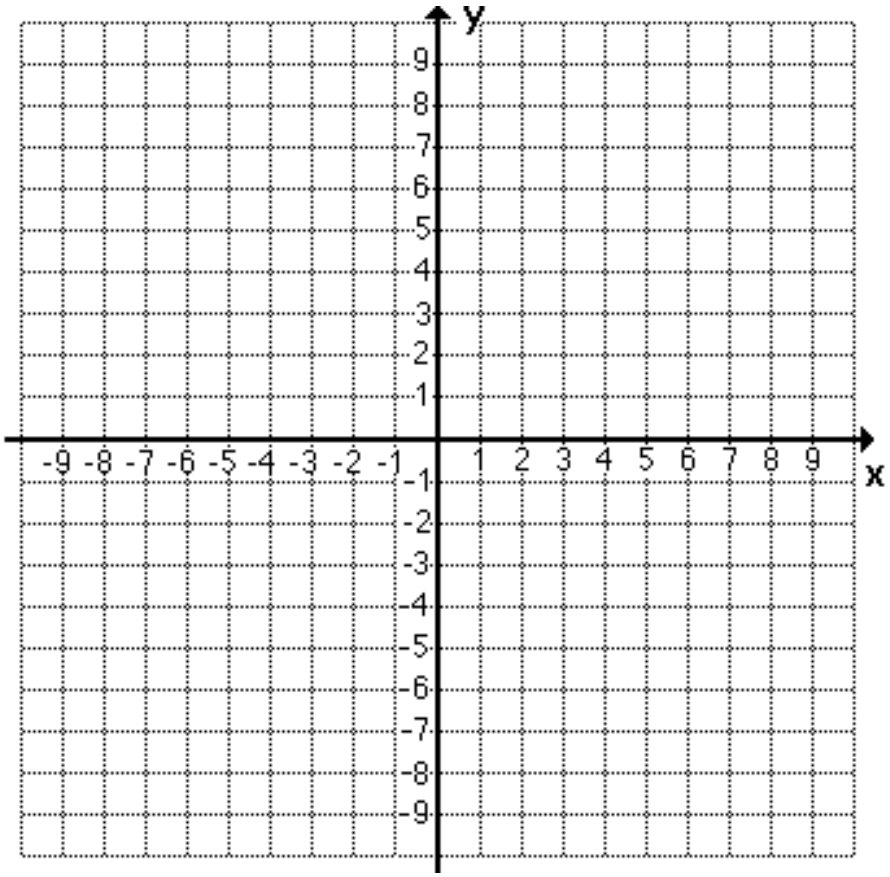
1. $f(x)=\left(\frac{1}{4}\right)^{x-3}+2$



2. $g(x)=2(3)^{x+5}-6$



3. $h(x) = 2^{3-x} + 1$



4. $f(x) = -2^{x-1} - 2$