

# Graphing Exp. Functions

$$y = a \cdot \boxed{b}^{x+h} + k$$

↖ left/right  
↑ parent  
↑ up/down  
↑ vert. dilation

1) graph the parent function:

$$y = b^x$$

- plot horizontal asymptote  $y=0$  (x-axis)

- plot points:

X	Y
0	1
1	base (b)
-1	reciprocal of base ( $1/b$ )

1 | base (b)

-1 | reciprocal of base ( $1/b$ )

2) Transform in order:

- Dilation (a)

- Reflection (if a is -)

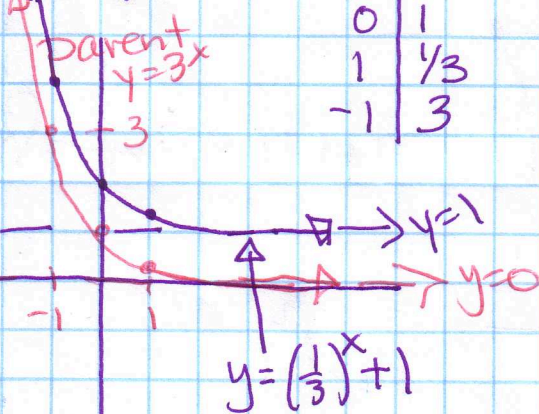
- Translation (h, k)

example  $y = (\frac{1}{3})^x + 1$

parent:  $y = (\frac{1}{3})^x$

up 1

x	y
0	1
1	$1/3$
-1	3



- graph parent 1<sup>st</sup> (red)
- then translate (purple)

example  $y = 3(2)^x - 5$

parent:  $y = 2^x$

vert. dilation bafco 3  
down 5

- graph parent 1<sup>st</sup> (red)
- graph dilation (pencil)
- translate (purple)

x	y
0	$1 \cdot 3 = 3$
1	$2 \cdot 3 = 6$
-1	$\frac{1}{2} \cdot 3 = \frac{3}{2}$

