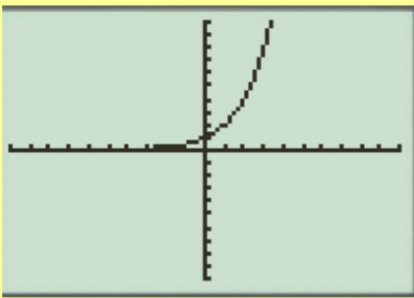


What does it mean when an exponential function has a shift?

An exponential function in the form $f(x) = a(b)^x + k$ has a vertical shift.

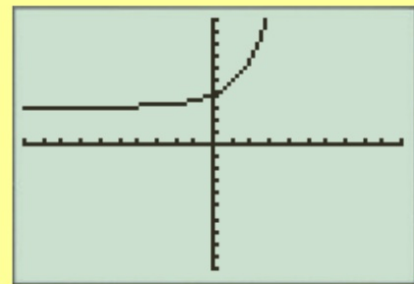
The constant, k , is what causes the shift to occur.



$$y = 2^x$$

(0,1)

$a=1$
 $b=2$



$$y = 2^x + 3$$

(0,4)

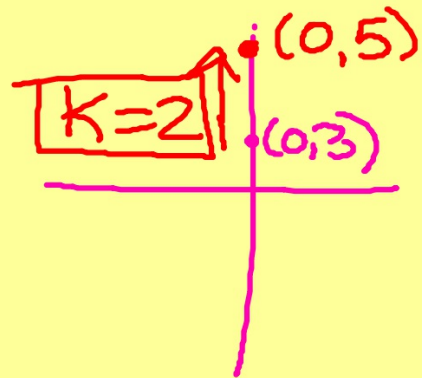
$a=1$
 $1+3$
 4

*Notice the y-intercepts.

Ex.) The function $f(x) = 3(2)^x$ was replaced with $f(x) + k$ so that the y-intercept became $(0,5)$. What is the value of k ?

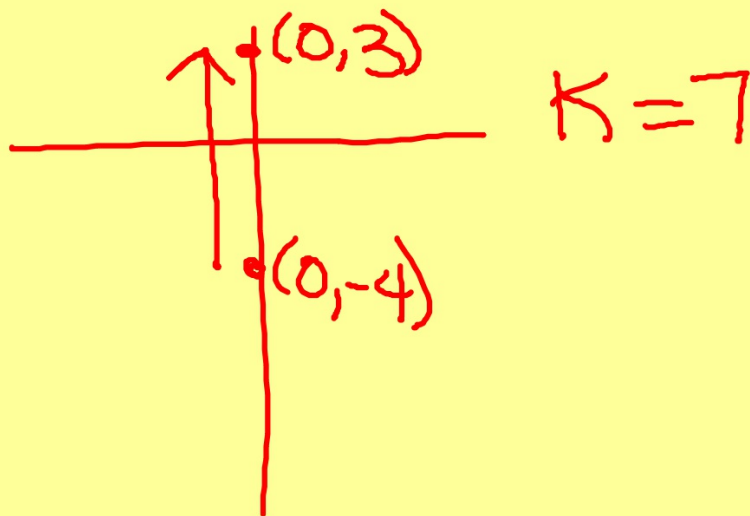
$$a = 3, b = 2$$

$$\text{y - int: } (0,3)$$



Ex.) The function $f(x) = -4(3)^x$ was replaced with $f(x) + k$ so that the y-intercept became $(0,3)$. What is the value of k ?

$$a = -4 \quad (0, -4)$$
$$b = 3$$



Ex.) The function $f(x) = 0.5(1.5)^x$ was replaced with $f(x) + k$, as graphed below. What is the value of k ?

