

Chapter 6: Exponential Functions

$y = b^x$  ← variable is the exponent.

Compare

$y = 2^x$

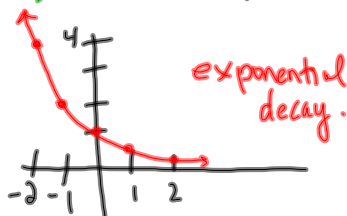
$2^{-2} = \left(\frac{1}{2}\right)^2 = \frac{1}{4}$

x	y
-2	1/4 or 0.25
-1	1/2 or 0.5
0	1
1	2
2	4



a)  $y = \left(\frac{1}{2}\right)^x$   $\left(\frac{1}{2}\right)^{-2} = \left(\frac{2}{1}\right)^2 = 4$

x	y
-2	4
-1	2
0	1
1	1/2
2	1/4



Exponential Growth  $y = b^x$   
\*  $b > 1$

Exponential Decay  $y = b^x$   
 $0 < b < 1$

Growth or Decay?

Examples:

1.  $y = 3^x$  G      3.  $y = \left(\frac{3}{7}\right)^x$  D  
 2.  $y = 0.6^x$  D      4.  $y = \left(\frac{6}{5}\right)^x$  G

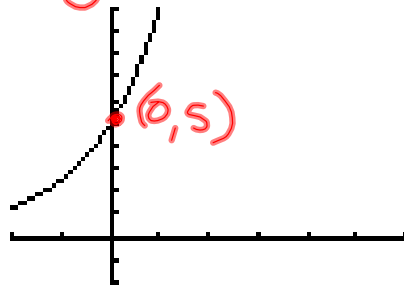
5.  $y = \left(\frac{1}{4}\right)^{-x}$  G  
 $y = 4^x$

$y = b^x$  all have one common point. What is it?

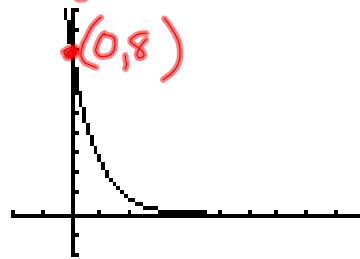
$$(0, 1) \Rightarrow y\text{-intercept}$$

What happens when we change it to  $y = a(b)^x$ ?

ex.  $y = 5(2)^x$



$y = 8(0.3)^x$



$$\begin{aligned} y &= 5(2)^0 \\ &= 5(1) \\ &= 5 \end{aligned}$$

\* For  $y = a(b)^x$ , the y-intercept is  $(0, a)$

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Your Turn.

