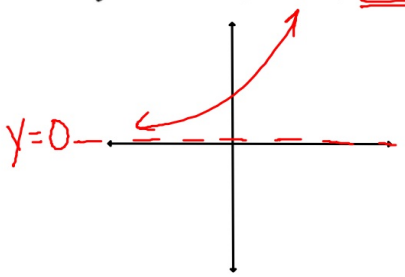
8.1/8.2 Graphing Exponential Functions

std. 12.0

equation $y = ab^x$, $b > 0$, $b \neq 1$, $a \neq 0$

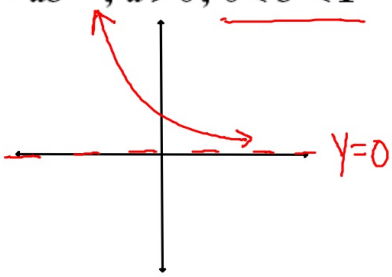
exponential growth

$y = ab^x$, $a > 0$, $b > 1$



exponential decay

$y = ab^x$, $a > 0$, $0 < b < 1$



asymptote: $y=0$

domain: all real #s

range: $y > 0$

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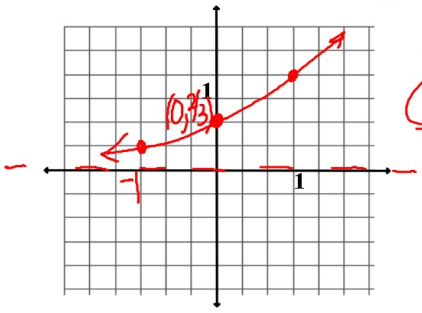
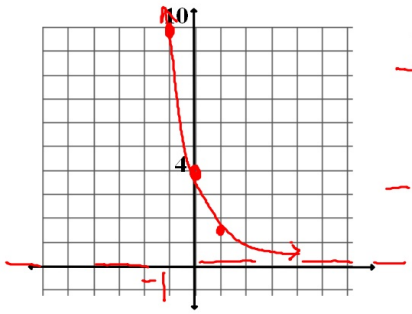
ex. 1 $y = \frac{2}{3} \cdot 2^x$ (b) $b>1$ growth



x	y
0	2/3
-1	2/3 · 1/2 = 1/3
1	1 1/3

ex. 2 $y = 4\left(\frac{2}{5}\right)^x$ (b) $0<b<1$ decay



x	y
0	4
-1	10
1	4 · 5/2 = 10
	1 3/5

general equation: $y = ab^{x-h} + k \;,\; b > 0,\; b \neq 1,\; a \neq 0$

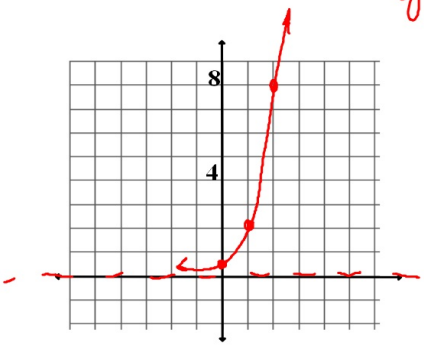
k = vertical shift for asymptote

b

0<b<1 decay

ex. 3 $y = 2 \cdot 4^{x-1}$

b>1 growth

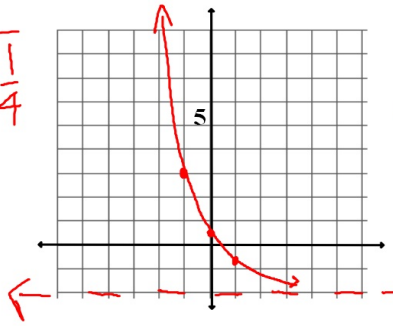


x	y
0	$\frac{1}{2}$
1	2
2	8

$\cdot\frac{1}{4}$

y=0

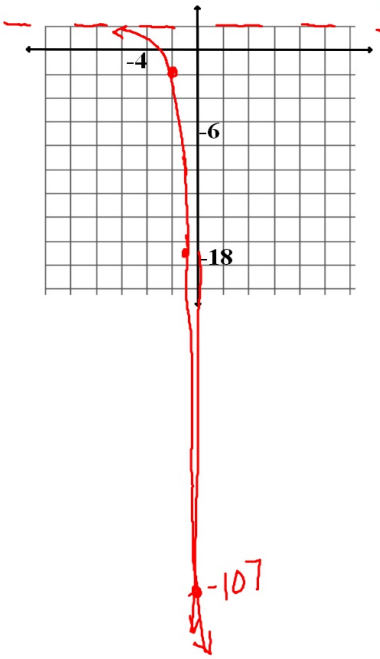
ex. 4 $y = 5\left(\frac{1}{2}\right)^{x+1} - 2$



x	y
0	$\frac{1}{2}$
-1	3
1	$-\frac{3}{4}$

y=-2

ex. 5 $y = -3 \cdot 6^{x+2} + 1$



y=1

x	y
0	-107
-2	-2
-1	-17