

# Exponential Functions

HW  $3^{4/3} = 3 \cdot 3^{1/3}$

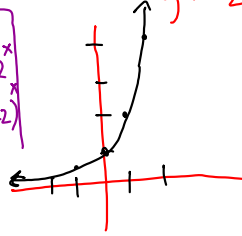
ex  $2^{5/4} = 2 \cdot 2^{1/4}$

ex  $0 = (x+2)^2$  vs  $x^2 + 4x + 4$

## Exponential Functions

Ex  $f(x) = 2^x$

note:  
 $f(x) = -2^x$   
 $g(x) = (-2)^x$



x	f(x)
-2	$2^{-2} = \frac{1}{4}$
-1	$\frac{1}{2}$
0	1
1	2
2	4
3	8
4	16
5	32
6	64

Ex The town of Alicetown has a population of 1000. The population grows by 5% each year. What is the population after 10 years?

1500, 1628.89, 5000.

	5% of	5% growth of pop. $\Rightarrow 1000(1.05)$
1.05	1000	50
	1050	52.5
1.05	1102.5	

ans:  $1000(1.05)^{10}$

Q: What is the population after  $t$  years

ans:  $1000(1.05)^t$

From the previous two examples the 2 and 1.05 are called the base of the exponential. the 1 and 1000 are starting amounts (y-int)

$f(x) = 2^x$

slope	x	f(x)	difference in y values is constant
	-1	$\frac{1}{2}$	
	0	1	
	1	2	
	2	4	

$g(x) = 3^x$

x	g(x)
-1	$\frac{1}{3}$
0	1
1	3
2	9
3	27

the ratio of y-values is the same

$\Sigma x$ 

$$f(x) = 20(1.10)^x$$

base = 1.10  $\rightarrow$  10% growth.  
 20 is the y-int (or start point)

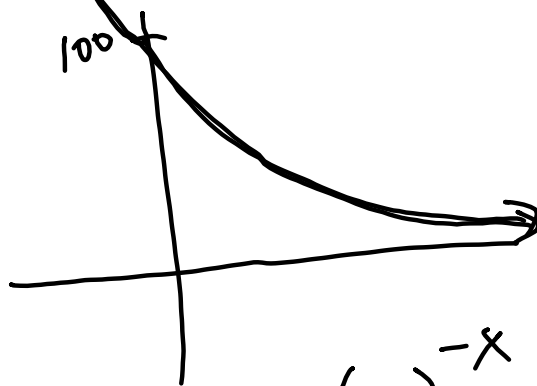
 $\Sigma y$ 

$$g(x) = 5(2.1)^x$$

 $\Sigma x$ 

$$h(x) = 100(0.91)^x$$

decrease  
by 9%

 $\Sigma y$ 

$$j(x) = 100(2)^{-x} = 100(2^{-1})^x = 100\left(\frac{1}{2}\right)^x$$

