8.6 Exponential Functions and Applications.

We've evolved beyond linear equations now that we know about exponents, so we're moving into exponential functions and their graphs.

The general exponential function

$y = ab^{x-h} + k$ ← Extension

$y = a \cdot b^x$ where b is the base, x is the exponent

a = starting pt. or multiplier

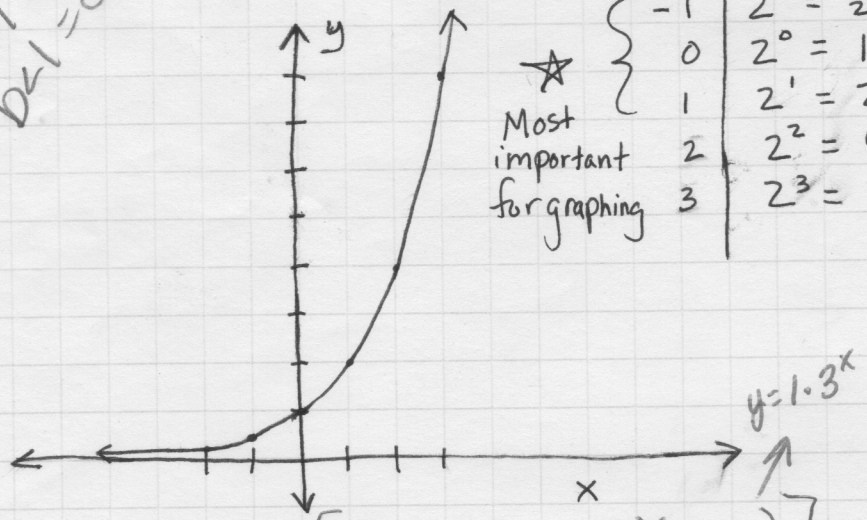
Remember that x is the independent variable which changes. Let's see what happens in a chart

$y = 2^x$

x	y
-2	$2^{-2} = \frac{1}{4}$
-1	$2^{-1} = \frac{1}{2}$
0	$2^0 = 1$
1	$2^1 = 2$
2	$2^2 = 4$
3	$2^3 = 8$

★ Most important for graphing

$b > 1$ = growth
$b < 1$ = decay



Plot the points [(0,1)(1,3)(2,9)(3,27)] and find the exponential equation.

Geogebra

Let's use ~~grapher~~ to try a few.

1. $y = 4^x$
2. $y = 8^x$
3. $y = .5^x$ decay
4. $y = 2.5^x$

You should notice

1. When $x = 0$ $y = 1$
2. When $x = 1$, $y =$ base
3. When $x = -1$, $y =$ recip of base.

General growth formula.

$$P = A(1+r)^t$$

P = amount
A = starting amount
r = growth rate as decimal
t = time in years.

can be used for anything with exponential growth:

1. Population
2. compound interest

C.W. Transformation Worksheet.