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Graphing a Basic Logarithmic Equation

(using the inverse of a logarithm)

First, keep in mind that logarithm equations and exponential equations are inverses of each other .

Example: $y = \log_2 x$ is the inverse of $y = 2^x$

Notice: $y = \log_2 x$ ← Do you see $y = 2^x$?

This is a convenient way to find the equation of the inverse of a logarithm (i.e., an exponential equation).

Practice:

Logarithmic form		Inverse of $y = \log_3 x$ in Exponential form
$y = \log_3 x$	$y = \log_3 x$	$y = 3^x$
$y = \log_7 x$	$y = \log_7 x$	$y = 7^x$

Inverse of $y = \log_7 x$ in Exponential form

These are inverses of each other

The Key: You can easily graph a logarithmic equation using the graph of an exponential equation.

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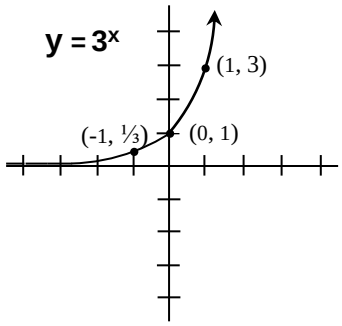
Graph: $y = \log_3 x$

- First graph its inverse ($y = 3^x$) by using a:

t-chart or **graphing calculator**

x	y
0	1
1	3
-1	⅓

Use these ordered pairs to graph $y = 3^x$



$y = 3 \wedge x$

Enter this into a graphing calculator then go to TABLE to get some ordered pairs.
(see below)

- If you are using a graphing calculator, go to TABLE and jot down a few ordered pairs:

$(-1, \frac{1}{3})$ $(0, 1)$ $(1, 3)$

X	y1
-1	.3333
0	1
1	3

- Because exponential equations are inverses of logarithm equations, just switch the x's and y's, plot them, and you have graphed a logarithm:

new points: $(\frac{1}{3}, -1)$ $(1, 0)$ $(3, 1)$