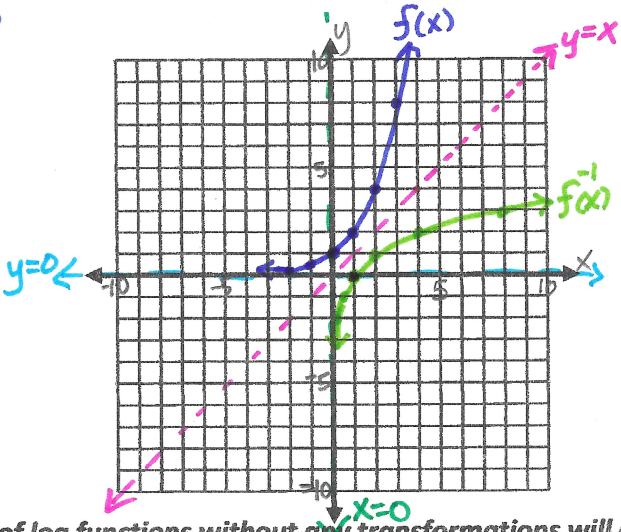
Logarithm Graphs

The logarithm function is an inverse of the exponential function.

$f(x) = 2^x$

x	$f(x)$
−2	$\frac{1}{4}$
−1	$\frac{1}{2}$
0	1
1	2
2	4
3	8



$f^{-1}(x) = \log_2 x$

x	$f^{-1}(x)$
$\frac{1}{4}$	−2
$\frac{1}{2}$	−1
1	0
2	1
4	2
8	3

Note: The graphs of log functions without any transformations will go through the following three points: $(1,0)$, $(b,1)$, $(b^2,2)$... etc. where b is the base.
(anything to 0 power = 1)

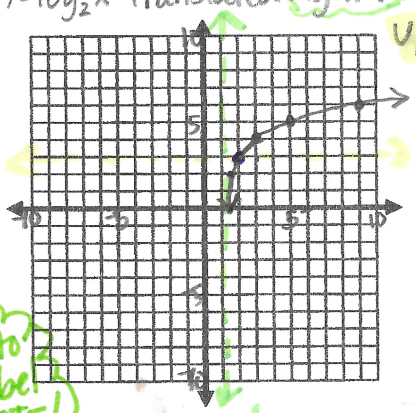
Characteristics of the parent functions:

Exponential: (when $b>1$)	*Logarithmic:* (when $b>1$)
• curve	• curve
• increasing at INCREASING rate	• increasing at DECREASING rate
• continuous	• continuous
• horizontal asymptote: $y=0$	• Vertical asymptote: $x=0$
• Domain: $(-\infty,\infty)$, Range: $(0,\infty)$	• Domain: $(0,\infty)$, Range: $(-\infty,\infty)$
• $(0,1)$; $(1,b)$; $(2,b^2)$; $(-1,b^{-1})$ etc...	• $(1,0)$; $(b,1)$; $(b^2,2)$; $(\frac{1}{b},-1)$... etc

Examples: Graph each of the functions.

1. $f(x) = 3 + \log_2(x-1)$

$f(x)=\log_2 x$ translated right 1 and up 3



*Be sure to show & label ASYMPTOTE!

2. $f(x) = \log_2 \frac{x}{32} \rightarrow f(x) = \log_2 x - \log_2 32$

$f(x)=\log_2 x$ translated 5 $= (\log_2 x) - 5$