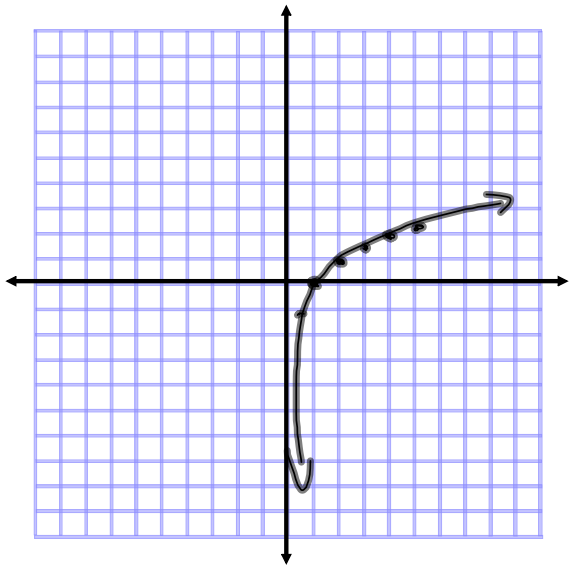
Graphs of Logarithmic Functions

Example 1: Using a table of values, graph $y = \log_2(x)$.

x	y
-3	ERROR
-2	"
-1	"
0	"
0.5	-1
1	0
2	1
3	1.58
4	2
5	2.3

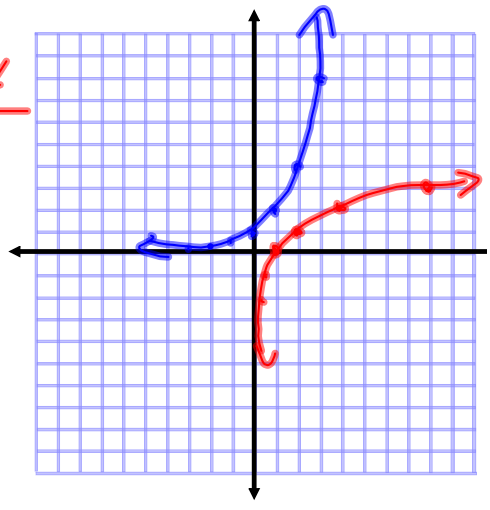


Recall: The logarithmic function and the exponential function are inverses.

Example 2: Sketch the graph of $y = 2^x$ and $y = \log_2 x$ on the same set of axes. State the key features of each graph.

x	$y = 2^x$
-3	0.125
-2	0.25
-1	0.5
0	1
1	2
2	4
3	8

x	$y = \log_2 x$
0.125	-3
0.25	-2
0.5	-1
1	0
2	1
4	2
8	3



Small Groups - Graph the following functions:

$y = \log_3 x$

$y = \log_4 x$

$y = \log_{1.2} x$

$y = \log_{5.5} x$

$y = \log_{0.5} x$

$y = \log_{0.2} x$

-> never touches y-axis
-> if the base is >1, it goes up; less than 1, down.
-> point (1,0)
-> Domain is $\{x > 0, x \in R\}$
-> Range is $\{y \in R\}$

Summary

- The basic logaritmic function is $y = \log_b x$.
- If $b > 1$, then y increases from left to right.
- If $0 < b < 1$, then y decreases from left to right.
- The x-intercept is 1.
- There is a vertical asymptote of $y = 0$.
- Domain is $\{x > 0, x \in R\}$
- Range is $\{y \in R\}$

Practice:

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