

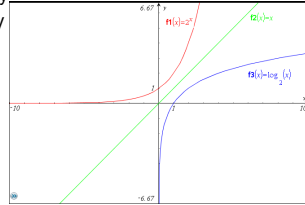
3-4 Graphing Logarithmic Functions

Logarithms & Exponentials

$f(x) = 2^x$ & $f(x) = \log_2 x$ are inverses

$x = 2^y$ to find inverse:

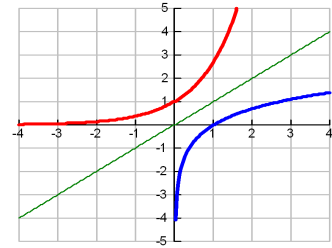
1. switch x&y
2. solve for y



natural log

$$f(x) = \ln x$$

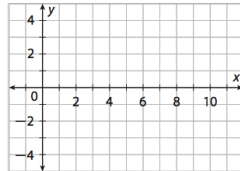
$$f(x) = e^x$$



Complete the table for the function $f(x) = \log x$

Then plot the points on the graph and connect the dots.

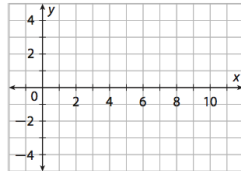
x	$f(x) = \log x$
0.1	
1	
10	



Complete the table for the function $f(x) = \ln x$

Then plot the points on the graph and connect the dots.

x	$f(x) = \ln x$
$\frac{1}{e} \approx 0.368$	
1	
$e \approx 2.72$	
$e^2 \approx 7.39$	



Analyze the graphs of:

$$f(x) = \log x$$

$$f(x) = \ln x$$

Domain:

Range:

End

behavior:

VA/HA:

Increasing/

Decreasing:

Intercepts:

Describe the transformations on each graph:

$$f(x) = \log(x + 2)$$

$$f(x) = 3 \log(-x) - 4$$

$$f(x) = -2 \ln(2x) + 5$$

Graphing Transformed Logarithmic Functions

When graphing a transformed function, it is helpful to consider the following features of the graph: the vertical asymptote, and two reference points (1,0) and (b,1).

Function	$f(x) = \log_b x$	$g(x) = a \log_b(x - h) + k$
Asymptote	$x = 0$	$x = h$
Reference point	(1, 0)	(1 + h, k)
Reference point	(b, 1)	(b + h, a + k)

Graph and analyze the following functions:

$$f(x) = 2 \cdot \log(x-1)$$

Domain:

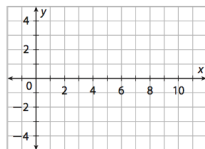
Range:

**End
behavior:**

VA/HA:

**Increasing/
Decreasing:**

Intercepts:



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

Domain:

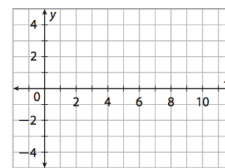
Range:

**End
behavior:**

VA/HA:

**Increasing/
Decreasing:**

Intercepts:



$$f(x) = 3 \cdot \ln(x) + 2$$

Domain:

Range:

**End
behavior:**

VA/HA:

**Increasing/
Decreasing:**

Intercepts:

