

Advanced Math

3-2

Logarithm Functions and Their Graphs

Logarithm - $b > 0, b \neq 1$

Given: $b^x = y \Rightarrow \log_b y = x$

Definition of the Number e - $e = 2.718281828\dots$

Natural Logarithm - $\ln x = y$, provided $e^y = x$

Important! Remember this! - The answer to a logarithm is a power!

Why do we need Logarithms? - To get the variable out of a power.

Graph: $y = 2^x$

x	y
0	1
1	2
2	4
3	8
4	16
5	32

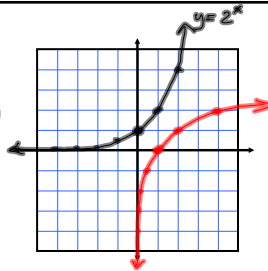
Then Graph its inverse, $f(x) = \log_2 x$.

x	y
1	0
2	1
4	2
8	3
16	4

Domain: $(0, \infty)$

Range: \mathbb{R}

Asymptote: $x = 0$



Write each logarithm equation in exponential form.

1) $\log_4 64 = 3$

$$4^3 = 64$$

Write each exponential equation in logarithmic form.

13) $6^{-2} = \frac{1}{36}$

$$\log_6\left(\frac{1}{36}\right) = -2$$

Evaluate without using a calculator.

19) $\log_2 16 = x$

$$2^x = 16$$

$$2^x = 2^4$$

$$\boxed{4}$$

$$\log 100$$

25) $\log_{10} 0.01$

$$10^x = .01$$

$$10^x = 10^{-2}$$

$$\boxed{-2}$$

$$10^x = \frac{1}{100}$$

$$10^x = \frac{1}{10^2}$$

$$10^x = 10^{-2}$$

29) $\ln e^3$

$$\boxed{3}$$

ln and e are inverses

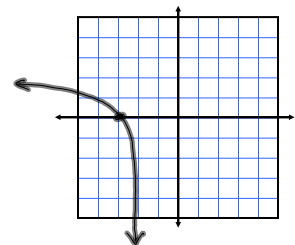
Find the domain, vertical asymptote, and x-intercept of the logarithmic function and sketch its graph.

55) $f(x) = -\log_6(x + 2)$

Domain: $(-2, \infty)$

vertical asymptote: $x = -2$

x-intercept: $\{-3\}$



Assignment:
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2-40 even,
45-50 all,
52-62 even,
75-82 all,