GRAPHING LOGS

Graphing form of a log function

$$y = a \cdot \log_2(x - h) + k$$

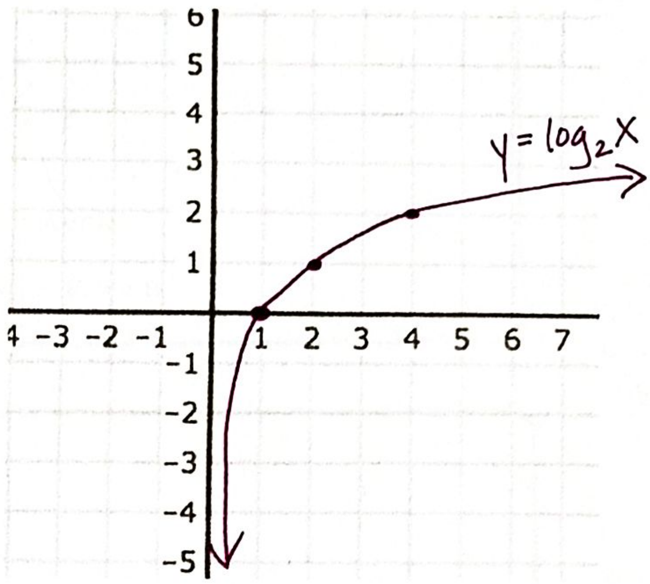
Equation of the asymptote= $x = h$

Locator Point= $(1, 0)$

2nd point = (base, 1)

Domain: $x > 0$

Range: $\mathbb{R}$

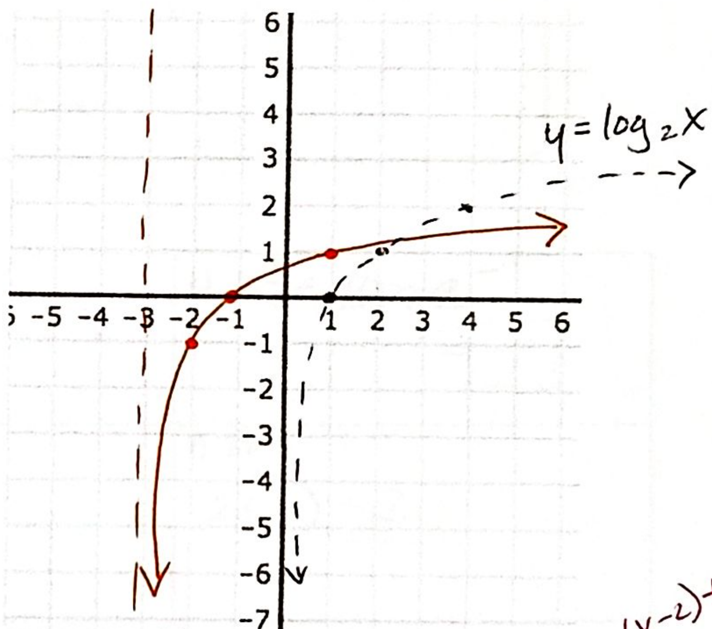


ex: Graph

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

Domain: $x > -3$

Range: $\mathbb{R}$

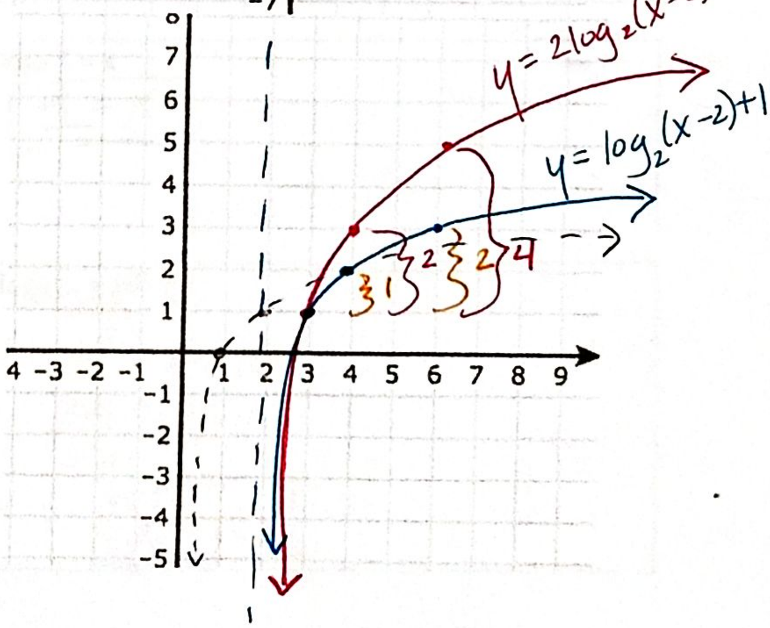


ex: Graph

$$y = 2 \cdot \log_2(x - 2) + 1$$

Domain: $x > 2$

Range: $\mathbb{R}$



PROPERTIES OF LOGS *PART 1*

Properties of Logarithms

1. $\log_a 1 = 0$ because $a^0 = 1$.
2. $\log_a a = 1$ because $a^1 = a$.
3. $\log_a a^x = x$ and $a^{\log_a x} = x$. Inverse Properties
4. If $\log_a x = \log_a y$, then $x = y$. One-to-One Property

Properties of Natural Logarithms

1. $\ln 1 = 0$ because $e^0 = 1$.
2. $\ln e = 1$ because $e^1 = e$.
3. $\ln e^x = x$ and $e^{\ln x} = x$. Inverse Properties
4. If $\ln x = \ln y$, then $x = y$. One-to-One Property

Use Properties of Logs to **simplify** the following:

a) $\cancel{\log_7} \cancel{7}^x = \boxed{X}$	b) $\cancel{8}^{\cancel{\log_8} 24} = \boxed{24}$	c) $\ln\frac{1}{e} = \ln e^{-1}$ $= \boxed{-1}$
d) $\cancel{e}^{\cancel{\ln} 5} = \boxed{5}$	e) $4 \ln 1$ $4(0) = \boxed{4}$	f) $2 \ln e$ $2(1) = \boxed{2}$

Use Properties of Logs to **solve** the following:

a) $\log_2 x = \log_2 3$ $\boxed{X = 3}$	b) $\log_4 4 = x$ $\boxed{1 = X}$
c) $\log_3 x^2 = \log_3 (x + 12)$ $X^2 = X + 12$ $-X - 12 \quad -X \quad -12$ $X^2 - X - 12 = 0$ $(X+3)(X-4) = 0$ $\boxed{X = -3}\ \boxed{X = 4}$	d) $\log_5 (x + 10) = 2$ $5^2 = X + 10$ $25 = X + 10$ $-10 \quad -10$ $\boxed{X = 15}$