Math 121 (Lesieutre); §5.3; September 13, 2017

1. Remember that

$$\log_a x = y \iff a^y = x$$

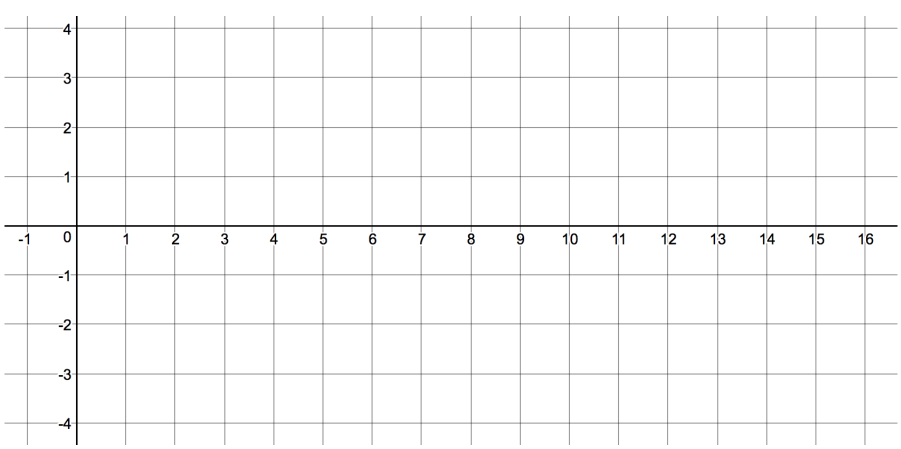
When you see "log" without an a subscript, it means $\log_{10}$. When you see ln, it means $\log_e$. Use this to evaluate the following logarithmic expressions:

$$\log_2 8, \quad \log_5 125, \quad \log_3 81, \quad \log_{16} 4, \quad \log 0.01, \quad \ln\left(\frac{1}{\sqrt{e}}\right)$$

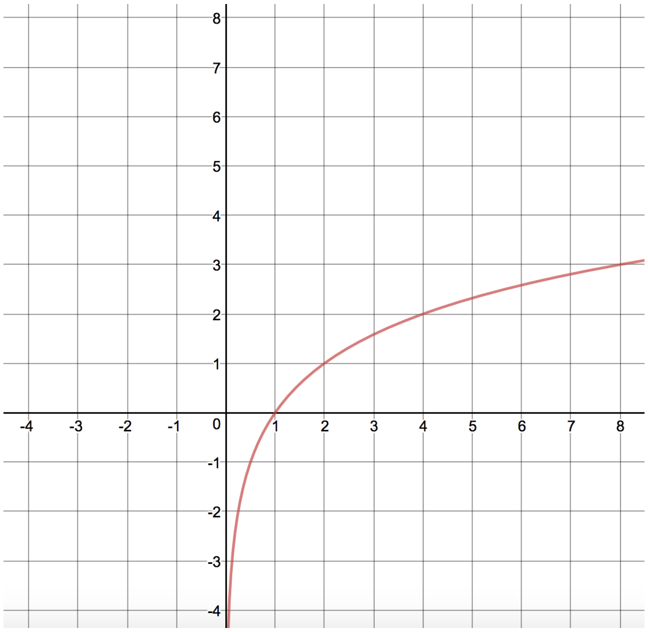
2. Evaluate:

$$\log_a 1, \quad \log_a a, \quad \log 10^{12}, \quad \log_a a^x, \quad 10^{\log 1000}, \quad a^{\log_a x}$$

3. Sketch the graph of $\log_2(x)$ by plotting some points and interpolating. What are the domain and range, and are there any asymptotes?



4. What is the inverse function of $f(x) = \log_2 x$? f is sketched below, sketch $f^{-1}(x)$ on the same plane.



5. To solve logarithmic equations, rewrite them using exponentials. $\log_2(2x+1) = 3, \quad \log(5x+80) = 3, \quad \log_6 36 = 5x+3.$

6. $\log_5(x^2+4x+4) = 2, \quad \ln e^{-2x} = 8$

7. We can also use logarithms to solve exponential equations. $e^{3x} = 10, \quad 2e^{2x+5} = 16, \quad 5^{3x-1} = 11, \quad 2 \cdot 10^{x-2} = 5$