

Logarithms

Section 1: Introduction to Logarithms (KA link)

1. $\log_{10} 100 = \log_{10}(10^2) = 2$
2. $\log_2 64 = \log_2(2^6) = 6$
3. $\log_2 1/2 = \log_2(2^{-1}) = -1$
4. $\log_{1/2} 4 = \log_{1/2}((1/2)^{-2}) = -2$
5. $\log_{0.3} 0.027 = \log_{0.3}(0.3^3) = 3$

Section 2: Properties of Logarithms (KA link)

1. Expand the following:
 - a. $\log(2x) = \log(2) + \log(x)$
 - b. $\log(10/x) = \log(10) - \log(x) = 1 - \log(x)$
 - c. $\log_5(x^{10}) = 10 \log_5(x)$
 - d. $\log_2\left(\frac{10x}{y^2}\right) = \log_2(10x) - \log_2(y^2) = \log_2(10) + \log_2(x) - 2 \log_2(y)$
2. Condense the following:
 - a. $10 \log(x) = \log(x^{10})$
 - b. $2 \log_2(x) + 4 \log_2(y) = \log_2(x^2) + \log_2(y^4) = \log_2(x^2 y^4)$
 - c. $\frac{1}{2} \log_8(a) - \frac{1}{4} \log_8(b) = \log_8(a^{1/2}) - \log_8(b^{1/4}) = \log_8\left(\frac{a^{1/2}}{b^{1/4}}\right)$
 - d. $\frac{1}{3} \log_6(a) - 3 \log_6(b) + 5 \log_6\left(\frac{c}{2}\right) = \log_6(a^{1/3}) - \log_6(b^3) + \log_6\left(\frac{c^5}{2^5}\right) = \log_6\left(\frac{a^{1/3} c^5}{32 b^3}\right)$