PROPERTIES OF LOGARITHMS

GRAPHIC ORGANIZER

Name	Rule(s)	Example 1	Example 2
BASIC LOGARITHMS	$\log_b b^n = n$; $\log_b b = 1$; $\log_b 1 = 0$ ($\log_b b^0$)	**Simplify:** $\log_{14} 14 =$ 1	**Simplify:** $\log_3 1 =$ 0
PRODUCT RULE	$\log_b (m \cdot n) =$ $\log m + \log n$	**Condense:** $\log_5 6 + \log_5 7 =$ $\log_5 (42)$	**Expand:** $\log_2 63 =$ $\log_2 7 + \log_2 9$
QUOTIENT RULE	$\log_b \left(\frac{m}{n}\right) =$ $\log_b m - \log_b n$	**Condense:** $\log_4 84 - \log_4 12 =$ $\log_4 \left(\frac{84}{12}\right)$ $\log_4 7$	**Expand:** $\log 9 =$ $\log\left(\frac{18}{2}\right)$ $\log 18 - \log 2$
POWER RULE	$\log_b m^n =$ $n \log_b m$	**Condense:** $2 \cdot \log_3 8 =$ $\log_3 8^2$ $\log_3 64$	**Expand:** need ↓ ↘ $\log_2 6^{x-1} =$ $(x-1)\log_2 6 \neq x-1 \log_2 6$
CHANGE OF BASE FORMULA	$\log_b a = \frac{\log_c a}{\log_c b}$	**Using a common base, evaluate the expression below.** $\log_7 32 =$ $\frac{\log 32}{\log 7} \approx 1.781$	

REMEMBER: BASE 10 LOGS ARE COMMON LOGS AND WRITTEN WITHOUT A BASE! **($\log x$)**