7-4 Log Properties

1) $\log_b(mn) = \log_b(m) + \log_b(n)$ Product Property

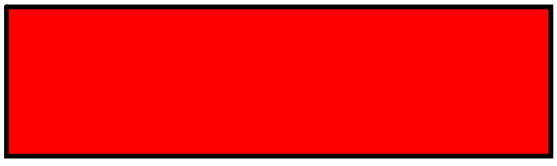
2) $\log_b(m/n) = \log_b(m) - \log_b(n)$ Quotient Property

3) $\log_b(m^n) = n \cdot \log_b(m)$ Power Property

In most instances, you will be shrinking the expression into one log.

A. Expand.

$$\log_2 \frac{\sqrt[3]{xy}}{z^3}$$

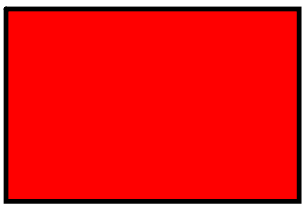


Expand.

$$\log \frac{x^4}{y^3 z}$$

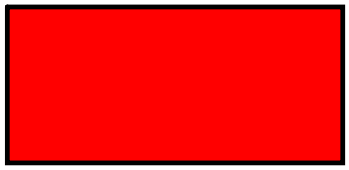
B. Condense by rewriting as one log.

$$2\log_5 x + \frac{1}{2}\log_5 y - \log_5 r$$



Condense by rewriting as one log.

$$\frac{1}{4}\log(xy)^2 + \log m$$



C. Evaluate.

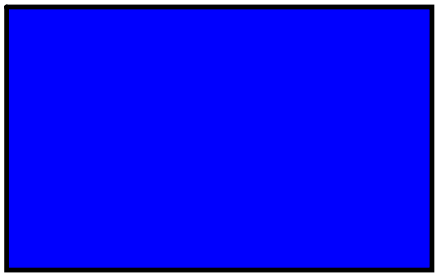
$\log_2 8 + \log_2 4 =$

Evaluate.

$\log_3 81 - \log_3 9 =$

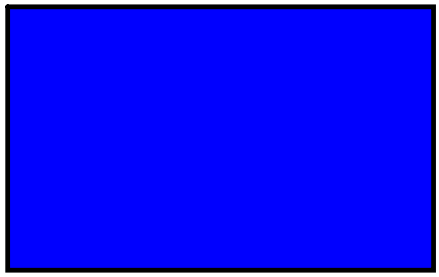
Evaluate.

$5\log_3 3 - \log_3 9 =$



Evaluate.

$\log_5 1 + 2\log_5 25 =$



Change of Base Formula
For any positive numbers m, b, and c, with $b \neq 1$ and $c \neq 1$, $$\log_b m = \frac{\log_c m}{\log_c b}$$

For our purposes, we will use: $\log_b m = \dfrac{\log m}{\log b}$

Check it with a previous example: $\log_3 81 - \log_3 9 =$

$$\frac{\log 81}{\log 3} - \frac{\log 9}{\log 3}$$

$= 4 - 2 = 2$