5-2 Rules of Logarithms

Name	Property	Examples
Zero Rule	$\log_a 1 =$	$\log_5 1 =$ $\ln 1 =$
Identity Rule	$\log_a a =$	$\log_4 4 =$ $\log 10 =$
Inverse Properties	$\log_a a^r =$ $b^{\log_b M} =$	$\log_4 4^3 =$ $\ln e^{-0.5} =$ $5^{\log_5 20} =$ $e^{\ln 24} =$
Product Rule	$\log_b MN =$	$\log_2 5 * 3 =$ $\log 5w =$ $\ln 6z =$
Quotient Rule	$\log_b \dfrac{M}{N} =$	$\log_7 \dfrac{9}{x} =$ $\ln \dfrac{p}{3} =$
Power Rule	$\log_b M^r =$	$\log_8 3^5 =$ $\log_b 5 =$

Rules of Logarithms Examples:

Expand using the Rules of Logarithms.

$$\log_2 x^2 y^2 \qquad\qquad \log \frac{x^3}{\sqrt{y}} \qquad\qquad \log_3 \frac{ab^2}{c^3}$$

Using the Rules of Logarithms, write each expression as a single logarithm (condense), then simplify if possible.

$$\log_6 3 + \log_6 12 \qquad\qquad 3\log_5 x - \frac{1}{3}\log_5 y$$

$$\ln 2 + 3\ln a - 4\ln b \qquad\qquad 2\log_4 x + (\log_4 3y - 4\log_4 z)$$

$$\log_6 6 + \frac{1}{2}\log_6 36 \qquad\qquad \ln e^{10} - \ln 4$$