Logarithm Properties

Rule 1: $\log_b(M \cdot N) = \log_b M + \log_b N$

Rule 2: $\log_b\left(\dfrac{M}{N}\right) = \log_b M - \log_b N$

Rule 3: $\log_b\left(M^k\right) = k \cdot \log_b M$

Rule 4: $\log_b(1) = 0$

Rule 5: $\log_b(b) = 1$

Rule 6: $\log_b\left(b^k\right) = k$

Rule 7: $b^{\log_b(k)} = k$

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Where:

$b > 0$ but $b \neq 1$, and M, N, and k are real

numbers but M and N must be positive!

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Rule 8: If $\log_a x = \log_a y$, **then** $x = y$