

Review of Logarithms

Common log : $\log_{10}x = \log x$ **Natural log:** $\log_e x = \ln x$

Property	Definition	Example
Product	$\log_b mn = \log_b m + \log_b n$	
Quotient	$\log_b \frac{m}{n} = \log_b m - \log_b n$	
Power	$\log_b m^p = p \cdot \log_b m$	
Equality	If $\log_b m = \log_b n$, then $m = n$.	

Identities: $\log(10) = 1$ and $\ln(e) = 1$

Change of Base: $\log_b x = \frac{\log(x)}{\log b} = \frac{\ln(x)}{\ln(b)}$

Exponent Properties:

$$\log_b b^x = x$$

$$b^{\log_b x} = x$$

$$\log 10^x = x$$

$$10^{\log x} = x$$

Lesson #65

Example #1: **Expand** $\log\sqrt{bc}$.

Example #3: **Expand** $\ln\left(\frac{b}{a^4}\right)$

Example #4: **Rewrite as a single logarithm.**

$$5\log 2 + \log 3 - \log 8$$

Example #5:

$$\frac{1}{3}\ln x - \ln(x^2 - 1)$$

Example #6: **Solve for x:** $\ln(x + 1) = 5$

Example #7: **Solve for x:** $\log_7(7^{3x}) = 9$