

Precalculus

Expand logarithm of multiplicative expression as sum of logarithms

Todor Milev

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Example

Fully expand the expression to a sum of logarithms. Your answer should not contain logarithms of products or logarithms of exponents.

$$\ln \left(\frac{y\sqrt{1+x}}{z^2} \right)$$

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$$\begin{aligned}\ln\left(\frac{y\sqrt{1+x}}{z^2}\right) &= \ln\left(y\sqrt{1+x}\right) - \ln\left(z^2\right) \\ &= \ln y + \ln\sqrt{1+x} - 2\ln z \\ &= \ln y + \frac{1}{2}\ln(1+x) - 2\ln z\end{aligned}$$