Precalculus
Expand logarithm of multiplicative expression as sum of logarithms

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