

Lesson 4.4: Laws of Logarithms

Laws of Logarithms

Let a be a positive number, with $a \neq 1$. Let A , B , and C be any real numbers with $A > 0$ & $B > 0$.

Examples: Evaluate each expression using the laws of logarithms.

1. $\log_4 2 + \log_4 32 =$

2. $\log_2 80 - \log_2 5 =$

3. $-\frac{1}{3}\log 8 =$

Examples: Use laws of logarithms to expand each expression.

1. $\log_2(6x) =$

2. $\log_5(x^3y^6) =$

3. $\ln\left(\frac{ab}{\sqrt[3]{c}}\right) =$

Examples: Use laws of logarithms to condense each expression into a single logarithm.

1. $3 \log(x) + \frac{1}{2} \log(x + 1) =$

2. $3 \ln(s) + \frac{1}{2} \ln(t) - 4 \ln(t^2 + 1) =$

Change of Base Formula

Example: Use the change of base formula, so that you can evaluate the following logarithm with a calculator (correct to 5 decimal places).

$\log_8 5$