Example 7: Rewrite the expression in a form with no logarithm of a product, power, or quotient.

\[ \log_7 \left( \frac{\sqrt{x+1}}{x^3} \right) = \log_7 (x^{1/2}) - \log_7 (x^3) \]

\[ = \frac{1}{2} \log_7 (x+1) - 3 \log_7 x \]

Example 8: Rewrite the following so that each logarithm contains a prime number.

\[ \log_2 35 = \log_2 (5 \cdot 7) = \log_2 5 + \log_2 7 \]

\[ \log_3 100 = \log_3 (2^2 \cdot 5^2) = \log_3 (2^2) + \log_3 (5^2) \]

\[ = 2 \log_3 2 + 2 \log_3 5 \]

\[ 100 = 10 \times 10 \]

\[ = 2 \times 5 \times 2 \times 5 = 2^2 \times 5^2 \]

Combining a sum of logarithmic expressions:

Example 9: Rewrite as a single logarithm.

\[ \log_3 x + \log_3 2 = \log_3 (x \cdot 2) = \log_3 (2x) \]