

Example 4 Rewriting logs in expanded form

$$c] \log_2 \left(\frac{\sqrt{x}}{4y^3} \right) =$$

Using Properties of Logs to Rewrite Expressions

$$\log_b m^n = n \log_b m$$

$$\log_b mn = \log_b m + \log_b n$$

$$\log_b \left(\frac{m}{n} \right) = \log_b m - \log_b n$$

Use the properties to expand the expression as much as possible following the order of operations. BE CAREFUL to use parentheses correctly!

$$A] \ln \left(\frac{2x}{y} \right)^3 =$$

$$B] \log_3 \sqrt[3]{xy^2} =$$

Example 3 Rewriting logs in expanded form**Example 1** Rewriting logs in condensed form

Use the properties to condense the expression into a single log following the order of operations. Use the Power Property first, then Product and Quotient Properties. If addition, the objects go in the numerator; if subtraction, the objects go in the denominator.

$$A] \log 4 + 3 \log x - \log 2 - \log y$$

$$B] \frac{1}{2} (\log_2 3x + \log_2 2y)$$

$$\log_b m^n = n \log_b m$$

$$\log_b mn = \log_b m + \log_b n$$

$$\log_b \left(\frac{m}{n} \right) = \log_b m - \log_b n$$

Example 2 Rewriting logs in condensed form

Use the properties to condense the expression into a single log following the order of operations. Use the Power Property first, then Product and Quotient Properties. If addition, the objects go in the numerator; if subtraction, the objects go in the denominator.

$$\log_b m^n = n \log_b m$$

$$\log_b mn = \log_b m + \log_b n$$

$$\log_b \left(\frac{m}{n} \right) = \log_b m - \log_b n$$

$$C] 2 \log_3 4x + \log_3 2y - \log_3 4xy$$

$$D] \ln 4 - \ln 3 + \ln x - 2 \ln y$$