Exercise 272

For the following exercises, use properties of logarithms to write the expressions as a sum, difference, and/or product of logarithms.

$$\ln a\sqrt[3]{b}$$

Solution

There are three properties of logarithms to know.

$$\ln(ab) = \ln a + \ln b \tag{1}$$

$$\ln\left(\frac{a}{b}\right) = \ln a - \ln b \tag{2}$$

$$\ln a^b = b \ln a \tag{3}$$

Use property (1) followed by property (3).

$$\begin{aligned} \ln a\sqrt[3]{b} &= \ln a + \ln \sqrt[3]{b} \\ &= \ln a + \ln b^{1/3} \\ &= \ln a + \frac{1}{3}\ln b \end{aligned}$$