

Evaluate the expression without using a calculator.

$$\log_2 16$$

$$\log_2 \left(\frac{1}{8}\right)$$

$$\log_{81} 3$$

$$\log 0.001$$

$$\log_7 1$$

$$\ln e^3$$

$$\log 1000$$

$$\log_{10} 10$$

$$\log_{27} 9$$

Assuming x and y are positive, use properties of logarithms to write the expression as a **sum or difference** of logarithms or multiples of logarithms

$$\log 3x^2$$

$$\ln \left(\frac{3}{y^4} \right)$$

$$\ln \left(\frac{\sqrt[4]{x^5}}{2\sqrt{y}} \right)$$