

Use the quotient property: $\log_b \frac{M}{N} = \log_b M - \log_b N$

Then use the product property twice: $\log_b MN = \log_b M + \log_b N$

$$\log_3 \left(\frac{243x}{27y} \right) = \log_3 243x - \log_3 27y$$

$$= \log_3 243 + \log_3 x - (\log_3 27 + \log_3 y) = 5 + \log_3 x - 3 - \log_3 y$$

$$= 2 + \log_3 x - \log_3 y$$