

ZHEM, 10.1.2022

$$\begin{aligned} 1. \quad \log \left( \frac{x^{-3} y^4}{z^{-5} w^6} \right) &= \log(x^{-3} y^4 z^5 w^{-6}) \\ &= \log(x^{-3}) + \log(y^4) + \log(z^5) + \log(w^{-6}) \\ &= -3 \log x + 4 \log y + 5 \log z - 6 \log w \end{aligned}$$

$$\begin{aligned} 2. \quad \log \sqrt[3]{\frac{x^2 y^{-3}}{z^4 w^{-5}}} &= \log \left( \frac{x^2 y^{-3}}{z^4 w^{-5}} \right)^{\frac{1}{3}} \\ &= \log \left( \frac{x^{\frac{2}{3}} y^{-1}}{z^{\frac{4}{3}} w^{-\frac{5}{3}}} \right) = \log \left( x^{\frac{2}{3}} y^{-1} z^{-\frac{4}{3}} w^{\frac{5}{3}} \right) \\ &= \log(x^{\frac{2}{3}}) + \log(y^{-1}) + \log(z^{-\frac{4}{3}}) + \log(w^{\frac{5}{3}}) \\ &= \frac{2}{3} \log x - \log y - \frac{4}{3} \log z + \frac{5}{3} \log w \end{aligned}$$