

$$\begin{aligned} 3. & 5 \log x - 3 \log y - 7 \log z + 4 \log w \\ &= \log(x^5) + \log(y^{-3}) + \log(z^{-7}) + \log(w^4) \\ &= \log(x^5 y^{-3} z^{-7} w^4) \end{aligned}$$

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