

$$\begin{aligned}
 1) \quad \sqrt{x^3 \cdot \sqrt[4]{x^6} \cdot \sqrt[3]{x^2}} &= (x^3)^{1/2} \cdot ((x^6)^{1/4})^{1/2} \cdot (((x^2)^{1/3})^{1/4})^{1/2} \\
 &= x^{3/2} \cdot x^{3/4} \cdot x^{1/12} \\
 &= x^{\frac{3}{2} + \frac{3}{4} + \frac{1}{12}} = x^{\frac{18+9+1}{12}} = x^{28/12}
 \end{aligned}$$

$$x^{7/3} = \sqrt[3]{x^{28}}$$

$$2) \quad \frac{(8\mu^2 v^{-2} w)^4}{(81r^{-3}s^{-2}t^3)^2} : \frac{(3^4 r^{-3} s^4 t^3)^{-2}}{(2^4 \mu^3 v^{-4} w^{-2})^{-3}}$$

$$\begin{aligned}
 &\frac{2^{12} \cdot \mu^8 \cdot v^{-8} w^4}{3^8 r^{-6} s^{-4} t^6} : \frac{3^{-8} r^6 s^{-8} t^{-6}}{2^{-12} \mu^{-9} v^{12} w^6} = \frac{2^{12} \mu^8 v^{-8} w^4 2^{12} \mu^9 v^{-12} w^{-6}}{3^8 r^{-6} s^{-4} t^6 3^{-8} r^6 s^{-8} t^{-6}} \\
 &= \frac{2^{24} \mu^{17} v^{-20} w^{-2}}{r^0 s^{12} t^0} = \frac{2^{24} \mu^{17} v^{-20} w^{-2}}{\mu}
 \end{aligned}$$