

$$\begin{aligned} 3. \quad (2x^3)^2(3x^{-1})^3 &= [2^2(x^3)^2][3^3(x^{-1})^3] = (4x^6)(27x^{-3}) \\ &= 108x^{6+(-3)} = 108x^3 \end{aligned}$$

$$\begin{aligned} 4. \quad (3xy^4)^{-2}(12x^2y)^2 &= (3^{-2}x^{-2}(y^4)^{-2})(12^2(x^2)^2y^2) \\ &= \left(\frac{1}{9}x^{-2}y^{-8}\right)(144x^4y^2) = \frac{144}{9}x^{-2+4}y^{-8+2} \\ &= 16x^2y^{-6} = 16x^2\frac{1}{y^6} = \frac{16x^2}{y^6} \end{aligned}$$