

$$a) \frac{3^{a+1} \cdot 3^2}{3^3} = 3^{a+1+2-3} = 3^a$$

$$b) \frac{(x^{2m})^3 \cdot x^{-n}}{x^{2m+n}} = \frac{x^{6m-n}}{x^{2m+n}} = x^{6m-n-2m-n} = x^{4m-2n}$$

$$c) \frac{3^{n+1} \cdot 9^n}{27^{2n/3}} = \frac{3^{n+1} \cdot (3^2)^n}{(3^3)^{2n/3}} = \frac{3^{n+1+2n}}{3^{2n}} = 3^{3n+1-2n} = 3^{n+1}$$

$$d) \frac{16^{3n/4} \cdot 4^{n+1}}{8^{5n/3}} = \frac{(2^4)^{3n/4} \cdot (2^2)^{n+1}}{(2^3)^{5n/3}} = \frac{2^{3n+2n+2}}{2^{5n}} = 2^2 = 4$$