



Check Up

Simplify the following expressions.

1. $(3a^{-2}b^{-4})^{-2}$

2. $\frac{(4x^{-2}y^{-5})^{-2}}{3xy}$

3. $\left(\frac{2a^{10}b^{-4}}{8a^5}\right)^{-2}$

4. $\left(\frac{2a^3b^{-2}}{3a^2b^{-1}}\right)^{-3}$



Compare your answers.

Simplify the following expressions.

$$1. (3a^{-2}b^{-4})^{-2}$$

$$\begin{aligned} &= \frac{1}{(3a^{-2}b^{-4})^2} \\ &= \frac{1}{3^{1 \cdot 2} a^{-2 \cdot 2} b^{-4 \cdot 2}} \\ &= \frac{1}{3^2 a^{-4} b^{-8}} \\ &= \frac{a^4 b^8}{9} \end{aligned}$$

$$2. \frac{(4x^{-2}y^{-5})^{-2}}{3xy}$$

$$\begin{aligned} &= \frac{1}{3xy(4x^{-2}y^{-5})^2} \\ &= \frac{1}{3xy \cdot 4^2 x^{-2 \cdot 2} y^{-5 \cdot 2}} \\ &= \frac{1}{3xy \cdot 16x^{-4}y^{-10}} \\ &= \frac{1}{(3 \cdot 16)x^{1-4}y^{1-10}} \\ &= \frac{1}{48x^{-3}y^{-9}} \\ &= \frac{x^3 y^9}{48} \end{aligned}$$

$$3. \left(\frac{2a^{10}b^{-4}}{8a^5} \right)^{-2}$$

$$\begin{aligned} &= \left(\frac{8a^5}{2a^{10}b^{-4}} \right)^2 \\ &= \frac{8^2 a^{5 \cdot 2}}{2^2 a^{10 \cdot 2} b^{-4 \cdot 2}} \\ &= \frac{64a^{10}}{4a^{20}b^{-8}} \\ &= \frac{64}{4} \cdot \frac{a^{10-20}}{b^{-8}} \\ &= 16 \frac{a^{-10}}{b^{-8}} \\ &= \frac{16b^8}{a^{10}} \end{aligned}$$

$$4. \left(\frac{2a^3b^{-2}}{3a^2b^{-1}} \right)^{-3}$$

$$\begin{aligned} &= \left(\frac{3a^2b^{-1}}{2a^3b^{-2}} \right)^3 \\ &= \frac{3^3 a^{2 \cdot 3} b^{-1 \cdot 3}}{2^3 a^{3 \cdot 3} b^{-2 \cdot 3}} \\ &= \frac{27a^6b^{-3}}{8a^9b^{-6}} \\ &= \frac{27}{8} \cdot a^{6-9} b^{-3-(-6)} \\ &= \frac{27}{8} \cdot a^{-3} b^3 \\ &= \frac{27b^3}{8a^3} \end{aligned}$$