

Multiplicación y división de potencias

1. Aplica la definición y las propiedades estudiadas para calcular cada potencia.

a. $\left[\left(-\frac{5}{2} \right)^2 : \left(-\frac{5}{2} \right)^5 \right] : \left[\left(-\frac{2}{3} \right)^3 : \left(\frac{4}{5} \right)^3 \right]$

$$\begin{aligned} \left[\left(-\frac{5}{2} \right)^2 : \left(-\frac{5}{2} \right)^5 \right] : \left[\left(-\frac{2}{3} \right)^3 : \left(\frac{4}{5} \right)^3 \right] &= \left[\left(-\frac{5}{2} \right)^{-3} \right] : \left[\left(-\frac{5}{6} \right)^3 \right] = \left[\left(-\frac{2}{5} \right)^3 \right] : \left[\left(-\frac{5}{6} \right)^3 \right] \\ &= \left(-\frac{2}{5} : \left(-\frac{5}{6} \right) \right)^3 \\ &= \left(\frac{12}{25} \right)^3 = \frac{1728}{15625} \end{aligned}$$

b. $\frac{\left(\frac{2}{3} \right)^{-1} : \left(\frac{3}{2} \right)^{-2}}{\left(\frac{2}{3} \right)^{-5} : \left(-\frac{3}{2} \right)^3}$

$$\begin{aligned} \frac{\left(\frac{2}{3} \right)^{-1} : \left(\frac{3}{2} \right)^{-2}}{\left(\frac{2}{3} \right)^{-5} : \left(-\frac{3}{2} \right)^3} &= \frac{\frac{3}{2} : \frac{4}{9}}{\frac{243}{32} : \left(-\frac{27}{8} \right)} = \frac{\frac{3}{2} \cdot \frac{9}{4}}{\frac{243}{32} \cdot \left(-\frac{8}{27} \right)} = -\frac{3}{2} \end{aligned}$$

c. $\left[\left(-\frac{3}{4} \right)^2 \cdot \left(\frac{4}{3} \right)^8 \right] : \left[\left(-\frac{5}{6} \right)^9 : \left(\frac{5}{6} \right)^3 \right]$

$$\begin{aligned} \left[\left(-\frac{3}{4} \right)^2 \cdot \left(\frac{4}{3} \right)^8 \right] : \left[\left(-\frac{5}{6} \right)^9 : \left(\frac{5}{6} \right)^3 \right] &= \left[\left(-\frac{4}{3} \right)^{-2} \cdot \left(\frac{4}{3} \right)^8 \right] : \left[\left(-\frac{5}{6} \right)^9 : \left(\frac{5}{6} \right)^3 \right] = \left[\left(-\frac{4}{3} \right)^6 : \left(-\left(\frac{5}{6} \right)^6 \right) \right] \\ &= -\left(\frac{4}{3} \right)^6 : \left(\frac{5}{6} \right)^6 \\ &= -\left(\frac{8}{5} \right)^6 \end{aligned}$$

2. Simplifica la siguiente expresión utilizando las propiedades de las potencias:

$$\frac{(a^2 b^5 c : bc^2)}{a^6 c^2 b^{-2}}$$

$$\frac{(a^2 b^5 c : bc^2)}{a^6 c^2 b^{-2}} = \frac{a^2 b^4 c^{-2}}{a^6 c^2 b^{-2}} = a^{-4} b^6 c^{-4} = (ac)^{-4} b^6$$