Importante. $\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$. El exponente se distribuye.

¿Por qué?

Supongamos que tengo $\left(\frac{3}{5}\right)^2$. $= \left(\frac{3}{5}\right) \cdot \left(\frac{3}{5}\right)$

$$= (3 \cdot 3) \cdot \left(\frac{1}{5} \cdot \frac{1}{5}\right)$$

$$= 3^2 \cdot \frac{1}{5^2}$$

$$= \frac{3^2}{5^2}$$

Problemas (Individual)

4.23) a) $\left(\frac{2}{5}\right)^3 = \frac{2^3}{5^3} = \boxed{\frac{8}{125}}$

4.24)

(a) $\left(\frac{5}{7}\right)^{-1} = \frac{7}{5}$ (b) $\left(\frac{3}{4}\right)^3 = \boxed{\frac{27}{64}}$

4.25) $\left(\frac{a}{b}\right)^{-n} = \frac{1}{\left(\frac{a}{b}\right)^n} = \frac{1}{\frac{a^n}{b^n}} = \boxed{\frac{b^n}{a^n}}$

4.26) $\dfrac{(21/31)^5\,(31/21)^3}{(21/31)^2} = \left(\dfrac{21}{31}\right)^5 \cdot \left(\dfrac{31}{21}\right)^3 \cdot \left(\dfrac{31}{21}\right)^2$

$= \dfrac{\cancel{21^5}^{\,1}}{\cancel{31^5}} \cdot \dfrac{\cancel{31^3}}{\cancel{21^3}_{\,1}} \cdot \dfrac{\cancel{31^2}}{\cancel{21^2}_{\,1}}$

$= \boxed{1}$

Ejercicios

4.4.1) a) $\left(\dfrac{3}{5}\right)^2 = \boxed{\dfrac{9}{25}}$ b) $\left(-\dfrac{2}{7}\right)^0 = \boxed{1}$

(c) $\left(\dfrac{4}{9}\right)^{-2} = \dfrac{9^2}{4^2} = \boxed{\dfrac{81}{16}}$ (d) $\left(\dfrac{-3}{2}\right)^5 = \dfrac{(-3)^5}{2^5}$

$= \dfrac{-243}{32}$

$= \boxed{-\dfrac{243}{32}}$

(e) $\dfrac{1}{(1/5)^3} = 5^3 = \boxed{125}$

(f) $\dfrac{(2/9)^2}{(5/3)^4} = \dfrac{2^2}{9^2} \cdot \dfrac{3^4}{5^4}$

$= \dfrac{2^2 \cdot \cancel{3^4}^{\,1}}{\cancel{3^4}_{\,1} \cdot 5^4} = \boxed{\dfrac{4}{625}}$

4.4.2) (a) $\left(\frac{3}{4}\right)^n \quad \cdots \quad \left(\frac{3}{4}\right)^{3} = \frac{3^3}{4^3} = \frac{27}{64}$

(b) $\left(\frac{3}{4}\right)^n = \frac{16}{9} \quad \cdots \quad \left(\frac{3}{4}\right)^{-2} = \left(\frac{4}{3}\right)^2 = \frac{16}{9}$

4.4.3) $\frac{(2/1641)^4}{(3/1641)^4} \qquad \frac{2^4 \cdot \cancel{1641^4}}{3^4 \cdot \cancel{1641^4}} = \boxed{\frac{16}{81}}$

4.4.4) $\frac{(5/3)^4 \, (5/3)^3}{(5/3)^5} = \left(\frac{5}{3}\right)^4 \cdot \left(\frac{5}{3}\right)^3 \cdot \left(\frac{3}{5}\right)^5$

$= \frac{5^4 \cdot 5^3 \cdot 3^5}{3^4 \cdot 3^3 \cdot 5^5} = \frac{5^7 \cdot 3^5}{3^7 \cdot 5^5}$

$= \frac{5^2}{3^2}$

$= \boxed{\frac{25}{9}}$

4.4.5) $\left(\frac{7}{4}\right)^3 \cdot \left(\frac{4}{7}\right)^5 \cdot \left(\frac{7}{4}\right)^3$

$= \frac{7^3 \cdot 4^5 \cdot 7^3}{4^3 \cdot 7^5 \cdot 4^3} = \frac{7^6 \cdot 4^5}{7^5 \cdot 4^6}$

$= \frac{7^1}{4^1} = \boxed{\frac{7}{4}}$

4.4.6) Explain why $\left(\frac{a}{b}\right)^{-n} = \frac{a^{-n}}{b^{-n}}$

1) $\frac{a^{-n}}{b^{-n}} = \frac{(1/a)^n}{(1/b)^n} = \left(\frac{1}{a}\right)^n \cdot \left(\frac{b}{1}\right)^n$

$= \frac{1}{a^n} \cdot \frac{b^n}{1} = \frac{b^n}{a^n}$

2) $\left(\frac{a}{b}\right)^{-n} = \left(\frac{b}{a}\right)^n = \frac{b^n}{a^n}$

ya que $\frac{a^{-n}}{b^{-n}}$ y $\left(\frac{a}{b}\right)^{-n}$

Son igual a $\frac{b^n}{a^n}$,

$$\boxed{\frac{a^{-n}}{b^{-n}} = \left(\frac{a}{b}\right)^{-n}}$$