Appliquer les lois des exposants 1 Nom_____Per_____

Niveau 1: simplifie chaque expression et écris-la dans la forme d'une seule puissance

$\left(\left(\frac{2}{3}\right)^{9}\right)^{\frac{1}{3}} \times \left(\left(\frac{2}{3}\right)^{4}\right)^{\frac{1}{2}} =$

$\left(\frac{2}{3}\right)^{3} \cdot \left(\frac{2}{3}\right)^{2} = \left(\frac{2}{3}\right)^{5}$

$\left(\left(-\frac{5}{8}\right)^{\frac{1}{2}}\right)^{\frac{2}{3}} \div \left(\left(-\frac{5}{8}\right)^{\frac{3}{5}}\right)^{\frac{5}{6}} =$

$\left(-\frac{5}{8}\right)^{\frac{1}{3}} \div \left(-\frac{5}{8}\right)^{\frac{1}{2}} = \left(-\frac{5}{8}\right)^{-\frac{1}{6}} = \left(-\frac{8}{5}\right)^{\frac{1}{6}}$

Niveau 2: evalue chaque expression :

$\frac{21^{-3}}{7^{-4}} = \frac{7^4}{21^3} = \frac{3 \cdot 7 \cdot 7 \cdot 7}{21 \cdot 21 \cdot 21} = \frac{7}{27}$

$\frac{22^{-5}}{11^{-7}} = \frac{11^7}{22^5} = \frac{11 \cdot 11 \cdot 11 \cdot 11 \cdot 11 \cdot 11 \cdot 11}{22 \cdot 22 \cdot 22 \cdot 22 \cdot 22} = \frac{121}{32}$

$\left(\left(\frac{16}{9}\right)^{\frac{3}{5}}\right)^{\frac{5}{4}} \times \left(\left(\frac{16}{9}\right)^{\frac{5}{2}}\right)^{-\frac{1}{2}} = \left(\frac{16}{9}\right)^{\frac{3}{4}} \cdot \left(\frac{16}{9}\right)^{-\frac{5}{4}} = \left(\frac{16}{9}\right)^{-\frac{1}{2}} = \frac{3}{4}$

$\frac{3}{4} - \frac{5}{4} = -\frac{2}{4}$

$\left(\left(-\frac{27}{64}\right)^{-\frac{1}{2}}\right)^{2} \div \left(\left(-\frac{27}{64}\right)^{\frac{2}{5}}\right)^{\frac{5}{6}} = \left(-\frac{27}{64}\right)^{-1} \div \left(-\frac{27}{64}\right)^{\frac{1}{3}} = \left(-\frac{27}{64}\right)^{-\frac{4}{3}} = \left(-\frac{64}{27}\right)^{\frac{4}{3}} = \frac{256}{81}$

$\frac{0{,}0016^{\frac{5}{4}} \times 0{,}0016^{\frac{3}{4}}}{0{,}0016^{\frac{7}{4}} \times 0{,}0016} = 0{,}0016^{-\frac{3}{4}} = \frac{1}{0{,}0016^{\frac{3}{4}}} = \frac{1}{0{,}2^3} = \left(\frac{1}{0{,}2}\right)^3 = 5^3 = 125$

$\frac{5}{4} + \frac{3}{4} - \frac{7}{4} - 1 = -\frac{3}{4}$

Niveau 3 : simplifie chaque expression

$\frac{x^5 y^{12}}{x^{-2} y^3} = x^7 y^9$

$\frac{40x^{-8}y^2}{5x^{-3}y^{-9}} = 8x^{-5}y^{11} = \frac{8y^{11}}{x^5}$

$\frac{8^2 \cdot 8^1 \cdot 8}{12^1 \cdot 12^1} = \frac{32}{9}$

$\frac{10^2 \cdot 10^2 \cdot 10^2 \cdot 10^2}{25 \cdot 25 \cdot 25 \cdot 25} = \frac{16}{25}$ ✓

$\frac{12^{-2}x^7y^{-5}}{8^{-3}x^2y^4} = \frac{8^3}{12^2} \cdot x^5 y^{-9} = \boxed{\frac{32x^5}{9y^9}}$

$\frac{25^{-3}x^5y^{12}}{10^{-4}x^{-2}y^3} = \frac{10^4}{25^3} x^7 y^9 = \boxed{\frac{16x^7y^9}{25}}$

$\frac{(x^2y^{-8})(x^{-5}y^{11})}{x^{-6}y^7} = \frac{x^2 \cdot x^{-5}}{x^{-6}} \cdot \frac{y^{-8}y^{11}}{y^7} = x^3 y^{-4} = \boxed{\frac{x^3}{y^4}}$

$\frac{(x^{-1}y^3)^4 (x^7y^{-3})^{-1}}{(x^{-2}y^5)^3} = \frac{x^{-4}y^{-7}}{x^{-6}} \cdot \frac{y^{12}y^3}{y^{15}} = x^{-5}y^0 = \boxed{\frac{1}{x^5}}$

$\frac{(2x^{-1}y^3)^4 (4x^7y^{-3})^{-1}}{(3x^{-2}y^5)^{-3}} = \frac{2^4 \cdot 4^{-1}}{3^{-3}} \cdot \frac{x^{-4} \cdot x^{-7}}{x^6} \cdot \frac{y^{12} \cdot y^3}{y^{-15}} = 108x^{-17}y^{30} =$

$\frac{2^2 \cdot 3^3}{4} = 27 \cdot 4 = 108$

$= \boxed{\frac{108y^{30}}{x^{17}}}$

$\left(\frac{120x^{15}y^{-2}}{30x^7y^{-13}}\right)^{\frac{1}{2}} = \left(\frac{120}{30}\right)^{\frac{1}{2}} \left(\frac{x^{15}}{x^7}\right)^{\frac{1}{2}} \cdot \left(\frac{y^{-2}}{y^{-13}}\right)^{\frac{1}{2}} = 4^{\frac{1}{2}} \cdot (x^8)^{\frac{1}{2}} \cdot (y^{11})^{\frac{1}{2}} =$

$= \boxed{2x^4y^{\frac{11}{2}}}$

$\left(\frac{48x^{-7}y^4}{6x^8y^{-14}}\right)^{\frac{2}{3}} = \left(\frac{48}{6}\right)^{\frac{2}{3}} \left(\frac{x^{-7}}{x^8}\right)^{\frac{2}{3}} \left(\frac{y^4}{y^{-14}}\right)^{\frac{2}{3}} = 8^{\frac{2}{3}} \cdot (x^{-15})^{\frac{2}{3}} (y^{+18})^{\frac{2}{3}} =$

$= \boxed{\frac{4y^{12}}{x^{10}}}$