

— MATHEMATICS / SOLVED PROBLEMS / Algebra / Exponents

5. Simplify $\frac{(8^{-2}z^{-3}y)^{-1}}{(5y^2z^{-2})^3(5yz^{-2})^{-1}}$

$$\begin{aligned} \frac{(8^{-2}z^{-3}y)^{-1}}{(5y^2z^{-2})^3(5yz^{-2})^{-1}} &= \frac{\frac{1}{(8^{-2}z^{-3}y)}}{(5y^2z^{-2})^3 \cdot \frac{1}{(5yz^{-2})}} \\ &= \frac{\frac{1}{(8^{-2}z^{-3}y)}}{\frac{(5y^2z^{-2})^3}{(5yz^{-2})}} \\ &= \frac{\frac{1}{\frac{1 \cdot 4}{64z^3}}}{\frac{(5y^2z^{-2})^3}{(5yz^{-2})}} \\ &= \frac{64z^3}{y} \cdot \frac{5yz^{-2}}{(5)^3(y^2)^3(z^{-2})^3} \\ &= \frac{(64)(5) \cdot z^{3+(-2)} \cdot y}{y \cdot (5)^3 \cdot y^6 \cdot z^{-6}} \\ &= \frac{(64) \cdot z}{(5)^2 \cdot y^6 \cdot z^{-6}} \\ &= \frac{64z^7}{25y^6} \end{aligned}$$

6. Simplify $\left(\frac{x}{y^3}\right)^4$

$$\left(\frac{x}{y^3}\right)^4 = \frac{(x)^4}{(y^3)^4} = \frac{x^4}{y^{12}}$$

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7. Simplify $\frac{z^2(x^2-y^2)}{x^3z}$; $x=2, y=0, z=3$

$$\begin{aligned} \frac{z^2(x^2-y^2)}{x^3z} &= \frac{z^2x^2 - z^2y^2}{x^3z} \\ &= \frac{(3)^2(2)^2 - (3)^2(0)^2}{(2)^3(3)} \\ &= \frac{(3)^2(2)^2}{(2)^3(3)} \\ &= \frac{3}{2} \end{aligned}$$

8. Simplify $\left(\frac{a^2b}{z}\right)^2$

$$\begin{aligned} \left(\frac{a^2b}{z}\right)^2 &= \frac{(a^2)^2(b)^2}{(z)^2} \quad \left\{ \begin{array}{l} \text{Expanding exponents} \\ \text{using the power rule} \\ \text{of exponents } (a^b)^c = a^{b \cdot c} \end{array} \right. \\ &= \frac{a^4 \cdot b^2}{z^2} \\ &= \frac{a^4b^2}{z^2} \end{aligned}$$