Raising a Fraction to a Power

* If a fraction in parentheses is raised to a power, raise both the numerator and the denominator to the power.

$$\left(\frac{x^{2}}{y^{3}}\right)^{4} = \frac{x^{2\cdot 4}}{y^{3\cdot 4}} = \frac{x^{8}}{y^{12}}$$

$2^3 = 2 \cdot 2 \cdot 2$

$$\left(\frac{2^{1}}{y^{2}}\right)^{3} = \frac{2^{1\cdot 3}}{y^{2\cdot 3}} = \frac{2^{3}}{y^{6}} = \frac{8}{y^{6}}$$

$$\left(\frac{4^{1}}{y^{1}}\right)^{2} = \frac{4^{1\cdot 2}}{y^{1\cdot 2}} = \frac{4^{2}}{y^{2}} = \frac{16}{y^{2}}$$

✓ (1) $\left(\frac{y^{3}}{x^{2}}\right)^{4} = \frac{y^{3\cdot 4}}{x^{2\cdot 4}} = \frac{y^{12}}{x^{8}}$

✓ (2) $\left(\frac{x^{3}}{2^{1}}\right)^{3} = \frac{x^{3\cdot 3}}{2^{1\cdot 3}} = \frac{x^{9}}{2^{3}} = \frac{x^{9}}{8}$

✓ (3) $\left(\frac{2x^{2}}{y^{3}}\right)^{2} = \frac{2^{1\cdot 2}x^{2\cdot 2}}{y^{3\cdot 2}} = \frac{2^{2}\cdot x^{4}}{y^{6}} = \frac{4x^{4}}{y^{6}}$

$3^3 = 3 \cdot 3 \cdot 3$

✓ (4) $\left(\frac{3y^{2}}{x^{2}}\right)^{3} = \frac{3^{1\cdot 3}y^{2\cdot 3}}{x^{2\cdot 3}} = \frac{3^{3}y^{6}}{x^{6}} = \frac{27y^{6}}{x^{6}}$