Rationalizing the Denominator: Higher Root

When rationalizing a denominator containing a term that has a root higher than 2, multiply the numerator and the denominator by the value needed to form a perfect cube, 4th, 5th, etc. of the denominator.

$\frac{7}{\sqrt[3]{x}}$ has a cube root. Therefore, 3 factors of x are needed in the radicand. $\frac{7}{\sqrt[3]{x}}\cdot\frac{\sqrt[3]{x^2}}{\sqrt[3]{x^2}}=\frac{7\sqrt[3]{x^2}}{\sqrt[3]{x^3}}=\frac{7\sqrt[3]{x^2}}{x}$

$\sqrt[3]{\frac{3}{4a^2}}$ Cannot be simplified, so split it. $\frac{\sqrt[3]{3}}{\sqrt[3]{4a^2}}$ Need 3 factors of 2 and 1 factor of a in the radicand.

$$\frac{\sqrt[3]{3}}{\sqrt[3]{4a^2}}=\frac{\sqrt[3]{3}}{\sqrt[3]{4a^2}}\cdot\frac{\sqrt[3]{2a}}{\sqrt[3]{2a}}=\frac{\sqrt[3]{6a}}{\sqrt[3]{8a^3}}=\frac{\sqrt[3]{6a}}{2a}$$

$$\sqrt[5]{\frac{3}{x^2y}}=\frac{\sqrt[5]{3}}{\sqrt[5]{x^2y}}\cdot\frac{\sqrt[5]{x^3y^4}}{\sqrt[5]{x^3y^4}}=\frac{\sqrt[5]{3x^3y^4}}{\sqrt[5]{x^5y^5}}=\frac{\sqrt[5]{3x^3y^4}}{xy}$$

TRY:

$\sqrt[3]{\frac{3}{5}}$

$\sqrt[4]{\frac{2}{27x^2}}$

$\frac{9}{\sqrt[5]{a^3b^4}}$

$\sqrt[3]{\frac{4a}{b}}$