Rational Exponents ⟷ Radicals

$$\left(\sqrt[n]{b}\right)^m = b^{\frac{m}{n}}$$

$5^{\frac{1}{2}} = \sqrt{5}$ $\quad (3x)^{\frac{1}{2}} = \sqrt{3x}$ $\quad (2x^3)^{\frac{1}{4}} = \sqrt[4]{2x^3}$

$8^{\frac{2}{3}} = \left(\sqrt[3]{8}\right)^2$ $\quad (5x)^{\frac{4}{3}} = \left(\sqrt[3]{5x}\right)^4$ $\quad (4p)^{\frac{5}{3}} = \left(\sqrt[3]{4p}\right)^5$

$(10p^2)^{\frac{7}{4}} = \left(\sqrt[4]{10p^2}\right)^7$ $\quad \sqrt[7]{4y^2z} = (4y^2z)^{\frac{1}{7}}$

$\left(\sqrt[4]{6y^2}\right)^3 = (6y^2)^{\frac{3}{4}}$ $\quad \left(\sqrt{xy^2}\right)^5 = (xy^2)^{\frac{5}{2}}$

$\sqrt[4]{6x^3} = (6x^3)^{\frac{1}{4}}$ $\quad \left(\sqrt[4]{5x}\right)^5 = (5x)^{\frac{5}{4}}$

Simplify: $36^{\frac{1}{2}} = \boxed{6}$ $\quad 125^{\frac{2}{3}} = 5^2 = \boxed{25}$

$(4x^2)^{\frac{3}{2}} = (2x)^3 = \boxed{8x^3}$ $\quad (a^6)^{\frac{3}{2}} = (a^3)^3 = \boxed{a^9}$ $\quad (25m^4)^{\frac{1}{2}} = \boxed{5m^2}$