1/16/13 Whiteboard Problems

Write in exponential form

① $\sqrt[5]{x^4 y^3}$

$(x^4 y^3)^{1/3}$

$x^{4/3} y^{3/3}$

$\boxed{x^{4/3} y}$

② $\sqrt[8]{m^3 y z^7}$

$(m^3 y z^7)^{1/8}$

$\boxed{m^{3/8} y^{1/8} z^{7/8}}$

③ $\sqrt{16 x^3 y^{-3} z}$

$(16 x^3 y^{-3} z)^{1/2}$

$16^{1/2} x^{3/2} y^{-3/2} z^{1/2}$

$\frac{\sqrt{16}\, x^{3/2} z^{1/2}}{y^{3/2}} = \boxed{\frac{4 x^{3/2} z^{1/2}}{y^{3/2}}}$

④ $\sqrt[3]{8 b^6 c^{-4}}$

$(8 b^6 c^{-4})^{1/3}$

$8^{1/3} b^{6/3} c^{-4/3}$

$\frac{\sqrt[3]{8}\, b^2}{c^{4/3}} = \boxed{\frac{2 b^2}{c^{4/3}}}$

⑤ $\sqrt[4]{7 x^3 y^6 z^{-8}}$

$(7 x^3 y^6 z^{-8})^{1/4}$

$7^{1/4} x^{3/4} y^{6/4} z^{-8/4}$

$\frac{7^{1/4} x^{3/4} y^{3/2}}{z^{8/4}}$

$\boxed{\frac{7^{1/4} x^{3/4} y^{3/2}}{z^2}}$

⑥ $\frac{1}{\sqrt{p^4 q^{-8}}}$

$\frac{1}{(p^4 q^{-8})^{1/2}}$

$\frac{1}{p^{4/2} q^{-8/2}}$

$\frac{1}{p^2 q^{-4}}$

$\boxed{\frac{q^4}{p^2}}$

⑦ $\sqrt[4]{\frac{16^3 a^{-2}}{b^6}}$

Express in Simplest Radical Form

⑧ $\sqrt{3} \cdot \sqrt[6]{3}$

$3^{1/2} \cdot 3^{1/6}$

$3^{1/2 + 1/6}$

$3^{3/6 + 1/6}$

$3^{4/6} = 3^{2/3} = \boxed{\sqrt[3]{9}}$

⑨ $\frac{\sqrt[6]{2^3}}{\sqrt[6]{8}} = \frac{2^{3/6}}{2^{3/6}}$

$= 2^{3/6 - 3/6}$

$= 2^0$

$= \boxed{1}$

⑩ $\frac{\sqrt[3]{125}}{\sqrt[6]{25}}$

$\frac{\sqrt[3]{5^3}}{\sqrt[6]{5^2}} = \frac{5^{3/3}}{5^{2/6}} = \frac{5^{3/3}}{5^{1/3}} = 5^{3/3 - 1/3}$

$= 5^{2/3}$

$= \sqrt[3]{5^2}$

$\boxed{\sqrt[3]{25}}$

⑪ $\sqrt[5]{81} \cdot \sqrt[6]{27}$

$\sqrt[5]{3^4} \cdot \sqrt[6]{3^3}$

$3^{4/5} \cdot 3^{3/6}$

$3^{4/5} \cdot 3^{1/2}$

$3^{4/5 + 1/2}$

$3^{8/10 + 5/10}$

$3^{13/10}$

$\boxed{\sqrt[10]{3^{13}}}$

⑫ $\frac{\sqrt[5]{27}}{\sqrt[5]{9}} = \frac{\sqrt[5]{3^3}}{\sqrt[5]{3^2}} = \frac{3^{3/5}}{3^{2/5}} = 3^{3/5 - 2/5} = 3^{1/5} = \boxed{\sqrt[5]{3}}$