$\sqrt[n]{x} = r$ (index, radical, radicand, root)

Simplify: factor tree

Multiply: $a\sqrt{b} \cdot c\sqrt{d} = (a \cdot c)\sqrt{b \cdot d}$

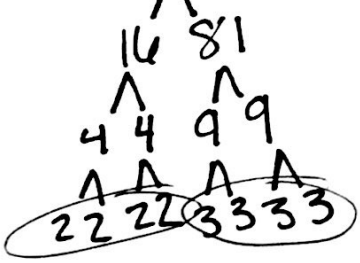
Add/Subtract (simplify first): $a\sqrt{b} + c\sqrt{b} = (a+c)\sqrt{b}$

Simplify:

① $\sqrt[3]{64} = \boxed{4}$

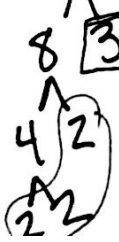
② $\sqrt[4]{1296 m^4 n^8} = 2 \cdot 3 m^1 n^2$

$\boxed{6mn^2}$



~~③~~

③ $\sqrt[3]{24x^4}$ $2x^1$ $\sqrt[3]{3x^1}$



$\boxed{2x\sqrt[3]{3x}}$

Multiply:

① $\sqrt{3x^2y} \cdot \sqrt{5xy} = \sqrt{15x^3y^2} = x^1y^1\sqrt{15x^1} = \boxed{xy\sqrt{15x}}$

(3, 5)

② $6\sqrt{8x^3y^2} \cdot 2\sqrt{10xy^3} = 12\sqrt{80x^4y^5} = 12 \cdot 2 \cdot 2x^2y^2\sqrt{5y}$

$= \boxed{48x^2y^2\sqrt{5y}}$

Add/Subtract:

① $\sqrt{45x^3} - \sqrt{20x^3}$

$3x\sqrt{5x} - 2x\sqrt{5x}$

$\boxed{x\sqrt{5x}}$

② $5\sqrt[3]{32} + 2\sqrt[3]{108}$

$5 \cdot 2\sqrt[3]{4} + 2 \cdot 3\sqrt[3]{4}$

$10\sqrt[3]{4} + 6\sqrt[3]{4}$

$\boxed{16\sqrt[3]{4}}$