6.3 - I will simplify products and quotients of roots

$\sqrt{20} \cdot \sqrt{6} = \sqrt{20 \cdot 6} = \sqrt{2^2 \cdot 2 \cdot 3 \cdot 5} = 2\sqrt{30}$

$\sqrt[3]{12x^5y^8} \cdot \sqrt[3]{20x^2y^4} = \sqrt[3]{12 \cdot 20 x^6 x y^{12}} = \sqrt[3]{2^3 \cdot 2 \cdot 3 \cdot 5 \cdot x^6 \cdot x \cdot y^{12}}$

$= 2x^2y^4\sqrt[3]{30x}$

$2x\sqrt[4]{16x^5y^7} \cdot 3x\sqrt[4]{70x^3y^{10}}$

$= 6x^2\sqrt[4]{16 \cdot 70 x^8 y^{16} y}$

$= 6x^2\sqrt[4]{2^4 \cdot 2 \cdot 5 \cdot 7 \cdot x^8 \cdot y^{16} \cdot y}$

$= 12x^4y^4\sqrt[4]{70y}$

$\frac{\sqrt{12}}{\sqrt{6}} = \sqrt{2}$ No $\sqrt{}$ in denominator!

$\frac{\sqrt{10}\cdot\sqrt{7}}{\sqrt{7}\cdot\sqrt{7}} = \frac{\sqrt{10\cdot 7}}{7} = \frac{\sqrt{70}}{7}$

$\frac{\sqrt[3]{4}}{\sqrt[3]{32}} = \frac{\sqrt[3]{1}}{\sqrt[3]{8}} = \frac{1}{2}$

$8 = 2^3$, $4 = 2^2$

$\frac{1}{\sqrt[3]{6}}\cdot\frac{\sqrt[3]{6^2}}{\sqrt[3]{6^2}} = \frac{\sqrt[3]{6^2}}{6} = \frac{\sqrt[3]{36}}{6}$

$\sqrt[3]{6}\cdot\sqrt[3]{6^2} = \sqrt[3]{6^3} = 6$

$\sqrt[3]{\frac{12}{6}} = \frac{\sqrt[3]{12}}{\sqrt[3]{6}} = \sqrt[3]{2}$

$\frac{\sqrt{24}}{\sqrt{25}} = \frac{\sqrt{24}}{5} = \frac{\sqrt{2^2\cdot 2\cdot 3}}{5} = \frac{2\sqrt{6}}{5}$

$2 < 12 < 2^3$, $\sqrt{2} < \sqrt{12} < \sqrt{2^3}$

what if... $\frac{2\sqrt{6}}{4} = \frac{1\sqrt{6}}{2}$

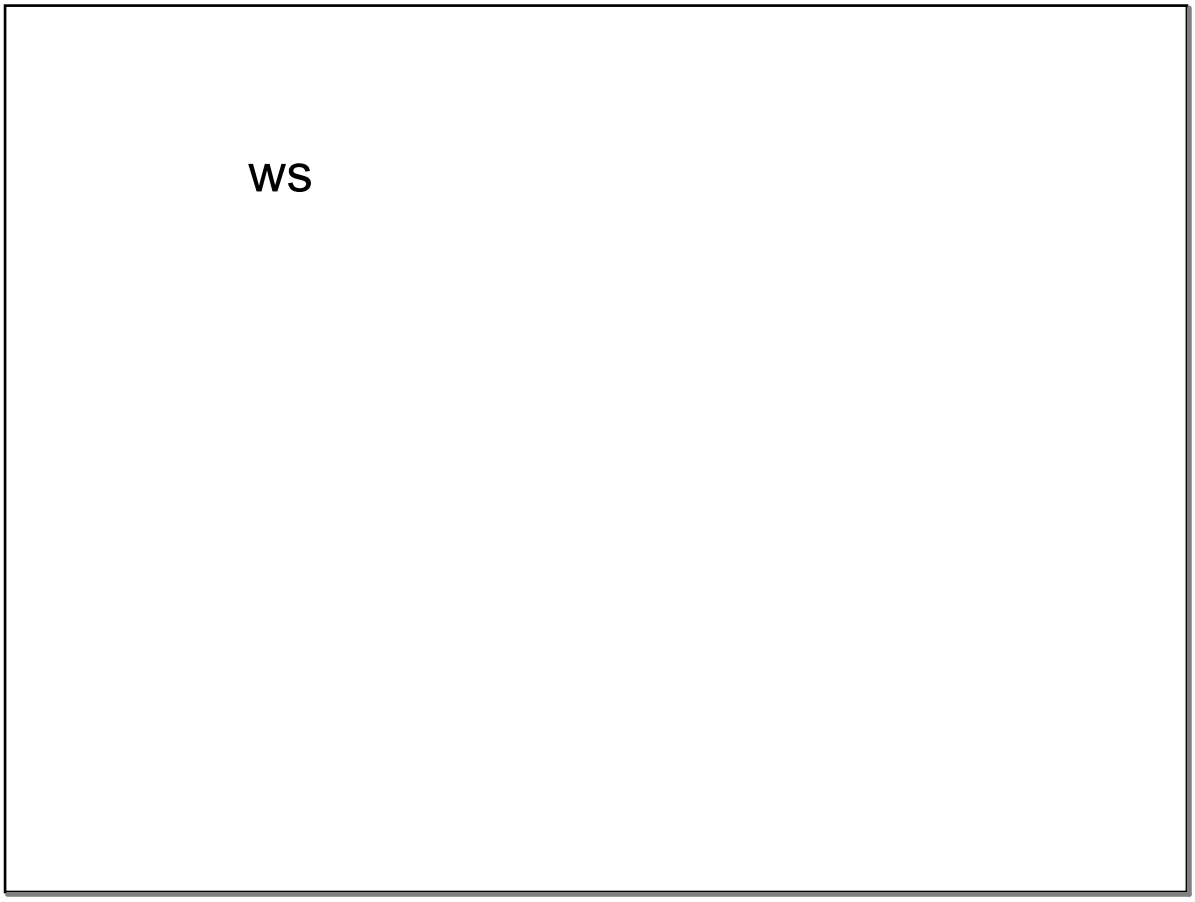
$$\frac{\sqrt[3]{27}}{\sqrt[3]{5}} = \frac{\sqrt[3]{3^3}}{\sqrt[3]{5}} = \frac{3}{\sqrt[3]{5}} \cdot \frac{\sqrt[3]{5^2}}{\sqrt[3]{5^2}} = \frac{3\sqrt[3]{25}}{5}$$

$$\frac{\sqrt[4]{5}}{\sqrt[4]{4x^3}} = \frac{\sqrt[4]{5}}{\sqrt[4]{2^2x^3}} \cdot \frac{\sqrt[4]{2^2x}}{\sqrt[4]{2^2x}} = \frac{\sqrt[4]{20x}}{2x}$$

$$\sqrt[3]{-121} \cdot \sqrt[3]{44} = \sqrt[3]{-121 \cdot 44} = \sqrt[3]{-1 \cdot 4 \cdot 11^3} = -11\sqrt[3]{4}$$

(-1 · 121 · 4 · 11; 121 = 11 · 11)

$$\frac{\sqrt{-8}}{\sqrt{9}} = \frac{\sqrt{-8}}{3} = \frac{\sqrt{-1 \cdot 2^2 \cdot 2}}{3} = \frac{2i\sqrt{2}}{3}$$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