Multiplication Property of Radicals

$$\sqrt[n]{ab} = \sqrt[n]{a} \times \sqrt[n]{b}$$

eg. $\sqrt{16 \times 25} = \sqrt{16} \times \sqrt{25} = 4 \times 5 = 20$

Entire radicals $\longrightarrow \sqrt{10}, \sqrt[3]{5} \longrightarrow \sqrt[n]{x}$

Mixed radicals $\longrightarrow 3\sqrt{7}, 4\sqrt[3]{6} \longrightarrow a\sqrt[n]{x}$

Simplifying Radicals

eg. $\sqrt{75}$ $\longrightarrow$ product of prime factors

75

3×25

$\sqrt{3 \cdot 5 \cdot 5}$

$5\sqrt{3}$

since we have $\sqrt{\ }$ looking for pairs of equal factors

$\longrightarrow$ perfect squares

$\sqrt{75} = \sqrt{25 \times 3}$

$= \sqrt{25} \times \sqrt{3}$

$= 5\sqrt{3}$

4
9
16
25 ✓
36
49
⋮

$= 5\sqrt{3}$

ex. 1 $\sqrt{24}$

$\sqrt{2\cdot2\cdot2\cdot3}$ → $2\sqrt{6}$

$\sqrt{4\times6}$ → $\sqrt{4}\times\sqrt{6}$ → $2\sqrt{6}$

2. $\sqrt[3]{108}$

$9\cdot12$

$3\cdot3\cdot2\cdot2\cdot3$

$3\sqrt[3]{4}$

since $\sqrt[3]{}$ look for triplets

$\sqrt[3]{27}\times4$

$3\sqrt[3]{4}$

3. $\sqrt[3]{80}$

$2\cdot2\cdot2\cdot2\cdot5$ $\quad$ 8×10

$2\sqrt[3]{10}$ $\quad$ $2\sqrt[3]{10}$

4. $\sqrt[4]{48}$

$2\cdot2\cdot2\cdot2\cdot3$

$2\sqrt[4]{3}$

Change Mixed to Entire

$3\sqrt{5} \longrightarrow \sqrt{3\cdot3\cdot5} = \sqrt{45}$

$2\sqrt[3]{3} \rightarrow \sqrt[3]{2 \cdot 2 \cdot 2 \cdot 3} = \sqrt[3]{24}$

$2\sqrt[4]{3} \rightarrow \sqrt[4]{2 \cdot 2 \cdot 2 \cdot 2 \cdot 3} = \sqrt[4]{48}$

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