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 9-12-18

Simplify Radical Expressions

I. (1st standard) No radicand may contain a factor to a power greater than or equal to the index of the radical,

$$\sqrt{75} \rightarrow \sqrt{3 \cdot 5 \cdot 5} \rightarrow 5\sqrt{3}$$

\swarrow \searrow
 3 25
 \swarrow \searrow
 5 5

$$\sqrt{50a^3} \rightarrow \sqrt{2 \cdot 5 \cdot 5 \cdot a \cdot a \cdot a} \rightarrow 5a\sqrt{2a}$$

\swarrow \searrow
 2 25
 \swarrow \searrow
 5 5

II. (2nd standard) No power of a radicand and the index of the radical may have a common factor other than one.

$$\sqrt[6]{a^4} \rightarrow \begin{array}{l} 6 \text{ and } 4 \\ \text{are divisible} \\ \text{by } 2. \end{array} \rightarrow \sqrt[6/2]{a^{4/2}} \rightarrow \sqrt[3]{a^2}$$

$$\sqrt[8]{a^2 b^4 c^6} \rightarrow \begin{array}{l} \text{divisible} \\ \text{by } 2 \end{array} \rightarrow \sqrt[8/2]{a^{2/2} b^{4/2} c^{6/2}} \rightarrow \sqrt[4]{a b^2 c^3}$$

$$\sqrt[8]{a^2 b^4 c^5} \rightarrow \begin{array}{l} \text{simplified} \\ \text{because not all can be divided.} \end{array}$$

$$\sqrt[6]{27x^3} \rightarrow \sqrt[6]{3^3 \cdot x^3} \rightarrow \begin{array}{l} \text{divide} \\ \text{by } 3 \end{array} \rightarrow \sqrt[6/3]{3^{3/3} \cdot x^{3/3}} \rightarrow \sqrt[2]{3x}$$