

**Mixed
&
Entire
Radicals !!**

Mixed Radical

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

A number is in front of the radical sign. “**Mixture**”

Entire Radical

$$\sqrt[3]{54}$$

Everything is
entirely under the
radical sign.

Calculate $\sqrt{125}$

What do you notice?

**Your answer is irrational,
therefore lets simplify!!!**

Method #1

Simplify $\sqrt{125}$

Use Prime Factorization !!

Prime Factorization

Simplify $\sqrt{125}$

$$\sqrt[2]{125} - \sqrt{5 \times 5 \times \underline{\underline{5}}}$$

$$5\sqrt{5}$$

Reducing or Simplifying Radicals

Method #2

Simplify $\sqrt{125}$

To simplify $\sqrt{125}$, we must determine the greatest perfect square that divides into 125 evenly!!

Use Your Lifeline

TIP: Start at the bottom!



4
9
16
25
36
49
64
81
100
121

$$25 \times 5 = 125$$

$$\sqrt{125}$$

$$\sqrt{25 \cdot 5}$$

$$5\sqrt{5}$$

Simplify $\sqrt{63}$

$$\sqrt[2]{3 \times 3 \times 7}$$

$$\sqrt{3 \times 3 \times 7}$$

$$3\sqrt{7}$$

Simplify $\sqrt[3]{1080}$

$$\sqrt[3]{2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 5}$$

$$\sqrt[3]{\underbrace{2 \times 2 \times 2}_{\text{circled}} \times \underbrace{3 \times 3 \times 3}_{\text{circled}} \times 5}$$

$$2 \times 3 \sqrt[3]{5}$$

$$6\sqrt[3]{5}$$

Simplify $\sqrt[3]{120}$

$$\sqrt[3]{2 \times 2 \times 2 \times 3 \times 5}$$

$$\sqrt[3]{\color{red}{2 \times 2 \times 2} \times 3 \times 5}$$

$$2\sqrt[3]{3 \times 5}$$

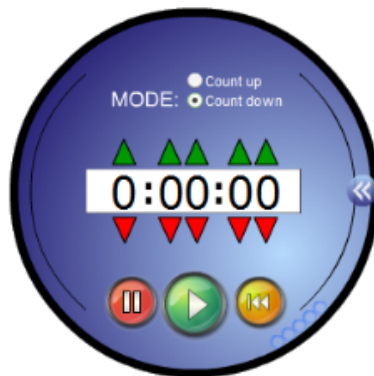
$$2\sqrt[3]{15}$$

Try It Yourself!!!

Simplify:

a) $\sqrt{147}$ b) $\sqrt{80}$ c) $\sqrt{98}$

d) $\sqrt{81}$ e) $\sqrt{80}$ f) $\sqrt{432}$



a) $\sqrt{147}$

b) $\sqrt{80}$

c) $\sqrt{98}$

a) $\sqrt{3 \times 7 \times 7}$

$$7\sqrt{3}$$

b) $\sqrt{2 \times 2 \times 2 \times 2 \times 5}$

$$2 \times 2\sqrt{5}$$

$$4\sqrt{5}$$

c) $\sqrt{2 \times 7 \times 7}$

$$7\sqrt{2}$$

$$\mathbf{d) \quad \sqrt[3]{81} \quad e) \quad \sqrt[3]{80} \quad f) \quad \sqrt[3]{432}}$$

$$\mathbf{d) \quad \sqrt[3]{\underline{3 \times 3 \times 3 \times 3}}}$$

$$3^3 \sqrt{3}$$

$$\mathbf{e) \quad \sqrt[3]{\underline{2 \times 2 \times 2 \times 2 \times 5}}}$$

$$2^3 \sqrt{2 \times 5}$$

$$2^3 \sqrt{10}$$

$$\mathbf{f) \quad \sqrt[3]{\underline{2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3}}}$$

$$2 \times 3^3 \sqrt{2}$$

$$6^3 \sqrt{2}$$

Write $3\sqrt{12}$ as an entire radical

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

$$\sqrt{12 \times 3 \times 3}$$

$$\sqrt{108}$$

Write $2\sqrt[3]{6}$ as an entire radical

$$2\sqrt[3]{6}$$

$$\sqrt[3]{6 \times 2 \times 2 \times 2}$$

$$\sqrt[3]{48}$$

Write $4\sqrt[4]{3}$ as an entire radical

$$4\sqrt[4]{3}$$
$$\sqrt[4]{3 \times 4 \times 4 \times 4 \times 4}$$
$$\sqrt[4]{768}$$



$$4\sqrt[4]{3}$$
$$\sqrt[4]{3 \times 256}$$
$$\sqrt[4]{768}$$

Try It Yourself!!!

a) $6\sqrt{2}$ b) $4\sqrt[3]{7}$ c) $3\sqrt[4]{11}$

Try It Yourself!!!

a) $6\sqrt{2}$

$$\sqrt{2 \times 6 \times 6}$$

$$\sqrt{72}$$

or $\sqrt{2 \times 36}$

$$\sqrt{72}$$

b) $4\sqrt[3]{7}$

$$\sqrt[3]{7 \times 4 \times 4 \times 4}$$

$$\sqrt[3]{448}$$

$$\sqrt[3]{64 \times 7}$$

$$\sqrt[3]{448}$$

c) $3\sqrt[4]{11}$

$$\sqrt[4]{11 \times 3 \times 3 \times 3 \times 3}$$

$$\sqrt[4]{891}$$

$$\sqrt[4]{11 \times 81}$$

$$\sqrt[4]{891}$$