

**Mixed  
&  
Entire  
Radicals !!**

## Mixed Radical

$$2\sqrt{3}$$

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

## Entire Radical

$$\sqrt{54}$$

Everything is  
**entirely** under the  
radical sign.

Calculate  $\sqrt{75}$

**What do you notice?**

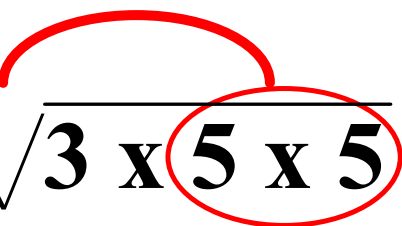
**Your answer is irrational,  
therefore lets simplify!!!**

**Simplify**  $\sqrt{75}$

**Use Prime Factorization !!**

# Prime Factorization

Simplify  $\sqrt{75}$

$$\sqrt{75} \quad \sqrt{3 \times 5 \times 5}$$


$$5\sqrt{3}$$

# 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

**Hint:** 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**  $\sqrt{63}$

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

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

$$3\sqrt{7}$$

**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**  $\sqrt[3]{120}$

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

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

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

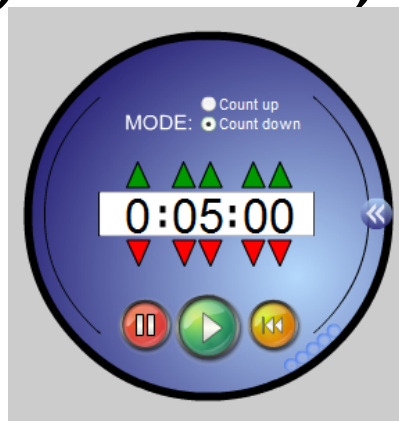
$$2\sqrt[3]{15}$$

# 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**

$$3\sqrt{12}$$

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

$$\sqrt{108}$$

**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**

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



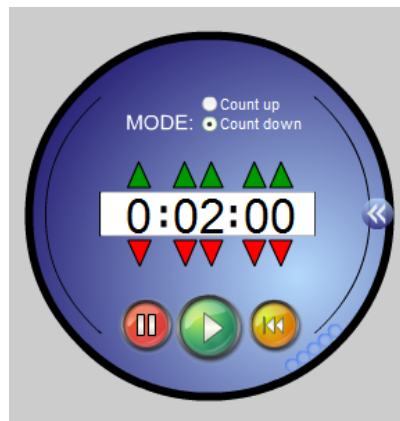
$$4\sqrt[4]{3}$$
$$\sqrt[4]{3 \times 256}$$
$$\sqrt[4]{768}$$

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

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

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

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

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