

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

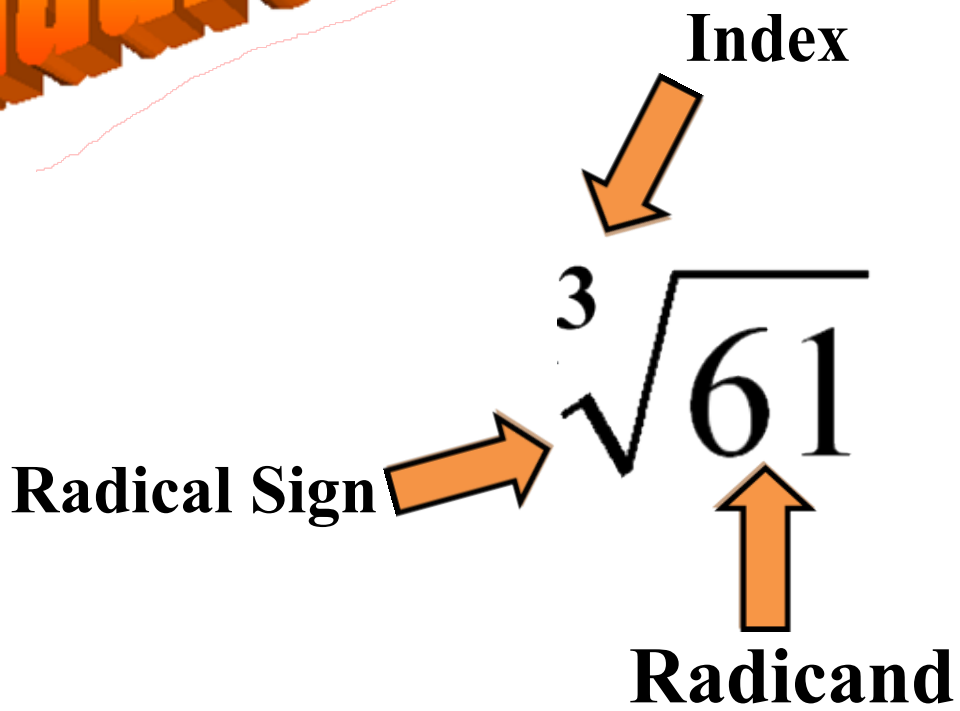
$$\sqrt[5]{243}$$

Roots & Powers



$$\left(\frac{1}{4}\right)^{-3}$$

Radicals



ERASE
FOR
ANSWERS

Let's Check Your Understanding!

1. What is the index of $\sqrt[5]{13}$
5
2. What is the radicand of $\sqrt[7]{24}$
24
3. Explain the meaning of the index.
The index tells us which root to take.
4. Write 2 as a square root, a cube root, and a fourth root.

$$\begin{aligned} 2^2 &= 4, & \sqrt{4} &= 2 \\ 2^3 &= 8, & \sqrt[3]{8} &= 2 \\ 2^4 &= 16, & \sqrt[4]{16} &= 2 \end{aligned}$$

**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 $\sqrt{75}$

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

What do you notice?

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

Simplify $\sqrt{75}$

Use Prime Factorization !!

Prime Factorization

Simplify $\sqrt{75}$

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

$$5\sqrt{3}$$

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) $\sqrt{147}$

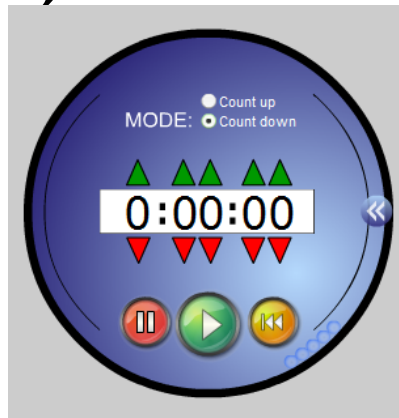
b) $\sqrt{80}$

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

$7\sqrt{2}$

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

$$\text{d) } \sqrt[3]{\underbrace{3 \times 3 \times 3}_{\text{circled}} \times 3}$$

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

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

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

$$3 \text{ —}$$

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

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

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

$$3 \text{ —}$$

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

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

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

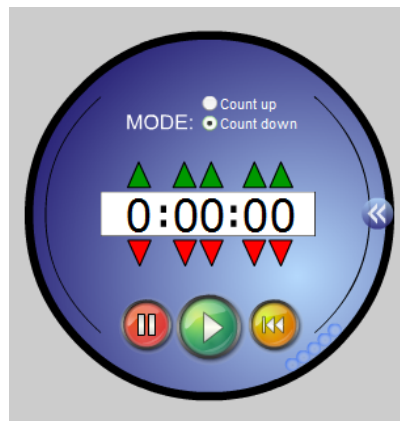
$$\frac{4\sqrt[4]{3} \cdot \sqrt[4]{3 \times 4^4}}{\sqrt[4]{3 \times 256}}$$
$$\sqrt[4]{768}$$

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

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

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

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

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

Pg. 218

#4 a,b,c,d

#5 a,b,c,d

#11 e,f,g,h

#12 e,f,g,h

#14, #15, #17

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

$$25 \times 5 = 125$$

$$\sqrt{125}$$

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

$$5\sqrt{5}$$

