

## Simplifying Radicals

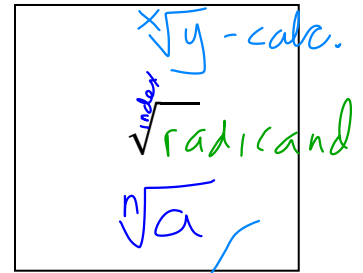
Radicand: **Monomial under radical**

Index: **Little number in the check mark that tells what root to take**

Square root: **Index is 2. Find 2 factors that are same and take one of them**

Cube root: **Index is 3. Find 3 factors that are same & take one of them**

Other roots: **Index is n. Find n factors that are same & take one of them**



What makes a radical simplified? **No more same factors, if square root — no more perfect squares**

Steps for simplifying radicals:

- ① factor to prime #'s
- ② find same # of factors that = index
- ③ bring one of those factors out
- ④ mult  $1/5$  &  $8/5$

Examples:

$$\sqrt{120} = 2\sqrt{30}$$

Handwritten prime factorization of 120:  $2 \cdot 2 \cdot 2 \cdot 3 \cdot 5$ . The first 2 is circled in pink. An arrow points from the circled 2 to the coefficient 2 in the simplified radical. The remaining factors  $2 \cdot 3 \cdot 5 = 30$  are under the radical.

## Simplifying Radicals

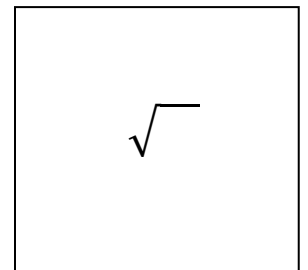
Radicand:

Index:

Square root:

Cube root:

Other roots:



What makes a radical simplified?

Steps for simplifying radicals:

Examples:

## Complex (Imaginary) Numbers

$$\sqrt{-1} = i$$

\*\*\*Remember\*\*\*: pull negative out before you simplify

Examples:

$$\sqrt{-12} = \sqrt{4 \cdot 3 \cdot -1} = 2i\sqrt{3}$$

$$i = \sqrt{-1}$$

$$i^2 = -1$$
$$\sqrt{-1} \cdot \sqrt{-1} = \sqrt{-1 \cdot -1} = -1$$

$$i^3 = -i$$
$$i^2 \cdot i = -1 \cdot i = -i$$

$$i^4 = 1$$
$$i^2 \cdot i^2 = -1 \cdot -1 = 1$$

## Complex (Imaginary) Numbers

$$\sqrt{-1} = i$$

\*\*\*Remember\*\*\*: pull negative out before you simplify

Examples:

$$i = \sqrt{-1}$$

$$i^2 =$$

$$i^3 =$$

$$i^4 =$$