

Objective

- **Orally justify** your **sorting and labeling of properties of radicals** using the key words common, exponent and base, n th root, principal n th root, radical expression, index, and radicand in a group.
 - A) Using a graphic organizer to sort
 - B) Using sentence frames with word bank
 - C) Using examples from the exponent rules
- **Success Criteria**
 - Define n th root and corresponding vocabulary
 - Identify common features in exponent and radical properties
 - Brainstorm examples of radical properties with numbers
- **Vocabulary:** common, exponent and base, n th root, principal n th root, radical expression, index, radicand

Definition: Real n th Root of a Real Number

Let n be an integer greater than 1 and a and b real numbers.

1. If $b^n = a$, then b is the **n th root** of a .
2. If a has an n th root, the **principal n th root** of a is the n th root having the same sign as a .

$$\sqrt{4} = \pm 2$$

$$\sqrt[3]{8} = 2$$

The principal n th root of a is denoted by the **radical expression** $\sqrt[n]{a}$.

$\sqrt{\quad}$ radical

The positive integer n is the **index** of the radical and a is the **radicand**.



Sort and Label

- You will receive cards with the 7 properties we have learned so far and 6 new properties involving radicals.
- Your task is to match properties you think correspond to one another (act the same). Use the key vocabulary words and sentence frames to guide your discussion.
- Hint: Not every property has a match, so you can decide that it belongs by itself.
- Once you've matched the properties, give the property a name your partner and you agree on.
- When you're done, let your teacher know.

Let u and v be real numbers, variables, or algebraic expressions, and m and n be positive integers greater than 1. We assume that all of the roots are real numbers and all of the denominators are not zero.

Property	Example
1. $\sqrt[n]{uv} = \sqrt[n]{u} \cdot \sqrt[n]{v}$	$\sqrt{75} =$
2. $\sqrt[n]{\frac{u}{v}} = \frac{\sqrt[n]{u}}{\sqrt[n]{v}}$	$\frac{\sqrt[4]{96}}{\sqrt[4]{6}} =$
3. $\sqrt[m]{\sqrt[n]{u}} = \sqrt[m \cdot n]{u}$	$\sqrt{\sqrt[3]{7}} =$
4. $(\sqrt[n]{u})^n = u$	$(\sqrt[4]{5})^4 =$
5. $\sqrt[n]{u^m} = (\sqrt[n]{u})^m$	$\sqrt[3]{27^2} =$
6. $\sqrt[n]{u^n} = \begin{cases} u & n \text{ is even} \\ u & n \text{ is odd} \end{cases}$	$\sqrt{(-6)^2} =$ $\sqrt[3]{(-6)^3} =$