

Algebra 1 - Unit 8
Simplifying Cube Roots NOTES

When we raise a number to the third power, we cube that number. Cubing a number means to multiply the number by itself. The cube of an integer is called a perfect cube.

If $x^3 = 8$, then $x^3 = 2 \cdot 2 \cdot 2$ and $x = 2$

If $x^3 = 64$, then $x^3 = 4 \cdot 4 \cdot 4$, and $x = 4$.

Simplifying cube root expressions without using decimals

- Factor the radicand using a factor tree
- Circle "three-of-a-kind" of numbers
- Remove the three-of-a-kind from under the radical and place a "representative" of each three-of-a-kind outside of the radical
- Multiply numbers on the outside of the radical to simplify

Examples

$\sqrt[3]{8}$ → perfect cube

$\sqrt[3]{8}$ factor tree: 8 → 4, 2 → 2, 2. Three 2s circled. Result: 2 (the cube root of 8).

$\sqrt[3]{32}$ factor tree: 32 → 2, 16 → 2, 8 → 2, 4 → 2, 2. Three 2s circled. Result: $2\sqrt[3]{4}$.

Practice

$\sqrt[3]{16}$ factor tree: 16 → 4, 4 → 2, 2, 2. Three 2s circled. Result: $2\sqrt[3]{2}$.

$\sqrt[3]{24}$ factor tree: 24 → 2, 12 → 2, 6 → 2, 3. Three 2s circled. Result: $2\sqrt[3]{3}$.

$\sqrt[3]{54}$ factor tree: 54 → 2, 27 → 3, 9 → 3, 3. Three 3s circled. Result: $3\sqrt[3]{2}$.

