Section 7.2- Cube Roots
Concept #21

Essential Question How is the cube root of a number different from the square root of a number?

When you multiply a number by itself twice, you cube the number.

Symbol for cubing is the exponent 3.

$4^3 = 4 \bullet 4 \bullet 4$
$= 64$

4 cubed is 64.

To "undo" this, take the *cube root* of the number.

Symbol for cube root is $\sqrt[3]{\ }$.

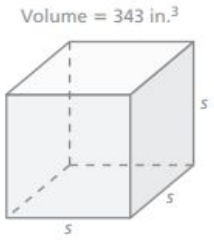
$\sqrt[3]{64} = \sqrt[3]{4^3} = 4$

The cube root of 64 is 4.

Use a cube root symbol to write the side length of each cube. Then find the Cube root. Check your answer.

EXAMPLE 1

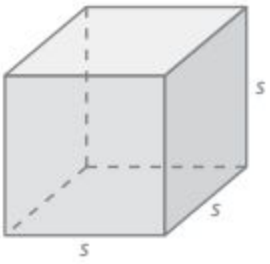
a. Sample: $s = \sqrt[3]{343} = \sqrt[3]{7^3} = 7$ inches



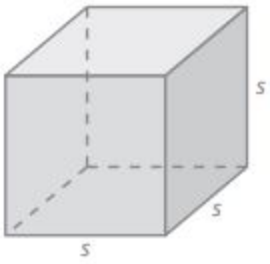
Check
$7 \bullet 7 \bullet 7 = 49 \bullet 7$
$= 343$ ✓

The edge length of the cube is 7 inches.

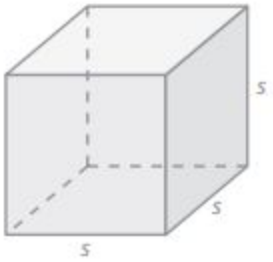
b. Volume = 27 ft^3



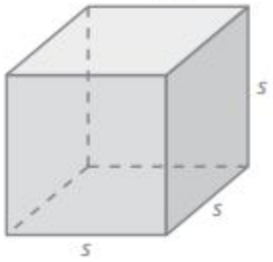
c. Volume = 125 m^3



d. Volume = $0.001\ cm^3$



e. Volume = $\frac{1}{8}\ yd^3$



A **cube root** of a number is a number that, when multiplied by itself, and then multiplied by itself again, equals the given number. A **perfect cube** is a number that can be written as the cube of an integer. The symbol $\sqrt[3]{\ }$ is used to represent a cube root.

EXAMPLE 2

Find the cube root.

1. $\sqrt[3]{1}$ **2.** $\sqrt[3]{-343}$ **3.** $\sqrt[3]{-\frac{27}{1000}}$

Cubing a positive number and finding the cube root are inverse operations. You can use this relationship to evaluate expressions and solve equations involving cubes.

EXAMPLE 3

Evaluate the expression.

4. $18 - 4\sqrt[3]{8}$ **5.** $\left(\sqrt[3]{-64}\right)^3 + 43$ **6.** $5\sqrt[3]{512} - 19$