

8.EE.A.2: Use square root and cube root symbols to represent solutions to equations of the form  $x^2 = p$  and  $x^3 = p$ , where  $p$  is a positive rational number. Know that  $\sqrt{2}$  is irrational.  
 a. Evaluate square roots of perfect squares less than or equal to 225.  
 b. Evaluate cube roots of perfect cubes less than or equal to 1000.

Learning Target: I can

Questions:

What is the inverse operation of cubing a number?

Notes:

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

Symbol for cubing is the exponent 3.

$$4^3 = 4 \cdot 4 \cdot 4 = 64$$

4 cubed is 64.

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

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

$$\sqrt[3]{64} = \sqrt[3]{4^3} = 4 \quad \text{The cube root of 64 is 4.}$$

What is a cube root?

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

What is a perfect cube?

perfect cube is a number that can be written as the cube of an integer. The symbol \_\_\_\_\_ is used to represent a cube root.

1 Finding Cube Roots

Find each cube root.

a.  $\sqrt[3]{8}$

Because  $\square = 8$ ,  $\sqrt[3]{8} = \square = \square$

b.  $\sqrt[3]{-27}$

Because  $(\square)^3 = -27$ ,  $\sqrt[3]{-27} = \square = \square$

c.  $\sqrt[3]{\frac{1}{64}}$

Because  $\square = \frac{1}{64}$ ,  $\sqrt[3]{\frac{1}{64}} = \square = \square$

On Your Own

Find the cube root.

1.  $\sqrt[3]{1}$

2.  $\sqrt[3]{-343}$

3.  $\sqrt[3]{-\frac{27}{1000}}$

Questions:

Notes:

## 2 Evaluating Expressions Involving Cube Roots

Evaluate each expression.

a.  $2\sqrt[3]{-216} - 3 = 2(\text{---}) - 3$

Evaluate the cube root.

$= \text{---} - 3$

Multiply.

$= \text{---}$

Subtract.

b.  $(\sqrt[3]{125})^3 + 21 = \text{---} + 21$

Evaluate the power using inverse operations.

$= \text{---}$

Add.

### On Your Own

Evaluate the expression.

4.  $18 - 4\sqrt[3]{8}$

5.  $(\sqrt[3]{-64})^3 + 43$

6.  $5\sqrt[3]{512} - 19$

## 3 Evaluating an Algebraic Expression

Evaluate  $\frac{x}{4} + \sqrt[3]{\frac{x}{3}}$  when  $x = 192$ .

$\frac{x}{4} + \sqrt[3]{\frac{x}{3}} = \frac{\text{---}}{4} + \sqrt[3]{\frac{\text{---}}{3}}$

$\text{---}$  192 for  $x$ .

$= \text{---} + \sqrt[3]{\text{---}}$

Simplify.

$= \text{---} + \text{---}$

Evaluate the cube root.

$= \text{---}$

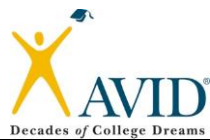
Add.

### On Your Own

Evaluate the expression for the given value of the variable.

7.  $\sqrt[3]{8y} + y, y = 64$

8.  $2b - \sqrt[3]{9b}, b = -3$



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- a. Evaluate square roots of perfect squares less than or equal to 225.  
b. Evaluate cube roots of perfect cubes less than or equal to 1000.

**Find the cube root.**

1 6.  $\sqrt[3]{729}$

7.  $\sqrt[3]{-125}$

8.  $\sqrt[3]{-1000}$

9.  $\sqrt[3]{1728}$

10.  $\sqrt[3]{-\frac{1}{512}}$

11.  $\sqrt[3]{\frac{343}{64}}$

**Evaluate the expression.**

2 12.  $18 - (\sqrt[3]{27})^3$

13.  $(\sqrt[3]{-\frac{1}{8}})^3 + 3\frac{3}{4}$

14.  $5\sqrt[3]{729} - 24$

15.  $\frac{1}{4} - 2\sqrt[3]{-\frac{1}{216}}$

16.  $54 + \sqrt[3]{-4096}$

17.  $4\sqrt[3]{8000} - 6$

**Evaluate the expression for the given value of the variable.**

3 18.  $\sqrt[3]{\frac{n}{4}} + \frac{n}{10}, n = 500$

19.  $\sqrt[3]{6w} - w, w = 288$

20.  $2d + \sqrt[3]{-45d}, d = 75$

**M7 L3 Cube Roots Exit Ticket** Name: \_\_\_\_\_ Cohort: \_\_\_\_\_

**Find the cube root.**

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

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

3.  $\sqrt[3]{-64}$

4.  $\sqrt[3]{-\frac{125}{216}}$

**Evaluate the expression.**

5.  $10 - (\sqrt[3]{12})^3$

6.  $2\sqrt[3]{512} + 10$