# **Cube Root of Product of Integers**

#### **Understanding the Concept**

- The cube root of the product of integers can be found by taking the cube root of each integer separately.
- If numbers are multiplied together their cube roots can also be multiplied.
- Formula used is  $\sqrt[3]{a \times b} = \sqrt[3]{a} \times \sqrt[3]{b}$ .
- This property makes calculation easier especially when numbers are perfect cubes.
- Works for both positive and negative integers.

## **Important Points**

- If both integers are positive the result is positive
- If one integer is negative the result is negative
- If both integers are negative their product is positive
- Useful for simplifying cube root expressions quickly
- Helps in solving bigger problems involving multiplication and cube roots

## **Examples with Solutions**

#### **Example Easy Level**

$$\succ$$
 Find  $\sqrt[3]{8 \times 27}$ 

**Solution:**  $\sqrt[3]{8} \times \sqrt[3]{27} = 2 \times 3 = 6$ 

## **Example Easy Level**

 $\succ$  Find  $\sqrt[3]{1 \times 125}$ 

**Solution:**  $\sqrt[3]{1} \times \sqrt[3]{125} = 1 \times 5 = 5$ 

## **Example Moderate Level**

 $\succ$  Find  $\sqrt[3]{64 \times 343}$ 

**Solution:**  $\sqrt[3]{64} \times \sqrt[3]{343} = 4 \times 7 = 28$ 

## **Example Moderate Level**

> Find  $\sqrt[3]{216 \times 8}$ 

**Solution**:  $\sqrt[3]{216} \times \sqrt[3]{8} = 6 \times 2 = 12$ 

#### **Example Word Problem**

Find the cube root of the volume obtained by multiplying volumes 27 cubic meters and 125 cubic meters

**Solution**:  $\sqrt[3]{27 \times 125} = \sqrt[3]{3375}$ 

 $\sqrt[3]{3375} = \sqrt[3]{27} \times \sqrt[3]{125} = 3 \times 5 = 15$  meters

#### **Summary Points**

- Cube root of a product = product of cube roots.
- Works for positive and negative integers.
- Useful when numbers are perfect cubes.
- Simplifies large cube root calculations.
- Apply  $\sqrt[3]{a \times b} = \sqrt[3]{a} \times \sqrt[3]{b}$  for easy solving.