

Cubes & Cube Roots Practice Questions

Difficulty Level: Easy → Challenging

1. Basic Cube Calculation

Question: Find the cube of 5.

Solution:

$$5^3 = 5 \times 5 \times 5 = \boxed{125}$$

2. Cube of a Negative Number

Question: Calculate $(-4)^3$.

Solution:

$$(-4)^3 = (-4) \times (-4) \times (-4) = \boxed{-64}$$

Note: Cubes of negative numbers are negative.

3. Cube Root of a Perfect Cube

Question: Evaluate $\sqrt[3]{216}$.

Solution:

$$6 \times 6 \times 6 = 216 \quad \Rightarrow \quad \sqrt[3]{216} = \boxed{6}$$

4. Cube Root of a Fraction

Question: Find $\sqrt[3]{\frac{8}{27}}$.

Solution:

$$\sqrt[3]{\frac{8}{27}} = \frac{\sqrt[3]{8}}{\sqrt[3]{27}} = \frac{2}{3} = \boxed{\frac{2}{3}}$$

5. Word Problem (Volume)

Question: A cube-shaped box has a side length of 3 cm. Calculate its volume.

Solution:

$$\text{Volume} = \text{side}^3 = 3^3 = \boxed{27 \text{ cm}^3}$$

6. Estimating Cube Roots (Non-Perfect Cube)

Question: Estimate $\sqrt[3]{50}$ to the nearest whole number.

Solution:

$$3^3 = 27 \quad \text{and} \quad 4^3 = 64$$

$$\text{Since } 27 < 50 < 64, \quad \sqrt[3]{50} \approx \boxed{4}$$

Note: 50 is closer to 64 than 27.

7. Solving Equations with Cubes

Question: Solve for x : $x^3 = 343$.

Solution:

$$x = \sqrt[3]{343} = \boxed{7}$$

8. Comparing Cubes

Question: Which is larger: 2^3 or 3^2 ?

Solution:

$$2^3 = 8 \quad \text{vs} \quad 3^2 = 9$$

3^2 is larger.

9. Cube Root of a Decimal

Question: Find $\sqrt[3]{0.125}$.

Solution:

$$0.5 \times 0.5 \times 0.5 = 0.125 \quad \Rightarrow \quad \sqrt[3]{0.125} = \boxed{0.5}$$

9. Cube Root of a Decimal

Question: Find $\sqrt[3]{0.125}$.

Solution:

$$0.5 \times 0.5 \times 0.5 = 0.125 \quad \Rightarrow \quad \sqrt[3]{0.125} = \boxed{0.5}$$

10. Challenging Word Problem

Question: A number's cube is $\frac{64}{125}$. What is the number?

Solution:

$$\sqrt[3]{\frac{64}{125}} = \frac{\sqrt[3]{64}}{\sqrt[3]{125}} = \frac{4}{5} = \boxed{\frac{4}{5}}$$

Key Concepts to Remember

1. **Cubes:** $a^3 = a \times a \times a$.

2. **Cube Roots:** $\sqrt[3]{b} = a$ if $a^3 = b$.

3. **Sign Rules:**

- Positive cubes \rightarrow Positive result.
- Negative cubes \rightarrow Negative result.

4. **Perfect Cubes:** Memorize $1^3 = 1$ to $10^3 = 1000$.