

General instructions for Students: Whatever be the notes provided, everything must be copied in the Maths copy and then do the HOMEWORK in the same copy.

If the volume of a cube is  $8 \text{ cm}^3$ . What would be the length of its side?

We know that

$$\text{Volume of a cube} = (\text{side})^3$$

Let the length of side of a cube be  $a \text{ cm}$ , then

$$8 = a^3$$

$$\Rightarrow a = \sqrt[3]{8}$$

$$\Rightarrow a = 2 \text{ cm.}$$

**NOTE:** The cube root of a number  $n$  is that number which when multiplied by itself three times gives  $n$  as the product.

**EXERCISE – 4.2**

**Cube root of a number by prime factorisation method**

**Q. No. 1(i)** Find the cube root of 12167 by prime factorisation.

**Solution:**  $12167 = (23 \times 23 \times 23)$

$$\sqrt[3]{12167} = 23$$

Hence, Cube root of 12167 is **23. Ans.**

23	12167
23	529
23	23
	1

**Q. No. 1(iv)** Find the cube root of 157464 by prime factorisation.

**Solution:**  $157464 = (2 \times 2 \times 2) \times (3 \times 3 \times 3) \times (3 \times 3 \times 3) \times (3 \times 3 \times 3)$

$$\sqrt[3]{157464} = 2 \times 3 \times 3 \times 3 = 54$$

Hence, Cube root of 157464 is **54. Ans.**

2	157464
2	78732
2	39366
3	19683
3	6561
3	2187
3	729
3	243
3	81
3	27
3	9
3	3
	1

### Cube root of a number through estimation

**Q.No.2 (ii) Find cube root of 59319 through estimation.**

**Solution:** Given a cube number 59319.

Form groups of three digits starting from the rightmost digit of the number.



First group 319.

Since, the unit digit is 9,

Therefore, **the unit digit** of the cube root of 59319 is **9**.

If a number has 1, 4, 5, 6 or 9 in the unit place, then its cube also ends with same digits.

Second group 59

3 is the largest number whose cube is less than or equal to 59 ( $3^3 < 59 < 4^3$ )

Therefore, **the ten's digit** of the cube root of 59319 is **3**

Hence,  $\sqrt[3]{59319} = 39$  Ans.

**Q.No.7 Multiply 6561 by the smallest number so that product is a perfect cube. Also find cube root of the product.**

**Solution:**  $6561 = (3 \times 3 \times 3) \times (3 \times 3 \times 3) \times 3 \times 3$

Since, 3 occurs twice after grouping in triplets.

Therefore, 6561 is not a perfect cube.

If we multiply 6561 by 3, then the prime factorisation of the product

$$6561 \times 3 = (3 \times 3 \times 3) \times (3 \times 3 \times 3) \times (3 \times 3 \times 3)$$

So, the req. smallest number is **3**. Ans.

The req. perfect cube is  $6561 \times 3 = 19683$

$$\text{Now, } \sqrt[3]{19683} = 3 \times 3 \times 3 = 27$$

Hence, Cube root of the product = **27** Ans.

3	6561
3	2187
3	729
3	243
3	81
3	27
3	9
3	3
	1

**Q.No.8** Divide the number 8748 by the smallest number so that the quotient is a perfect cube .Also find the cube root of the quotient.

**Solution:**  $8748 = 2 \times 2 \times 3 \times (3 \times 3 \times 3) \times (3 \times 3 \times 3)$

Since,  $2 \times 2 \times 3 (= 12)$  left after grouping in triplets

Therefore, 8748 is not a perfect cube.

If we divide 8748 by  $2 \times 2 \times 3 (= 12)$ , then the P.F. of the quotient

$$8748 \div 12 = (3 \times 3 \times 3) \times (3 \times 3 \times 3)$$

So, the req. smallest number is **12. Ans.**

The req. perfect cube is  $8748 \div 12 = 729$

Now,  $\sqrt[3]{729} = 3 \times 3 = 9$

Hence, Cube root of the quotient = **9 Ans.**

2	8748
2	4374
3	2187
3	729
3	243
3	81
3	27
3	9
3	3
	1

\*\*\*\*\*x\*\*\*\*\*

### **HOMEWORK**

#### **EXERCISE – 4.2**

**QUESTION NUMBERS – 1 (ii), (v), (vii) and 2 (i), (ii)**