CLASS VIII: Maths
Chapter 6: Cubes and Cube Roots

Questions and Solutions | Exercise 6.1 - NCERT Books

Q 1. Which of the following numbers are notperfect cubes?

(i) 216

(ii) 128

(iii) 1000

(iv) 100

(v) 46656

Answer :

(i) The prime factorisation of 216 is as follows.

2	216
2	108
2	54
3	27
3	9
3	3
	1

$216 = \underline{2 \times 2 \times 2} \times \underline{3 \times 3 \times 3} = 2^3 \times 3^3$

Here, as each prime factor is appearing as many times as a perfect multiple of 3, therefore, 216 is a perfect cube.

(ii)The prime factorisation of 128 is as follows.

2	128

2	64
2	32
2	16
2	8
2	4
2	2
	1

$128 = \underline{2 \times 2 \times 2} \times \underline{2 \times 2 \times 2} \times 2$

Here, each prime factor is not appearing as many times as a perfect multiple of 3. One 2 is remaining after grouping the triplets of 2. Therefore, 128 is not a perfect cube.

(iii) The prime factorisation of 1000 is as follows.

2	1000
2	500
2	250
5	125
5	25
5	5
	1

$1000 = \underline{2 \times 2 \times 2} \times \underline{5 \times 5 \times 5}$

Here, as each prime factor is appearing as many times as a perfect multiple of 3, therefore, 1000 is a perfect cube.

(iv)The prime factorisation of 100 is as follows.

2	100
2	50
5	25
5	5
	1

100 = 2 × 2 × 5 × 5

Here, each prime factor is not appearing as many times as a perfect multiple of 3. Two 2s and two 5s are remaining after grouping the triplets. Therefore, 100 is not a perfect cube.

(v)The prime factorisation of 46656 is as follows.

2	46656
2	23328
2	

Q2 :

Find the smallest number by which each of the following numbers must be multiplied to obtain a perfect cube.

(i) 243

(ii) 256

(iii) 72

(iv) 675

(v) 100

Answer :

(i) 243 = $\underline{3 \times 3 \times 3} \times 3 \times 3$

Here, two 3s are left which are not in a triplet. To make 243 a cube, one more 3 is required.

In that case, 243 x 3 = $\underline{3 \times 3 \times 3} \times \underline{3 \times 3 \times 3}$ = 729 is a perfect cube.

Hence, the smallest natural number by which 243 should be multiplied to make it a perfect cube is 3.

(ii) 256 = $\underline{2 \times 2 \times 2} \times \underline{2 \times 2 \times 2} \times 2 \times 2$

Here, two 2s are left which are not in a triplet. To make 256 a cube, one more 2 is required.

Then, we obtain

256 x 2 = $\underline{2 \times 2 \times 2} \times \underline{2 \times 2 \times 2} \times \underline{2 \times 2 \times 2}$ = 512 is a perfect cube.

Hence, the smallest natural number by which 256 should be multiplied to make it a perfect cube is 2.

(iii) 72 = $\underline{2 \times 2 \times 2} \times 3 \times 3$

Here, two 3s are left which are not in a triplet. To make 72 a cube, one more 3 is required.

Then, we obtain

72 x 3 = $\underline{2 \times 2 \times 2} \times \underline{3 \times 3 \times 3}$ = 216 is a perfect cube.

Hence, the smallest natural number by which 72 should be multiplied to make it a perfect cube is 3.

(iv) 675 = $\underline{3 \times 3 \times 3} \times 5 \times 5$

Here, two 5s are left which are not in a triplet. To make 675 a cube, one more 5 is required.

Then, we obtain

675 x 5 = $\underline{3 \times 3 \times 3} \times \underline{5 \times 5 \times 5}$ = 3375 is a perfect cube.

Hence, the smallest natural number by which 675 should be multiplied to make it a perfect cube is 5.

(v) 100 = 2 x 2 x 5 x 5

Here, two 2s and two 5s are left which are not in a triplet. To make 100 a cube, we require one more 2 and one more 5.

Then, we obtain

100 x 2 x 5 = $\underline{2 \times 2 \times 2}$ x $\underline{5 \times 5 \times 5}$ = 1000 is a perfect cube

Hence, the smallest natural number by which 100 should be multiplied to make it a perfect cube is 2 x 5 = 10.

Q3 :

Find the smallest number by which each of the following numbers must be divided to obtain a perfect cube.

(i) 81

(ii) 128

(iii) 135

(iv) 192

(v) 704

Answer :

(i) 81 = $\underline{3 \times 3 \times 3}$ x 3

Here, one 3 is left which is not in a triplet.

If we divide 81 by 3, then it will become a perfect cube.

Thus, 81 ÃƒÂ· 3 = 27 = $\underline{3 \times 3 \times 3}$ is a perfect cube.

Hence, the smallest number by which 81 should be divided to make it a perfect cube is 3.

(ii) 128 = $\underline{2 \times 2 \times 2}$ x $\underline{2 \times 2 \times 2}$ x 2

Here, one 2 is left which is not in a triplet.

If we divide 128 by 2, then it will become a perfect cube.

Thus, 128 ÃƒÂ· 2 = 64 = 2 x 2 x 2 x 2 x 2 x 2 is a perfect cube.

Hence, the smallest number by which 128 should be divided to make it a perfect cube is 2.

(iii) 135 = 3 x 3 x 3 x 5

Here, one 5 is left which is not in a triplet.

If we divide 135 by 5, then it will become a perfect cube.

Thus, 135 ÃƒÂ· 5 = 27 = 3 x 3 x 3 is a perfect cube.

Hence, the smallest number by which 135 should be divided to make it a perfect cube is 5.

(iv) 192 = 2 x 2 x 2 x 2 x 2 x 2 x 3

Here, one 3 is left which is not in a triplet.

If we divide 192 by 3, then it will become a perfect cube.

Thus, 192 ÃƒÂ· 3 = 64 = 2 x 2 x 2 x 2 x 2 x 2 is a perfect cube.

Hence, the smallest number by which 192 should be divided to make it a perfect cube is 3.

(v) 704 = 2 x 2 x 2 x 2 x 2 x 2 x 11

Here, one 11 is left which is not in a triplet.

If we divide 704 by 11, then it will become a perfect cube.

Thus, 704 ÃƒÂ· 11 = 64 = 2 x 2 x 2 x 2 x 2 x 2 is a perfect cube.

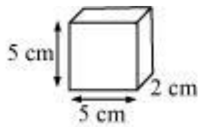
Hence, the smallest number by which 704 should be divided to make it a perfect cube is 11.

Q4 :

Parikshit makes a cuboid of plasticine of sides 5 cm, 2 cm, 5 cm. How many such cuboids will he need to form a cube?

Answer :

Here, some cuboids of size 5 x 2 x 5 are given.



When these cuboids are arranged to form a cube, the side of this cube so formed will be a common multiple of the sides (i.e., 5, 2, and 5) of the given cuboid.

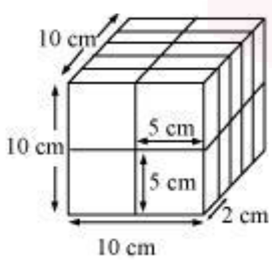
LCM of 5, 2, and 5 = 10

Let us try to make a cube of 10 cm side.

For this arrangement, we have to put 2 cuboids along with its length, 5 along with its width, and 2 along with its height.

Total cuboids required according to this arrangement = 2 x 5 x 2 = 20

With the help of 20 cuboids of such measures, a cube is formed as follows.



Alternatively

Volume of the cube of sides 5 cm, 2 cm, 5 cm

= 5 cm x 2 cm x 5 cm = (5 x 5 x 2) cm^3

Here, two 5s and one 2 are left which are not in a triplet.

If we multiply this expression by 2 x 2 x 5 = 20, then it will become a perfect cube.

Thus, (5 x 5 x 2 x 2 x 2 x 5) = ($\underline{5 \times 5 \times 5}$ x $\underline{2 \times 2 \times 2}$) = 1000 is a perfect cube. Hence, 20 cuboids of 5 cm, 2 cm, 5 cm are required to form a cube.