

NCERT SOLUTIONS OF Cube Roots

Exercise 1

Question 1

Which of the following numbers are not perfect cubes?

- (i) 216
- (ii) 128
- (iii) 1000
- (iv) 100
- (v) 46656

Answer:

i) Converting the number into common factors

$$\begin{aligned}216 &= 2 \times 2 \times 2 \times 27 \\ &= 2 \times 2 \times 2 \times 3 \times 3 \times 3\end{aligned}$$

As number of 2s and 3s is 3 in the factorization so it is a perfect cube

Therefore

$$\sqrt[3]{216} = 2 \times 3 = 6$$

ii) $128 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$

Number of 2s is 7 and 7 is not divisible by three so 128 is not a perfect cube

iii) $1000 = 2 \times 2 \times 2 \times 5 \times 5 \times 5$

Number of 2s and 5s is 3 each so 1000 is a perfect cube.

Therefore

$$\sqrt[3]{1000} = 2 \times 5 = 10$$

iv) $100 = 2 \times 2 \times 5 \times 5$

Number of 2s and 5s is 2 each and not 3 so 100 is not a perfect cube.

v) 46656

$$= 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3$$

Number of 2s and 3s is 6 each and 6 is divisible by 3 so 46656 is a perfect cube

Therefore

$$\sqrt[3]{46656} = 2 \times 2 \times 3 \times 3 = 36$$

Question 2

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

Converting the number into common factors

i) $243 = 3 \times 3 \times 3 \times 3 \times 3$

Number of 3s is 5, so we need to another 3 in the factorization to make 243 a perfect cube. 243 multiplied by 3 will be a perfect cube.

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ii) $256 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$

Number of 2s is 8 so 256 needs to be multiplied by 2 to become a perfect cube.

iii) $72 = 2 \times 2 \times 2 \times 3 \times 3$

Number of 2s is 3 and that of 3s is 2, so 72 needs to be multiplied by 3 to become a perfect cube.

iv) $675 = 5 \times 5 \times 27 = 5 \times 5 \times 3 \times 3 \times 3$

675 needs to be multiplied by 5 to become a perfect cube.

v) $100 = 10 \times 10$

100 needs to be multiplied by 10 to become a perfect cube.

Question 3

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

Converting the number into common factors

i) $81 = 3 \times 3 \times 3 \times 3$

So we have 4 3's, Therefore

81 needs to be divided by 3 to become a perfect cube.

ii) $128 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$

So we have 7 2's, Therefore

128 needs to be divided by 2 to become a perfect cube.

iii) $135 = 5 \times 3 \times 3 \times 3$

So we have 1 5's and 3 3's Therefore

135 needs to be divide by 5 to become a perfect cube.

iv) $192 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3$

So we have 6 2's and 1 3's Therefore

192 needs to be divided by 3 to become a perfect cube.

v) $704 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 11$

So we have 6 2's and 1 11's Therefore

704 needs to be divided by 11 to become a perfect cube.

Question 4

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: The volume of the cuboid $= 2 \times 5 \times 5 \text{ cm}^3$

If we multiply this expression by $2 \times 2 \times 5$, The it become perfect cube.

Now Volume of cube is given by

$= a^3$ where a is the side of the cube

So that means we need $2 \times 2 \times 5 = 20$ cuboid to make the cube