Cubes and Cubes Roots Ex 4.3 Q7

Answer :

On factorising 8192 into prime factors, we get:

$8192 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$

On grouping the factors in triples of equal factors, we get:

$8192 = \{2 \times 2 \times 2\} \times \{2 \times 2 \times 2\} \times \{2 \times 2 \times 2\} \times \{2 \times 2 \times 2\} \times 2$

It is evident that the prime factors of 8192 cannot be grouped into triples of equal factors such that no factor is left over. Therefore, 8192 is not a perfect cube. However, if the number is divided by 2, the factors can be grouped into triples of equal factors such that no factor is left over.

Hence, the number 8192 should be divided by 2 to make it a perfect cube.

Also, the quotient is given as:

$\frac{8192}{2} = \frac{\{2\times2\times2\}\times\{2\times2\times2\}\times\{2\times2\times2\}\times\{2\times2\times2\}\times2}{2}$

$\Rightarrow 4096 = \{2 \times 2 \times 2\} \times \{2 \times 2 \times 2\} \times \{2 \times 2 \times 2\} \times \{2 \times 2 \times 2\}$

To get the cube root of the quotient 4096, take one factor from each triple. We get:

Cube root = $2 \times 2 \times 2 \times 2 = 16$

Hence, the required numbers are 2 and 16.

Cubes and Cubes Roots Ex 4.3 Q8

Answer :

Let the numbers be x, $2x$ and $3x$.

Therefore

$$x^3 + (2x)^3 + (3x)^3 = 98784$$
$$\Rightarrow x^3 + 8x^3 + 27^3 = 98784$$
$$\Rightarrow 36x^3 = 98784$$
$$\Rightarrow x^3 = \frac{98784}{36} = 2744$$
$$\Rightarrow x^3 = 2744$$
$$\Rightarrow x = \sqrt[3]{2744} = \sqrt[3]{\{2 \times 2 \times 2\} \times \{7 \times 7 \times 7\}} = 2 \times 7 = 14$$

Hence, the numbers are 14, $(2 \times 14 = 28)$ and $(3 \times 14 = 42)$.

Cubes and Cubes Roots Ex 4.3 Q9

Answer :

Volume of a cube is given by:
$V = s^3$, where s = Side of the cube

It is given that the volume of the cube is 9261000 m^3; therefore, we have:
$s^3 = 9261000$

Let us find the cube root of 9261000 using prime factorisation: $9261000 = 2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 5 \times 5 \times 5 \times 7 \times 7 \times 7 = \{2 \times 2 \times 2\} \times \{3 \times \times \{5 \times 5 \times 5\} \times \{7 \times 7 \times 7\}$

9261000 could be written as a triples of equal factors; therefore, we get:
Cube root = $2 \times 3 \times 5 \times 7 = 210$

Therefore

$s^3 = 9261000 \Rightarrow s = \sqrt[3]{9261000} = 210$

Hence, the length of the side of cube is 210 m.

********** END **********