Day 11 Sept 2020 Chapter-7

Cube and Cube Roots

Ex 7.1

Q1. Which of the following numbers are not perfect cubes:-

(i) 216

Sol.

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

$\Rightarrow 2 \times 2 \times 2 \times 3 \times 3 \times 3$

$216 = 2 \times 3 = (6)^3$

It's a perfect cube.

(ii) 128

2	128
2	64
2	32
2	16
2	8
2	4
2	2
	1

$\Rightarrow 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$

$\Rightarrow$ Here 2, is not a group of three.

Therefore, 128 is not a perfect cube.

(iii) 1000

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

$\Rightarrow 2 \times 2 \times 2 \times 5 \times 5 \times 5$

$\Rightarrow$ Here 2 and 5 are in groups of three.

Therefore, 1000 is a perfect cube.

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(iv) 100

Sol.

2	100
2	50
5	25
5	5
	1

$\Rightarrow 2 \times 2 \times 5 \times 5$

Here 100 cannot be grouped into triplets of equal factors.

Therefore, 100 is not a perfect cube.

(v) 46656

2	46656
2	23328
2	11664
2	5832
2	2916
2	1458
3	729
3	243
3	81
3	27
3	9
3	3
	1

$\Rightarrow 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3$

~~There~~ Here 2 and $2 \times 2 \times 3 \times 3 = 36$

$46656 = (36)^3$

Therefore 46656 is a perfect cube.

Q2. Find the smallest number by which each of the following numbers must be ~~mut~~ multiplied to obtain a perfect cube:-

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(i) 243

Sol.

3	243
3	81
3	27
3	9
3	3
	1

⇒ 3×3×3×3×3

Here, factor 3 is not in group of three.
Therefore, to make 243 as a perfect cube, we have to multiply by 3.
Smallest no = 3.

(ii) 256

2	256
2	128
2	64
2	32
2	16
2	8
2	4
2	2
	1

⇒ 2×2×2×2×2×2×2×2

⇒ Here factor of 2 is in group of three.
Therefore, to make 256 as a perfect cube, we have to multiply by 2.
Smallest no. = 2.

(iii) 72

2	72
2	36
2	18
3	9
3	3
	1

⇒ 2×2×2×3×3

Here factor 3 is not in a group of three. Therefore to make 72 as a perfect cube we have to multiply by 3. Smallest no = 3.

(iv) 675

3	675
3	225
3	75
5	25
5	5
	1

3×3×3×5×5

Here, factor 5 is not in a group of three. Therefore to make 675 as a perfect cube we have to multiply by 5. Smallest no = 5.

(v) 1000

2	1000
2	500
5	250
5	50
5	10
	2

⇒ 2×2×5×5×5

⇒ Here 2 and 5 cannot be grouped into triplets of equal factors.
We will multiply 1000 by (2×5=10) to get perfect cube.
Smallest no = 10.

Q3. Find the smallest number by which each of the following numbers must be divided to obtain a perfect cube.

(i) 81

Sol.

3	81
3	27
3	9
3	3
	1

⇒ Here, factor 3 is not in group of three.
Therefore the smallest no. by which we should be divided to make it a perfect cube is 3.

(ii) 128

Sol.

2	128
2	64
2	32
2	16
2	8
2	4
2	2
	1

⇒ Here factor 2 is not in group of three. Therefore, the smallest no. by which 128 should be divided to make it a perfect cube is 2.

(iii) 135

Sol.

3	135
3	45
3	15
5	5
	1

⇒ $3 \times 3 \times 3 \times 5$

⇒ Here factor of 5 is not in group of three. Therefore, the smallest no. by which 135 should be divided to make it a perfect cube is 5.

(iv) 192

Sol.

2	192
2	96
2	48
2	24
2	12
2	6
3	3
	1

⇒ $2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3$

⇒ Here factor 3 is not in group of three. Therefore the smallest no. by which 192 should be divided to make it a perfect cube is 3.

(v) 704

Sol.

2	704
2	352
2	176
2	88
2	44
2	22
11	11
	1

⇒ $704 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 11$

⇒ Here a factor of 11 is not in group of three. Therefore, the smallest no by which 704 should be divided to make it a perfect cube is 11.

Q4. Parikshit makes a ~~cuboid~~ cube of plasticine of sides 5 cm, 2 cm, 5 cm. How many such cuboid will he need to form a cube?

Sol. Given side of cube is 5 cm, 2 cm and 5 cm.

Vol. of cube $= 5 \times 2 \times 5 = 50$ cm

2	50
5	25
5	5
	1

Here 2, 5, 5 cannot be grouped into triplets of equal factors.

We will multiply 50 by $(2 \times 2 \times 5)$ 20 to get perfect cube. Hence, 20 cuboid is needed.

Day 12 Sept 2020

Chapter - 7

Exe - 7.2

Q1. Find the cube root of each of the following numbers by Prime Factorisation method.

(i) 64.

Sol

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

$\Rightarrow 2 \times 2 \times 2 \times 2 \times 2 \times 2$

$\sqrt[3]{64} = 2 \times 2$

$\sqrt[3]{64} = 4$

(ii) 512

2	512
2	256
2	128
2	64
2	32
2	16
2	8
2	4
2	2
	1

$\Rightarrow 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$

$\Rightarrow 2 \times 2 \times 2 = 8$

$\sqrt[3]{512} = 8.$

(iii) 10648

2	10648
2	5324
2	2662
11	1331
11	121
11	11
	1

$= \sqrt[3]{2 \times 2 \times 2 \times 11 \times 11 \times 11}$

$2 \times 11 = 22$

(iv) 27000

2	27000
2	13500
2	6750
3	3375
3	1125
3	375
5	125
5	25
5	5
	1

$\sqrt[3]{2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 5 \times 5 \times 5}$

$2 \times 3 \times 5 = 30$

(v) 15625

(v)

5	15625
5	3125
5	625
5	125
5	25
5	5
	1

$\sqrt[3]{5 \times 5 \times 5 \times 5 \times 5 \times 5}$

$5 \times 5 = 25$

(vi) 13824

2	13824
2	6912
2	3456
2	1728
2	864
2	432
2	216
2	108
2	54
3	27
3	9
3	3
	1

$\sqrt[3]{2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3}$

$2 \times 2 \times 2 \times 3 = 24$

(vii) 110592

2	110592
2	55296
2	27648
2	13824
2	6912
2	3456
2	1728
2	864
2	432
2	216
2	108
2	54
3	27
3	9
3	3
	1

3 | 2×2×2×2×2×2×2×2×2×3×3×3

$2 \times 2 \times 2 \times 3 = 48$

(viii) 46656

2	46656
2	23328
2	11664
2	5832
2	2916
2	1458
3	729
3	243
3	81
3	27

3	9
3	3
	1

3 | 2×2×3×2×2×2×3×3×3×3

$3 \times 3 \times 3$

$2 \times 2 \times 3 \times 3 \Rightarrow 36$

(ix) 175616

2	175616
2	87808
2	43904
2	21952
2	10976
2	5488
2	2744
2	1372
2	686
7	343
7	49
7	7
	1

$3\overline{)2\times2\times2\times2\times2\times2\times2\times2\times2\times7\times7\times7}$

$\Rightarrow 2\times2\times2\times7 = 56$

(x) 91125

3	91125
3	30375
3	10125
3	3375
3	1125
3	375
5	125
5	25
5	5
	1

$3\overline{)3\times3\times3\times3\times5\times5\times5}$

$\Rightarrow 3\times3\times5 = 45$

(x) 91125

2 State true or false:

(i) Cube of any odd number is even. False

(ii) A perfect cube does not end with two zeroes. True

(iii) If square of a number ends with 5, then its cube ends with 25. False

(iv) There is no perfect cube which ends with 8. False

(v) The cube of a two digit number may be a three digit number. False

(vi) The cube of a two digit number may have seven or more digits. False

(vii) The cube of a single digit number may be a single digit number. True

3 You are told that 1,331 is a perfect cube. Can you guess without factorisation

Q3. You are told that 1331 is a perfect cube. Can you guess without factorisation what is its cube root? Similarly guess the cube roots of 4913, 12167, 32768.

Sol $1^3 = 1$ $\quad 6^3 = 216$

$2^3 = 8$ $\quad 7^3 = 343$

$3^3 = 27$ $\quad 8^3 = 512$

$4^3 = 64$ $\quad 9^3 = 729$

$5^3 = 125$ $\quad 10^3 = 1000$

(i) $\sqrt[3]{1331} \Rightarrow 11$

$1^3 = 1$

$2^3 = 8$

(ii) $\sqrt[3]{4913} \Rightarrow 17$

$1^3 = 1, \; 2^3 = 8$

(iii) $\sqrt[3]{12167} \Rightarrow 23$

$1^3 = 1, \; 2^3 = 8, \; 3^3 = 27$

(iv) $\sqrt[3]{32768} \Rightarrow 32$

$1^3 = 1, \; 2^3 = 8, \; 3^3 = 27, \; 4^3 = 64$