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CHAPTER-4 CUBE AND CUBE-ROOTS

EXERCISE - 4 (A)

1-i- $7 - 7^3 = 7 \times 7 \times 7 = 343$ ii- $11 - 11^3 = 11 \times 11 \times 13 = 1,331$ iii- $16 - 16^3 = 16 \times 16 \times 16 = 4,096$

iv- $23 - 23^3 = 23 \times 23 \times 23 = 12,167$ v- $31 - 31^3 = 31 \times 31 \times 31 = 29,791$ vi- $42 - 42^{23} = 42 \times 42 \times 42$ 74,088

vii- $54 - 54^3 = 54 \times 54 \times 54 = 1,57,464$

2-i- 243

3	243
3	81
3	27
3	9
3	3
	1

243 = 3 x 3 x 3 x 3 x 3

no, 243 is not a perfect cube

ii 588 = 2 x 2 x 3 x 7 x 7

2	588
2	294
3	147
7	49
7	7
	1

no, 588 is not a perfect cube

iv- 1331

iv- 24,000

2	24,000
2	12,000
2	6,000
2	3,000
2	1,500
2	750
3	375
5	125
5	25
5	5
	1

24000 = 2 x 2 x 2 x 2 x 2 x 2 x 3 x 5 x 5 x 5

no, 24,000 is not a perfect cube

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v. 1728

2	1728
2	864
2	432
2	216
2	108
2	54
3	27
3	9
3	3
	1

$1728 = 2\times2\times2\times2\times2\times2\times3\times3\times3$

So, 1728 is a perfect cube

vi- 1938

2	1938
3	969
17	323
19	19
	1

$1938 = 2\times3\times17\times19$

So, 1938 is not a perfect cube

3-i- $2.1 - 2.1\times2.1\times2.1 = 9.261$ ii. $0.4 - 0.4\times0.4\times0.4 - 0.064$ iii. $1.6 - 1.6\times1.6\times1.6 - 4.096$

iv $2.5 - (2.5)^3 = 15.625$ v. $0.12 - (0.12)^3 - 0.001728$ vi. $0.02 - (0.02)^3 = 0.000008$

vii $0.8 \cdot (0.8)^3 - 0.8\times0.8\times0.8 - 0.512$

4-i- $\frac{3}{7}$ $= \left(\frac{3}{7}\right)^3 = \frac{3\times3\times3}{7\times7\times7} = \frac{27}{343}$

ii- $\frac{8}{9}$ $\left(\frac{8}{9}\right)^3 = \frac{8\times8\times8}{9\times9\times9} = \frac{512}{729}$

iii- $\frac{10}{13}$ $\left(\frac{10}{13}\right)^3 = \frac{10\times10\times10}{13\times13\times13} = \frac{1000}{2197}$

iv- $1\frac{2}{7} = \left(1\frac{2}{7}\right)^3 = \left(\frac{9}{7}\right)^3 = \frac{9\times9\times9}{7\times7\times7} = \frac{729}{343} = 2\frac{43}{343}$

v- $2\frac{1}{2} = \left(2\frac{1}{2}\right)^3 = \left(\frac{5}{2}\right)^3 = \frac{5\times5\times5}{2\times2\times2} = \frac{125}{8} = 15\frac{5}{8}$

5-i- $-3 - (-3)\times(-3)\times(-3) = -27$

ii- $-7 - (-7)\times(-7)\times(-7) = -343$

iii- $-12 - (-12)\times(-12)\times(-12) = -1728$

iv- $-18 - (-18)\times(-18)\times(-18) = -5,832$

v- $-25 - (-25)\times(-25)\times(-25) = -15625$

vi- $-30 - (-30)\times(-30)\times(-30) = -27,000$

vii- $-50 - (-50)\times(-50)\times(-50) = -1,25,000$

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

3	729
3	243
3	81
3	27
3	9
3	3
	1

3	3375
3	1125
3	375
5	125
5	25
5	5
	1

2	8000
2	4000
2	2000
2	1000
2	500
2	250
5	125
5	25
	5

5	125
5	25
5	5
	1

7	343
7	49
7	7
	1

2	4096
2	2048
2	1024
2	512
2	256
2	128
2	64
2	32
2	16
2	8
2	4
	2

3	9261
3	3087
3	1029
7	343
7	49
7	7
	1

i. 216, 8,000, 4,096 are the cubes of an even number

ii. 729, 3,375, 125, 343, 9,261 are the cubes of an odd number.

7. Find the least no. by which 1,323 must be multiplied so that the product is a perfect cube.

sol-

7	1,323
7	189
3	27
3	9
3	3
	1

On finding the prime factors of 1,323 we get: $1,323 = 7 \times 7 \times (3 \times 3 \times 3)$

Clearly 1,323 must be multiplied by 7

$1,323 \times 7 = 9261$

$9,261 - 3 \times 3 \times 3 \times 7 \times 7 \times 7 = (3 \times 7)(3 \times 7)(3 \times 7)$ $(21)^3$

Hence, we must be multiplied multiply 7.

8. Find the smallest no. by which 8768 must be divided so that the quotient is a perfect cube.

sol-

2	8768
2	4384
2	2192
2	1096
2	548
2	274
	137

On finding the prime factors of 8,768

cleanly 8,768 must be divided by 137

$\frac{8,768}{137} = 64$

$64 = 4 \times 4 \times 4$

Hence, we must divide 64.

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9. Find the smallest no. by which 27,783 be multiplied to get a perfect cube no.

Sol

3	27,783
3	9,261
3	3,087
3	1,029
7	343
7	49
7	7
	1

$27,783 = (3\times3\times3)\times(7\times7\times7)\times3$

$27,783 \times 9 = 2,50,047$

$2;50,047 \; (\overline{3\times3\times3})\times(\overline{3\times3\times3})\times(\overline{7\times7\times7})$

We, would multiply 9 to make 27,783 a perfect cube.

10. With what least no. must 8,640 be divided so that the quotient is a perfect cube.?

Sol.

2	8,640
2	4,320
2	2,160
2	1,080
2	540
2	270
3	135
3	45
3	15
5	5
	1

$8,640 = (2\times2\times2)\times(2\times2\times2)\times(3\times3\times3)\times5$

$\frac{8,640}{5} = 1728$

$1728 = (\overline{2\times2\times2})\times(\overline{2\times2\times2})\times(\overline{3\times3\times3})$

$\therefore$ We, would divide 5 to 8,640 that the quotient is a perfect cube.

2	1728
2	864
2	432
2	216
2	108
2	54
3	27
3	9
3	3
	1