CHAPTER 4

Cubes and Cube Roots

Fill in the blanks : (Pg : 72)

1. negative **2.** 7 **3.** 4

EXERCISE 4.1

1. (*i*) The cube of 21 will end with digit 1.
(*ii*) The cube of 209 will end with digit 9.
(*iii*) The cube of 2365 will end with digit 5.
(*iv*) The cube of 774 will end with digit 4.
(*v*) The cube of 388 will end with digit 2.

2. (*i*) $5324 = 2 \times 2 \times \mathbf{11 \times 11 \times 11}$

2	5324
2	2662
11	1331
11	121
11	11
	1

Here, 2×2 is an incomplete group.
So, 5324 is not a perfect cube.

(*ii*) $243 = \mathbf{3 \times 3 \times 3} \times 3 \times 3$

3	243
3	81
3	27
3	9
3	3
	1

Here, 3×3 is an incomplete group.
So, 243 is not a perfect cube.

(*iii*) $1728 = \mathbf{2 \times 2 \times 2} \times \mathbf{2 \times 2 \times 2} \times \mathbf{3 \times 3 \times 3}$

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

It is a perfect cube.

(*iv*) $2437 = 2437 \times 1$
So, it is not a perfect cube.

(*v*) $3824 = \mathbf{2 \times 2 \times 2} \times 2 \times 239$
Here, 2 and 239 are incompleted group.
So, 3824 is not a perfect cube.

2	3824
2	1912
2	956
2	478
239	239
	1

(*vi*) $3375 = 3 \times 3 \times 3 \times 5 \times 5 \times 5$

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

Hence, 3375 is a perfect cube.

(*vii*) $74088 = 2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 7 \times 7 \times 7$

2	74088
2	37044
2	18522
3	9261
3	3087
3	1029
7	343
7	49
7	7
	1

Hence, 74088 is a perfect cube.

3. (*i*) $135 = \mathbf{3 \times 3 \times 3} \times 5$
For making it a perfect cube, we are required to multiply the given number by 5×5 *i.e.* 25.

3	135
3	45
3	15
5	5
	1

(*ii*) $92 = 2 \times 2 \times 23$
For making it a perfect cube, we are required to multiply the given number by $2 \times 23 \times 23$ *i.e.* 1058.

2	92
2	46
23	23
	1

(*iii*) $3267 = \mathbf{3 \times 3 \times 3} \times 11 \times 11$
Here, 11×11 is an incomplete group.
So, for making it a perfect cube,
we are required to multiply the given number by 11.

3	3267
3	1089
3	363
11	121
11	11
	1

4. (*i*) $1125 = 3 \times 3 \times \mathbf{5 \times 5 \times 5}$

3	1125
3	375
5	125
5	25
5	5

Here, 3×3 is an incomplete group.

So, we have to eliminate it.

Therefore, we must divide the given number by 3×3 *i.e.* 9.

(*ii*) $3087 = 3 \times 3 \times \mathbf{7 \times 7 \times 7}$

3	3087
3	1029
7	343
7	49
7	7
	1

Here, 3×3 is incomplete group.

So, we have to eliminate it.

Therefore, we must divide the given number by 3×3 *i.e.* 9.

2	8192
2	4096
2	2048
2	1024
2	512
2	256
2	128
2	64
2	32
2	16
2	8
2	4
2	2
	1

(*iii*) $8192 = \mathbf{2 \times 2 \times 2} \times \mathbf{2 \times 2 \times 2} \times \mathbf{2 \times 2 \times 2} \times \mathbf{2 \times 2 \times 2} \times 2$

Here, 2 is incomplete group.

So, we have to eliminate it.

Therefore, we must divide the given number by 2.

5. (*i*) $(0.05)^3 = 0.05 \times 0.05 \times 0.05 = 0.000125$

(*ii*) $(-6)^3 = (-6) \times (-6) \times (-6) = -216$

(*iii*) $(-0.9)^3 = (-0.9) \times (-0.9) \times (-0.9) = -0.729$

(*iv*) $(2.1)^3 = 2.1 \times 2.1 \times 2.1 = 9.261$

(*v*) $(0.33)^3 = 0.33 \times 0.33 \times 0.33 = 0.035937$

(*vi*) $\left(-5\frac{2}{3}\right)^3 = \left(-\frac{17}{3}\right)^3 = \left(-\frac{17}{3}\right)\times\left(-\frac{17}{3}\right)\times\left(-\frac{17}{3}\right)$

$$= -\frac{4913}{27} = -181\frac{26}{27}$$

6. (*i*) $\frac{343}{729} = \frac{7\times7\times7}{9\times9\times9} = \frac{7}{9}\times\frac{7}{9}\times\frac{7}{9} = \left(\frac{7}{9}\right)^3$

(*ii*) $\frac{9261}{10648} = \frac{21\times21\times21}{22\times22\times22} = \frac{21}{22}\times\frac{21}{22}\times\frac{21}{22}$

$$= \left(\frac{21}{22}\right)^3$$

(*iii*) $\frac{1125}{4096} = \frac{5\times5\times5\times3\times3}{16\times16\times16}$

Here, 1125 is not a perfect cube.

So, $\frac{1125}{4096}$ is not a cube of a rational number.

EXERCISE 4.2

1. $\frac{512}{2197} = \frac{2\times2\times2\times2\times2\times2\times2\times2\times2}{13\times13\times13}$

$$= \frac{8\times8\times8}{13\times13\times13} = \frac{8}{13}\times\frac{8}{13}\times\frac{8}{13} = \left(\frac{8}{13}\right)^3$$

Hence, required number is $\frac{8}{13}$.

2. (*i*) $216 = 2 \times 2 \times 2 \times 3 \times 3 \times 3$

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

$\sqrt[3]{216} = \sqrt[3]{2\times2\times2\times3\times3\times3}$

$= 2 \times 3 = 6$

Hence, $\sqrt[3]{216} = 6$

(*ii*) $17576 = 2 \times 2 \times 2 \times 13 \times 13 \times 13$

2	17576
2	8788
2	4394
13	2197
13	169
13	13
	1

$\sqrt[3]{17576} = \sqrt[3]{2\times2\times2\times13\times13\times13}$

$= 2 \times 13 = 26$

$\therefore \sqrt[3]{17576} = 26$

(*iii*) $39304 = 2 \times 2 \times 2 \times 17 \times 17 \times 17$

2	39304
2	19652
2	9826
17	4913
17	289
17	17
	1

$\sqrt[3]{39304} = \sqrt[3]{2\times2\times2\times17\times17\times17}$

$= 2 \times 17 = 34$

$\therefore \sqrt[3]{39304} = 34$

(*iv*) $54872 = 2 \times 2 \times 2 \times 19 \times 19 \times 19$

2	54872
2	27436
2	13718
19	6859
19	361
19	19
	1

$$\sqrt[3]{54872} = \sqrt[3]{2\times2\times2\times19\times19\times19}$$
$$= 2 \times 19 = 38$$
$$\therefore \quad \sqrt[3]{54872} = 38$$

(*v*) $21952 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 7 \times 7 \times 7$

2	21952
2	10976
2	5488
2	2744
2	1372
2	686
7	343
7	49
7	7
	1

$$\sqrt[3]{21952} = \sqrt[3]{2\times2\times2\times2\times2\times2\times7\times7\times7}$$
$$= 2 \times 2 \times 7 = 28$$

Hence, $\sqrt[3]{21952} = 28$

(*vi*) $46656 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3$

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

$$\sqrt[3]{46656} = \sqrt[3]{2\times2\times2\times2\times2\times2 \times3\times3\times3\times3\times3\times3}$$
$$= 2 \times 2 \times 3 \times 3 = 36$$

Hence, $\sqrt[3]{46656} = 36$

3. (*i*) $\sqrt[3]{\dfrac{1331}{9261}} = \dfrac{\sqrt[3]{1331}}{\sqrt[3]{9261}} = \dfrac{\sqrt[3]{11\times11\times11}}{\sqrt[3]{21\times21\times21}} = \dfrac{11}{21}$

(*ii*) $\sqrt[3]{-3.375} = -\sqrt[3]{3.375}$

$$= -\sqrt[3]{\frac{3375}{1000}} = -\frac{\sqrt[3]{3375}}{\sqrt[3]{1000}}$$
$$= -\frac{\sqrt[3]{15\times15\times15}}{\sqrt[3]{10\times10\times10}} = -\frac{15}{10} = -1.5$$
$$\therefore \quad \sqrt[3]{-3.375} = -1.5$$

(*iii*) $\sqrt[3]{-216} \times \sqrt[3]{-15625} = (-\sqrt[3]{216}) \times (-\sqrt[3]{15625})$

$$= \sqrt[3]{216} \times \sqrt[3]{15625}$$
$$= \sqrt[3]{6\times6\times6} \times \sqrt[3]{25\times25\times25}$$
$$= 6 \times 25 = 150$$
$$\therefore \quad \sqrt[3]{-216} \times \sqrt[3]{-15625} = 150$$

(*iv*) $\sqrt[3]{\dfrac{-2197}{4096}} = \dfrac{-\sqrt[3]{2197}}{\sqrt[3]{4096}} = \dfrac{-\sqrt[3]{13\times13\times13}}{\sqrt[3]{16\times16\times16}} = \dfrac{-13}{16}$

4. (*i*) $\sqrt[3]{216\times1331} = \sqrt[3]{216} \times \sqrt[3]{1331}$

$$= \sqrt[3]{2\times2\times2\times3\times3\times3} \times \sqrt[3]{11\times11\times11}$$
$$= (2 \times 3) \times 11 = 6 \times 11$$
$$= 66$$

(*ii*) $\sqrt[3]{(-1728)\times729} = \sqrt[3]{(-1728)} \times \sqrt[3]{729}$

$$= -\sqrt[3]{2\times2\times2\times2\times2\times2\times3\times3\times3} \times \sqrt[3]{3\times3\times3\times3\times3\times3}$$
$$= -(2 \times 2 \times 3) \times (3 \times 3)$$
$$= -12 \times 9$$
$$= -108$$

5. (i) $\sqrt[3]{10.648} = \sqrt[3]{\frac{10648}{1000}} = \frac{\sqrt[3]{10648}}{\sqrt[3]{1000}}$

$= \frac{\sqrt[3]{2\times2\times2\times11\times11\times11}}{\sqrt[3]{10\times10\times10}}$

$= \frac{2\times11}{10} = \frac{22}{10}$

$= 2.2$

(*ii*) $\sqrt[3]{0.003375} = \sqrt[3]{\frac{3375}{1000000}} = \frac{\sqrt[3]{3375}}{\sqrt[3]{1000000}}$

$= \frac{\sqrt[3]{3\times3\times3\times5\times5\times5}}{\sqrt[3]{10\times10\times10\times10\times10\times10}}$

$= \frac{3\times5}{10\times10} = \frac{15}{100}$

$= 0.15$

(*iii*) $\sqrt[3]{0.000512} = \sqrt[3]{\frac{512}{1000000}}$

$= \frac{\sqrt[3]{512}}{\sqrt[3]{1000000}} = \frac{\sqrt[3]{8\times8\times8}}{\sqrt[3]{100\times100\times100}}$

$= \frac{8}{100} = 0.08$

(*iv*) $\sqrt[3]{2.197} = \sqrt[3]{\frac{2197}{1000}} = \frac{\sqrt[3]{2197}}{\sqrt[3]{1000}}$

$= \frac{\sqrt[3]{13\times13\times13}}{\sqrt[3]{10\times10\times10}} = \frac{13}{10}$

$= 1.3$

6. $\sqrt[3]{64} + \sqrt[3]{0.027} + \sqrt[3]{0.125}$

$= \sqrt[3]{64} + \sqrt[3]{\frac{27}{1000}} + \sqrt[3]{\frac{125}{1000}}$

$= \sqrt[3]{64} + \frac{\sqrt[3]{27}}{\sqrt[3]{1000}} + \frac{\sqrt[3]{125}}{\sqrt[3]{1000}}$

$= \sqrt[3]{4\times4\times4} + \frac{\sqrt[3]{3\times3\times3}}{\sqrt[3]{10\times10\times10}} + \frac{\sqrt[3]{5\times5\times5}}{\sqrt[3]{10\times10\times10}}$

$= 4 + \frac{3}{10} + \frac{5}{10}$

$= 4 + 0.3 + 0.5$

$= 4.8$

EXERCISE 4.3

1. (*i*) $\overline{157}\,\overline{464}$

The last digit of the number is 4. So, the units digit of the cube root will be 4.

The number left, after making a group is 157. The largest number whose cube is less than 157 is 5.

$\because \quad 5^3 < 157 < 6^3$.

The digit at the tens place of the cube root will be 5.

$\therefore$ The cube root of 157464 is 54.

(*ii*) $5\overline{832}$

The last digit of the number is 2.

So, the units digit of the cube root will be 8.

The number left after making a group of three digits is 5. The largest number whose cube is less than 5 is 1.

$\because \quad 1^3 < 5 < 2^3$

The digit at the tens place of the cube root will be 1.

$\therefore$ The cube root of 5832 will be 18.

(*iii*) $19\overline{683}$

The last digit of the number is 3. So, the units digit of the cube root will be 7.

The number left after making the group of three digits is 19. The largest number whose cube is less than 19 is 2.

$\because \quad 2^3 < 19 < 3^3$.

The digit at the tens place of the cube root will be 2.

So, the cube root of the given number is 27.

(*iv*) $13\overline{824}$

The last digit of the number is 4. So, the units digit of the cube root will be 4.

The number left after making a group of three digits is 13. The largest number whose cube is less than 13 is 2.

$\because \quad 2^3 < 13 < 3^3$

$\therefore$ The digit at the tens place of the cube root will be 2.

So, the cube root of the given number is 24.

2. (*a*) Cube root of 35937 by using prime factorisation method.

3	35937
3	11979
3	3993
11	1331
11	121
11	11
	1

$35937 = 3 \times 3 \times 3 \times 11 \times 11 \times 11$

$\sqrt[3]{35937} = \sqrt[3]{3\times3\times3\times11\times11\times11}$

$= 3 \times 11 = 33$

$\therefore \sqrt[3]{35937} = 33$

(*b*) Cube root of 35937 without using prime factors.

$\overline{35}\,\overline{937}$: The last digit of the number is 7. So, the units digit of the cube root will be 3.

The number left after making a group of three is 35. The largest number whose cube is less than 35 is 3.

$\because 3^3 < 35 < 4^3$

The digit at the tens place of the cube root will be 3.

$\therefore$ The cube root of 35937 is 33.

3. Side of a cube = 17 cm

Volume of a cube $= (\text{side})^3$

$= (17 \text{ cm})^3 = (17)^3 \text{ cm}^3$

$= 17 \times 17 \times 17 \text{ cm}^3$

$= 4913 \text{ cm}^3$

Hence, volume of a cube is 4913 cm^3.

4. Area of one face of a cube = 121 sq. m.

Side of the cube $= \sqrt{121}$ m = 11 m.

Volume of the cube $= (\text{side})^3 = (11)^3 \text{ m}^3$

$= 1331 \text{ m}^3$.

Hence, volume of the cube is 1331 m^3.

5. Volume of a cuboid = 6 cm × 3 cm × 6 cm

$= 108 \text{ cm}^3$

Volume of a cube $= (6 \text{ cm})^3 = 216 \text{ cm}^3$

Therefore,

$$\text{Number of cuboid} = \frac{\text{Volume of a cube}}{\text{Volume of a cuboid}}$$

$$= \frac{216 \text{ cm}^3}{108 \text{ cm}^3} = \frac{216}{108} = 2$$

Hence, 2 cuboids will be required to make a cube of side 6 cm.

6. Let the three numbers be $2x$, $3x$ and $5x$.

Then, $(2x)^3 + (3x)^3 + (5x)^3 = 34560$

$\Rightarrow 8x^3 + 27x^3 + 125x^3 = 34560$

$\Rightarrow 160x^3 = 34560$

$\Rightarrow x^3 = \dfrac{34560}{160} = 216$

$\Rightarrow x = \sqrt[3]{216}$

$\Rightarrow x = \sqrt[3]{2\times2\times2\times3\times3\times3}$

$\Rightarrow x = 2 \times 3 \Rightarrow x = 6$

$\therefore 2x = 2 \times 6 = 12$

$3x = 3 \times 6 = 18$

$5x = 5 \times 6 = 30$

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

Hence, the three required numbers are 12, 18 and 30.

7.

3	19683
3	6561
3	2187
3	729
3	243
3	81
3	27
3	9
3	3
	1

Volume of a cubical box $= 19683 \text{ m}^3$

$\because$ Volume of a cubical box $= (\text{side})^3$

$\Rightarrow (\text{side})^3 = 19683$

$\Rightarrow \text{side} = \sqrt[3]{19683}$

$\Rightarrow \text{Side} = \sqrt[3]{3\times3\times3\times3\times3\times3\times3\times3\times3}$

$= 3 \times 3 \times 3 = 27$

Hence, side of a cubical box is 27 m.

MULTIPLE CHOICE QUESTIONS

1. $\sqrt[3]{0.001} = \sqrt[3]{\dfrac{1}{1000}} = \dfrac{1}{\sqrt[3]{10\times10\times10}} = \dfrac{1}{10} = 0.1$

Hence, option (*a*) is correct.

2. $\sqrt[3]{27} \times \sqrt[3]{64} = \sqrt[3]{3\times3\times3} \times \sqrt[3]{4\times4\times4}$

$= 3 \times 4 = 12$

Hence, option (*d*) is correct.

3. $1323 = 3 \times 3 \times 3 \times 7 \times 7$

3	1323
3	441
3	147
7	49
7	7
	1

Here, 7×7 is incomplete group. So, the given number is multiplied by 7 to make a perfect cube.

Hence, option (*b*) is correct.

4. $[(3^2+4^2)^{\frac{1}{2}}]^3 = [(9+16)^{\frac{1}{2}}]^3 = [(25)^{\frac{1}{2}}]^3$

$= [(5^2)^{\frac{1}{2}}]^3$ $\qquad [\because (a^m)^n = a^{mn}]$

$= \left(5^{2\times\frac{1}{2}}\right)^3 = (5)^3 = 125$

Hence, option (*c*) is correct.

5. $\sqrt[3]{0.1\times0.1\times0.1\times12\times12\times12} = 0.1 \times 12 = 1.2$

Hence, option (*b*) is correct.

6. Since cube of even number is even and cube of odd number is odd. So, 512, being an even number is the cube of an even number.

Hence, option (*a*) is correct.

7. $(0.05)^3 = 0.05 \times 0.05 \times 0.05 = 0.000125$

Hence, option (*c*) is correct.

8. $\sqrt[3]{\dfrac{-27}{343}} = \dfrac{-\sqrt[3]{27}}{\sqrt[3]{343}} = \dfrac{-3}{7}$

Hence, option (*a*) is correct.

9. Side of the face of cube = $\sqrt{64}$ = 8 m

$\therefore$ Volume of the cube = $(\text{side})^3 = (8\text{m})^3$

$= 512\ \text{m}^3$

Hence, option (*b*) is correct.

10. 6859 is a perfect cube.

6859 = 19 × 19 × 19

Hence, option (*c*) is correct.

19	6859
19	361
19	19
	1

MENTAL MATHS CORNER

1. No cube can end with exactly two zeros. **(True)**
2. For an integer *a*, a^3 is always greater than a^2. **(False)**
3. If a number is multiplied by 3, the cube of that number will be a multiple of 27. **(True)**
4. There is no perfect cube which ends with 8. **(False)**
5. $\sqrt[3]{-x} = -\sqrt[3]{x}$. **(True)**
6. Cube of the numbers ending with digits 0, 1, 4, 6, 7 and 9 also end with the same digits. **(False)**

REVIEW EXERCISE

1. 68600 = **7 × 7 × 7** × **2 × 2 × 2** × 5 × 5

2	68600
2	34300
2	17150
5	8575
5	1715
7	343
7	49
7	7
	1

Here, 5 × 5 is an incomplete group.
So, we are required to multiply the given number by 5.

2. (*i*) $\sqrt[3]{46656}$

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

$= \sqrt[3]{2\times2\times2\times2\times2\times2\times3\times3\times3\times3\times3\times3}$

$= 2 \times 2 \times 3 \times 3 = 36$

$\therefore \sqrt[3]{46656} = 36$

(*ii*) $\sqrt[3]{4096}$

2	4096
2	2048
2	1024
2	512
2	256
2	128
2	64
2	32
2	16
2	8
2	4
2	2
	1

$= \sqrt[3]{2\times2\times2\times2\times2\times2\times2\times2\times2\times2\times2\times2}$

$= 2 \times 2 \times 2 \times 2 = 16$

$\therefore \sqrt[3]{4096} = 16$

(*iii*) $\sqrt[3]{110592}$

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

$$= \sqrt[3]{\begin{matrix}2\times2\times2\times2\times2\times2\times2\times2\times2\times2\\ \times2\times2\times3\times3\times3\end{matrix}}$$

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

$\therefore \sqrt[3]{110592} = 48$

3. (*i*) $356 = 2 \times 2 \times 89$

2	356
2	178
89	89
	1

Every prime factor makes an incomplete group.

So, it is not a perfect cube.

(*ii*) $9261 = 21 \times 21 \times 21$

It is a perfect cube.

21	9261
21	441
21	21
	1

(*iii*) $4913 = 17 \times 17 \times 17$

It is a perfect cube.

17	4913
17	289
17	17
	1

4. (*i*) $\left(-3\frac{1}{3}\right)^3 = \left(-\frac{10}{3}\right)^3$

$= \left(-\frac{10}{3}\right) \times \left(-\frac{10}{3}\right) \times \left(-\frac{10}{3}\right)$

$= -\frac{1000}{27}$

(*ii*) $(2.5)^3 = 2.5 \times 2.5 \times 2.5 = 15.625$

(*iii*) $(0.4)^3 = 0.4 \times 0.4 \times 0.4 = 0.064$

(*iv*) $(-8)^3 = (-8) \times (-8) \times (-8) = -512$

(*v*) $\left(3\frac{2}{3}\right)^3 = \left(\frac{11}{3}\right)^3 = \frac{11}{3} \times \frac{11}{3} \times \frac{11}{3}$

$= \frac{1331}{27}$

5. (*i*) $\sqrt[3]{-\frac{512}{343}} = -\frac{\sqrt[3]{512}}{\sqrt[3]{343}} = -\frac{\sqrt[3]{8\times8\times8}}{\sqrt[3]{7\times7\times7}} = -\frac{8}{7}$

(*ii*) $\sqrt[3]{2.197} = \sqrt[3]{\frac{2197}{1000}} = \frac{\sqrt[3]{2197}}{\sqrt[3]{1000}}$

$= \frac{\sqrt[3]{13\times13\times13}}{\sqrt[3]{10\times10\times10}} = \frac{13}{10}$

$= 1.3$

(*iii*) $\sqrt[3]{100} \times \sqrt[3]{640} = \sqrt[3]{64000}$

$= \sqrt[3]{4\times4\times4\times10\times10\times10}$

$= 4 \times 10 = 40$

(*iv*) $\sqrt[3]{121} \times \sqrt[3]{704} = \sqrt[3]{121\times704}$

$= \sqrt[3]{11\times11\times11\times4\times4\times4}$

$= 11 \times 4 = 44$

(*v*) $\sqrt[3]{6250} \times \sqrt[3]{2500} = \sqrt[3]{6250\times2500}$

$= \sqrt[3]{25\times25\times25\times10\times10\times10}$

$= 25 \times 10 = 250$

6. L.H.S. $= \sqrt[3]{\dfrac{10976}{500}}$

$= \sqrt[3]{\dfrac{2744}{125}} = \dfrac{\sqrt[3]{2744}}{\sqrt[3]{125}}$

$= \dfrac{\sqrt[3]{14\times14\times14}}{\sqrt[3]{5\times5\times5}}$

$= \dfrac{14}{5}$

R.H.S. $= \dfrac{\sqrt[3]{21952}}{\sqrt[3]{1000}}$

$= \dfrac{\sqrt[3]{28\times28\times28}}{\sqrt[3]{10\times10\times10}} = \dfrac{28}{10}$

$= \dfrac{14}{5}$

Hence, L.H.S. = R.H.S.

7. Side of the cube $= \sqrt[3]{\text{Volume}}$

$= \sqrt[3]{614.125} = \dfrac{\sqrt[3]{614125}}{\sqrt[3]{1000}}$

$= \dfrac{\sqrt[3]{5\times5\times5\times17\times17\times17}}{\sqrt[3]{10\times10\times10}}$

$= \dfrac{5\times17}{10} = \dfrac{85}{10} = 8.5$

Thus, the side of the cube is 8.5 m.

BRAIN TEASER

1. $5324 = 2 \times 2 \times 11 \times 11 \times 11$

2×2 is an incomplete group.

So, we are required to multiply the given number by 2.

2. $\dfrac{\sqrt[3]{-125\times343}}{\sqrt[3]{(-27)\times(-64)}}$

$= -\dfrac{\sqrt[3]{125\times343}}{\sqrt[3]{27\times64}}$

$= -\dfrac{\sqrt[3]{5\times5\times5\times7\times7\times7}}{\sqrt[3]{3\times3\times3\times4\times4\times4}}$

$= -\dfrac{5\times7}{3\times4} = \dfrac{-35}{12}$

Hence, $\dfrac{\sqrt[3]{-125\times343}}{\sqrt[3]{(-27)\times(-64)}} = \dfrac{-35}{12}$

3. Yes, there is a number – 1.

$\therefore \quad (-1)^3 = (-1)\times(-1)\times(-1) = -1$

It is also true for 1 as $(1)^3 = 1$