Chapter 4 : Cubes and Cube Roots

ANSWER KEYS

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

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

Now, volume of the cube = $(\text{side})^3 = (11)^3 = 1331 \text{ m}^3$.

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

3. (*i*) 3324 = 2 × 2 × **11 × 11 × 11**

Hence, 2 × 2 is an incomplete group.

So, 5324 is not a perfect cube.

2	5324
2	2662
11	1331
11	121
11	11
	1

(*ii*) 243 = **3 × 3 × 3** × 3 × 3

Here, 3 × 3 is an incomplete group.

So, 243 is not a perfect cube.

3	243
3	81
3	27
3	9
3	3
	1

(*iii*) 1728 = **2 × 2 × 2** × **2 × 2 × 2** × **3 × 3 × 3**

It is a perfect cube.

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

(*iv*) 2437 = 2437 × 1

So, it is not a perfect cube.

(*v*) 3824 = 2 × 2 × 2 × 2 × 239

Here, 2 and 239 are incompleted group.

So, 3824 is not a perfect cube.

Hence, (*i*), (*ii*), (*iv*) and (*v*) are not a perfect cube.

2	3824
2	1912
2	956
2	478
	239

4. (*i*) 135 = **3 × 3 × 3** × 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 × 2 × 23

For making it a perfect cube.

We are required to multiply the given number by 2 × 23 × 23 *i.e.* 1058.

2	92
2	46
	23

(*iii*) 3267 = **3 × 3 × 3** × 11 × 11

Here, 11 × 11 is a incomplete group.

So, for making it a perefect cube, we are required to multiply the given number by 11.

3	3267
3	1089
3	363
11	121
11	11
	1

5. (*i*) 1125 = **5 × 5 × 5** × 3 × 3

Here, 3 × 3 is a incomplete group.

So, we have to eliminate it.

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

5	1125
5	225
5	45
3	9
3	3
	1

(*ii*) 3087 = 3 × 3 × **7 × 7 × 7**

Here, 3 × 3 is incompelte group.

So, we have to eliminate it.

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

3	3087
3	1029
7	343
7	49
7	7
	1

(*iii*) 8192

8192 = **2 × 2 × 2** × **2 × 2 × 2** × **2 × 2 × 2** × **2 × 2 × 2** × 2

Here, 2 is incomplete group.

So, we have to eliminate it.

Therefore, we must divide the given number by 2.

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

6. Volume of a cuboid $= 6\text{ cm} \times 3\text{ cm} \times 6\text{ cm}$

$= 108\text{ cm}^3$

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

Therefore,

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

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

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

7. Side of a cube = 17 cm

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

$= (17\text{ cm})^2$

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

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

$= 4913\text{ cm}^3$

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

8. (*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*) $\left(-5\dfrac{2}{3}\right)^3 = \left(-\dfrac{17}{3}\right)^3 = \left(-\dfrac{17}{3}\right)\times\left(-\dfrac{17}{3}\right)\times\left(-\dfrac{17}{3}\right)$

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

9. $\dfrac{512}{2197} = \dfrac{2\times2\times2\times2\times2\times2\times2\times2\times2}{13\times13\times13}$

$= \dfrac{8\times8\times8}{13\times13\times13} = \dfrac{8}{13}\times\dfrac{8}{13}\times\dfrac{8}{13}$

$= \left(\dfrac{8}{13}\right)^3$

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

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

(*ii*) $\dfrac{9261}{10648} = \dfrac{21\times21\times21}{22\times22\times22} = \dfrac{21}{22}\times\dfrac{21}{22}\times\dfrac{21}{22} = \left(\dfrac{21}{22}\right)^3$

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

Here, 1125 is not a perfect cube.

So, $\dfrac{1125}{4096}$ is not a cube of rational numbers.

EXERCISE 4.2

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

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

$= 2 \times 3 = 6$

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

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

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

$\sqrt[3]{1756} = \sqrt[3]{2\times2\times2\times13\times13\times13}$

$= 2 \times 13$

$= 26$

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

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

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

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

$= 2 \times 17$

$= 34$

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

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

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

$\sqrt[3]{54872} = \sqrt[3]{2\times2\times2\times19\times19\times19}$

$= 2 \times 19 = 38$

$\therefore \sqrt[3]{54872} = 38.$

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

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

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

$= 2 \times 2 \times 7 = 28$

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

2	21952
2	10976
2	5488
2	2744
2	1372
2	686
7	3437
7	49
7	7

(*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

$\sqrt[3]{46656}$

$= \sqrt{2\times2\times2\times2\times2\times2\times3\times3\times3\times3\times3\times3}$

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

$= 36$

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

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

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

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

$160x^3 = 34560$

$x^3 = \frac{34560}{160}$

$x^3 = 216$

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

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

$= 2 \times 3 = x = 6$

$x = 6$

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

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

3. (*a*) Cube root of 35937 by using prime factor method.

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

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

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

$= 3 \times 11 = 33$

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

(*b*) Cube root of 35937 by 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.

4. (*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 is 157after making a group of three digits. The largest number whose cube is less than 157 is 5.

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

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

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

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

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.

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

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

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

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

The last digit of the number is 3. So, the units digits 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.

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

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

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

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

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.

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

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

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

5. (*i*) $\sqrt[3]{\frac{1331}{9261}} = \frac{\sqrt[3]{1331}}{\sqrt[3]{9251}} = \frac{\sqrt[3]{11\times11\times11}}{\sqrt[3]{21\times21\times21}} = \frac{11}{21}$

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

$= -\sqrt[3]{\frac{3375}{1000}}$

$= -\frac{\sqrt[3]{3375}}{\sqrt[3]{1000}}$

$$= -\frac{\sqrt[3]{15\times15\times15}}{\sqrt[3]{10\times10\times10}}$$

$$= -\frac{15}{10} = -1.5$$

$\therefore \sqrt[3]{-3.375} = -1.5$

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

$= \sqrt[3]{216}\times\sqrt[3]{15625}$

$= \sqrt[3]{6\times6\times6}\times\sqrt[3]{25\times25\times25}$

$= 6 \times 25 = 150$

$\therefore \sqrt[3]{-216} \times \sqrt[3]{-15625} = 150$

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

6. Volume of a cubical box $=19683\ m^3$

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

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

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

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.

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

EXERCISE 4.3

1. $\sqrt[3]{11} = \sqrt[3]{x}$, where $x = 11$

from table, $\sqrt[3]{11}$ is 2.224,

$\therefore \sqrt[3]{11} = 2.224 = 2.22$

2. $\sqrt[3]{80} = \sqrt[3]{8\times10} = \sqrt[3]{8}\times\sqrt[3]{10}$

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

$= 2 \times 2.154 = 4.308$

(from table $\sqrt[3]{10} = 2.154$)

$\therefore \sqrt[3]{80} = 4.308 = 4.31.$

3. $\sqrt[3]{800} = \sqrt[3]{8\times100} = 2 \times \sqrt[3]{100}$

$= 2 \times 4.642 = 9.284$

(from table $\sqrt[3]{100} = 4.642$)

$\therefore \sqrt[3]{800} = 9.284 = 9.28$

4. $\sqrt[3]{700} = \sqrt[3]{7\times1000}$

$= \sqrt[3]{7} \times \sqrt[3]{1000}$

$= \sqrt[3]{7} \times 10$

$= 1.913 \times 10 = 19.13.$

(from table $\sqrt[3]{7} = 1.913$)

5. $\sqrt[3]{790} = \sqrt[3]{2\times5\times79}$

$= \sqrt[3]{2}\times\sqrt[3]{5}\times\sqrt[3]{79}$

$= 1.26 \times 1.71 \times 4.291$

$= 9.245 = 9.24$

$\therefore \sqrt[3]{790} = 9.24$

6. $\sqrt[3]{9700} = \sqrt[3]{97\times100}$

$= \sqrt[3]{97}\times\sqrt[3]{100}$

$= 4.547 \times 4.642 = 21.33.$

($\because$ From table $\sqrt[3]{97} = 4.547$ and $\sqrt[3]{100} = 4.642$)

7. $\sqrt[3]{732} = \sqrt[3]{12\times61}$

$= \sqrt[3]{12} \times \sqrt[3]{61}$

$= 2.289 \times 3.936 = 9.009 = 9.01$

($\because$ From table, $\sqrt[3]{12} = 2.289$, and $\sqrt[3]{61} = 3.936$)

$\therefore \sqrt[3]{732} = 9.01$

8. $\sqrt[3]{0.27} = \sqrt[3]{\frac{27}{100}} = \frac{\sqrt[3]{3\times3\times3}}{\sqrt[3]{100}}$

$$= \frac{3}{\sqrt[3]{5}\times\sqrt[3]{20}} = \frac{3}{1.71\times2.71}$$

$$= \frac{3}{4.63} = 0.647 = 0.65$$

$\therefore \sqrt[3]{0.27} = 0.65.$

9. $\sqrt[3]{833} = \sqrt[3]{49\times17}$

$= \sqrt[3]{49} \times \sqrt[3]{17}$

$= 3.659 \times 2.571 = 9.407$

$= 9.41$

$\sqrt[3]{833} = 9.41$

($\because$ From table, $\sqrt[3]{49} = 3.659$, and $\sqrt[3]{17} = 2.571$)

10. $\sqrt[3]{5319} = \sqrt[3]{27 \times 197}$

$= 3 \times \sqrt[3]{197}$

We know that 190 < 197 < 200

From the table, $\sqrt[3]{200} = 5.848$

$\sqrt[3]{190} = 5.749$

$\sqrt[3]{200} - \sqrt[3]{190} = 5.848 - 5.749 = 0.099$

Difference of 10 = 0.099

$\therefore$ Difference of 7 = $\frac{0.099}{10} \times 7$

$= \frac{0.693}{10}$

$= 0.0693$

$\sqrt[3]{197} = 5.749 + 0.0693$

$= 5.8183$

$= 5.82$

Thus, $\sqrt{5319} = 3 \times \sqrt[3]{197} = 3 \times 5.82 = 17.46$

$\therefore \sqrt[3]{5319} = 17.46.$

11. $\sqrt[3]{\frac{92}{125}} = \frac{\sqrt[3]{92}}{\sqrt[3]{125}} = \frac{\sqrt[3]{92}}{\sqrt[3]{5 \times 5 \times 5}}$

$= \frac{4.498}{5} = 0.8996 = 0.90.$

$\therefore \sqrt[3]{\frac{92}{125}} = 0.90$

12. $\sqrt[3]{56.3}$

We know that

$\sqrt[3]{56} < \sqrt[3]{56.3} < \sqrt[3]{57}$

($\because$ From the table, $\sqrt[3]{56} = 3.803$, $\sqrt[3]{57} = 3.849$)

Now, $\sqrt[3]{57} - \sqrt[3]{56} = 3.849 - 3.803 = 0.046$

Now, difference for 1 (57 – 56) = 0.046

$\therefore$ Difference for 0.3 = 0.046 × 0.3

= 0.0138

$\therefore \sqrt[3]{56.3} = 3.803 + 0.0138$

$\therefore \sqrt[3]{56.3} = 3.8168$

Hence, $\sqrt[3]{56.3} = 3.82.$

MULTIPLE CHOICE QUESTIONS

1. Volume of a cube = 216 m^3.

Edge of a cube = $\sqrt[3]{\text{volume}}$

$= \sqrt[3]{216}$

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

Edge of the cube = 6 m

Hence, option (*b*) is correct.

2. $\sqrt[3]{0.001} = \sqrt[3]{\frac{1}{1000}} = \frac{1}{\sqrt[3]{10 \times 10 \times 10}}$

$= \frac{1}{10} = 0.1$

Hence, option (*a*) is correct.

3. $\sqrt[3]{27} \times \sqrt[3]{64} = \sqrt[3]{\mathbf{3 \times 3 \times 3}} \times \sqrt[3]{\mathbf{4 \times 4 \times 4}}$

$= 3 \times 4 = 12$

Hence, option (*d*) is correct.

4. 1323 = 3 × 3 × 3 × 7 × 7

Here, 7 × 7 is incomplete group.

So, the given number is multiplied by 7 to make a perfect cube.

Hence, option (*b*) is correct.

3	1323
3	441
3	147
7	49
7	7
	1

5. $[(3^2 + 4^2)^{\frac{1}{2}}]^3 = [(9+16)^{\frac{1}{2}}]^3$

$= [(25)^{\frac{1}{2}}]^3$

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

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

$= (5)^3 = 125$

Hence option (*c*) is correct.

6. $\sqrt[3]{0.1 \times 0.1 \times 0.1 \times 12 \times 12 \times 12} = 0.1 \times 12$

$= 1.2$

Hence, option (*b*) is correct.

7. Since cube of even number is even and cube of odd number is odd. So,

(*a*) 512, being an even number is the cube of an even number.

(*b*) 1331, being an odd number is the cube of an odd number.

(*c*) 1375, being an odd number is the cube of an odd number.

(*d*) 6859, being an odd number is the cube of an odd number.

Hence, option (*a*) is correct.

8. In the following numbers, 6859 being odd number is the cube of an odd number.

Hence, option (*b*) is correct.

9. $(0.05)^3 = 0.05 \times 0.05 \times 0.05$

$= 0.000125$

Hence, option (*c*) is correct.

10. $\sqrt[3]{\frac{-27}{343}} = \frac{-\sqrt[3]{27}}{\sqrt[3]{343}} = \frac{-3}{7}$

Hence, option (*a*) is correct.

11. Side of the face of (*a*) 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.

12. In the following number 6839 is a perfect cube number.

$\therefore$ $6859 = 19 \times 19 \times 19$

Hence, option (*c*) is correct.

19	6859
19	361
19	19

13. $72 = 2 \times 2 \times 3 \times 3$

There 3×3 is incomplete pair.

So, in the given number multiplied by 3 to make it a perfect cube number.

Here option (*b*) is correct.

2	72
2	36
2	18
3	9
3	3
	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. Cube of a negative number is negative. **(True)**

4. If a number is multiplied by 3, the cube of that number will be a multiple of 27. **(True)**

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

6. $\sqrt[3]{-x} = -\sqrt[3]{x}$. **(True)**

7. In a perfect cube, each prime factor appears three times. **(True)**

8. Cube of the numbers ending with digits 0, 1, 4, 6, 7 and 9 also end with the same digits. **(False)**

9. Cube of the odd natural number is always an odd number. **(True)**

10. If a number is doubled, then its cube will be 6 times the cube of the number. **(False)**

11. The cube of a two-digit number may have 7 or more digits. **(False)**

12. Cube of all even natural numbers are always even numbers. **(True)**

REVIEW EXERCISE

1. $68600 = \mathbf{7 \times 7 \times 7} \times 10 \times 10 \times 2$

$= \mathbf{7 \times 7 \times 7} \times \mathbf{2 \times 2 \times 2} \times 5 \times 5$

Here, 5×5 is incomplete group.

So, we are required to multiply by 5 in the given number.

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

$= \sqrt{2\times2\times2\times2\times2\times2\times3\times3\times3\times3\times3\times3}$

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

$= 36$

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

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

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

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

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

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

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

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

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

$= 48$

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

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

Every prime factors makes incomplete group.

So, it is not perfect cubes.

2	356
2	178
	89

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

It is a perfect cube number.

21	9261
21	441
21	21
	1

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

It is a perfect cube number.

17	4913
17	289
17	17
	1

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

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

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

(*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 $= \sqrt[3]{\frac{10976}{500}}$

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

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

$= \frac{14}{5}$

L.H.S $= \frac{14}{5}$

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

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

$= \frac{28}{10} = \frac{14}{5}$

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

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

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

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

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

Side of the cube = 8.5 m.

HOTS QUESTIONS

1. 5324 = 2 × 2 × 11 × 11 × 11

Hence, 2 × 2 is incomplete group.

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

2	5324
2	2662
11	1331
11	121
11	11
	1

2. $\dfrac{\sqrt[3]{-125}\times 343}{\sqrt[3]{(-27)\times(-64)}}$

$= \dfrac{-\sqrt[3]{125\times 343}}{\sqrt[3]{27\times 64}}$

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

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

Hence, $\dfrac{\sqrt[3]{-125\times 343}}{\sqrt[3]{(-27)\times(-64)}} = \dfrac{-35}{12}$

3. Yes, there is a number – 1.

∴ $(-1)^3 = (-1) \times (-1) \times (-1) = -1$

and $(-1)^2 = (-1) \times (-1) = 1$.