

CHAPTER - 4

CUBES & CUBE ROOTS

EXERCISE 4(A)

Question 1.

Find the cube of :

- (i) 7
- (ii) 11
- (iii) 16
- (iv) 23
- (v) 31
- (vi) 42
- (vii) 54

Solution:

- (i) $(7)^3 = 7 \times 7 \times 7 = 343$
- (ii) $(11)^3 = 11 \times 11 \times 11 = 1331$
- (iii) $(16)^3 = 16 \times 16 \times 16 = 4096$
- (iv) $(23)^3 = 23 \times 23 \times 23 = 12167$
- (v) $(31)^3 = 31 \times 31 \times 31 = 29791$
- (vi) $(42)^3 = 42 \times 42 \times 42 = 74088$
- (vii) $(54)^3 = 54 \times 54 \times 54 = 157464$

Question 2.

Find which of the following are perfect cubes :

- (i) 243
- (ii) 588
- (iii) 1331
- (iv) 24000
- (v) 1728
- (vi) 1938

Solution:

(i) 243

$$\begin{array}{r|l} 3 & 243 \\ \hline 3 & 81 \\ \hline 3 & 27 \\ \hline 3 & 9 \\ \hline 3 & 3 \\ \hline & 1 \end{array}$$

$$\begin{aligned} \therefore 243 &= 3 \times 3 \times 3 \times 3 \\ &= (3 \times 3 \times 3) \times 3 \\ &= 3^3 \times 3 \end{aligned}$$

\therefore 297 is not a perfect cube.

(ii) 588

$$\begin{array}{r|l} 2 & 588 \\ \hline 2 & 294 \\ \hline 7 & 147 \\ \hline 7 & 21 \\ \hline 3 & 3 \\ \hline & 1 \end{array}$$

$$588 = 2 \times 2 \times 7 \times 7 \times 3$$

\therefore 588 is not a perfect cube.

(iii) 1331

$$\begin{array}{r|l} 11 & 1331 \\ \hline 11 & 121 \\ \hline 11 & 11 \\ \hline & 1 \end{array}$$

$$\therefore 1331 = 11 \times 11 \times 11 = (11)^3$$

\therefore 1331 is a perfect cube.

(iv) 24000

$$\begin{aligned} \therefore 24000 &= 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 5 \times \\ &5 \times 5 \\ &= (2)^3 \times (2)^3 \times (5)^3 \times 3 \end{aligned}$$

\therefore 24000 is not a perfect cube.

(v) 1728

$$\begin{array}{r|l} 2 & 1728 \\ \hline 2 & 864 \\ \hline 2 & 432 \\ \hline 2 & 216 \\ \hline 2 & 108 \\ \hline 2 & 54 \\ \hline 3 & 27 \\ \hline 3 & 9 \\ \hline 3 & 3 \\ \hline & 1 \end{array}$$

$$\begin{aligned} \therefore 1728 &= 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3 \\ &= (2)^3 \times (2)^3 \times (3)^3 \end{aligned}$$

\therefore 1728 is a perfect cube.

(vi) 1938

$$\begin{array}{r|l} 2 & 1938 \\ \hline 3 & 936 \\ \hline 17 & 323 \\ \hline 19 & 19 \\ \hline & 1 \end{array}$$

$$1938 = 2 \times 3 \times 17 \times 19$$

1938 is not a perfect cube.

Question 3.

Find the cubes of :

(i) 2.1

(ii) 0.4

(iii) 1.6

(iv) 2.5

(v) 0.12

(vi) 0.02

(vii) 0.8

Solution:

$$(i) 2.1 = (2.1)^3 = \left(\frac{21}{10}\right)^3 = \frac{21 \times 21 \times 21}{10 \times 10 \times 10}$$
$$= \frac{9261}{1000} = 9.261$$

$$(ii) 0.4 = (0.4)^3 = \left(\frac{4}{10}\right)^3 = \frac{4 \times 4 \times 4}{10 \times 10 \times 10}$$
$$= \frac{64}{1000} = 0.064$$

$$(iii) 1.6 = (1.6)^3 = \left(\frac{16}{10}\right)^3 = \frac{16 \times 16 \times 16}{10 \times 10 \times 10}$$
$$= \frac{4096}{1000} = 4.096$$

$$(iv) 2.5 = (2.5)^3 = \left(\frac{25}{10}\right)^3 = \frac{25 \times 25 \times 25}{10 \times 10 \times 10}$$
$$= \frac{15625}{1000} = 15.625$$

$$(v) 0.12 = (0.12)^3 = \left(\frac{12}{100}\right)^3 = \frac{12 \times 12 \times 12}{100 \times 100 \times 100}$$
$$= \frac{1728}{1000000} = 0.001728$$

$$(vi) 0.02 = (0.02)^3 = \left(\frac{2}{100}\right)^3 = \frac{2 \times 2 \times 2}{100 \times 100 \times 100}$$
$$= \frac{8}{1000000} = 0.000008$$

$$\begin{aligned} \text{(vii) } 0.8 &= (0.8)^3 = \left(\frac{8}{10}\right)^3 = \frac{8 \times 8 \times 8}{10 \times 10 \times 10} \\ &= \frac{512}{1000} = 0.512 \end{aligned}$$

Question 4.

Find the cubes of :

(i) $\frac{3}{7}$

(ii) $\frac{8}{9}$

(iii) $\frac{10}{13}$

(iv) $1\frac{2}{7}$

(v) $2\frac{1}{2}$

Solution:

$$\text{(i) } \frac{3}{7} = \left(\frac{3}{7}\right)^3 = \frac{3 \times 3 \times 3}{7 \times 7 \times 7} = \frac{27}{343}$$

$$\text{(ii) } \frac{8}{9} = \left(\frac{8}{9}\right)^3 = \frac{8 \times 8 \times 8}{9 \times 9 \times 9} = \frac{512}{729}$$

$$\text{(iii) } \frac{10}{13} = \left(\frac{10}{13}\right)^3 = \frac{10 \times 10 \times 10}{13 \times 13 \times 13} = \frac{1000}{2197}$$

$$\begin{aligned} \text{(iv) } 1\frac{2}{7} &= \left(1\frac{2}{7}\right)^3 = \left(\frac{1 \times 7 + 2}{7}\right)^3 = \left(\frac{9}{7}\right)^3 \\ &= \frac{9 \times 9 \times 9}{7 \times 7 \times 7} = \frac{729}{343} = 2\frac{43}{343} \end{aligned}$$

$$\begin{aligned} \text{(v) } 2\frac{1}{2} &= \left(2\frac{1}{2}\right)^3 = \left(\frac{5}{2}\right)^3 \\ &= \frac{5 \times 5 \times 5}{2 \times 2 \times 2} = \frac{125}{8} = 15\frac{5}{8} \end{aligned}$$

Question 5.

Find the cubes of :

(i) -3

- (ii) -7
- (iii) -12
- (iv) -18
- (v) -25
- (vi) -30
- (vii) -50

Solution:

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

$$(ii) -7 = (-7)^3 = -7 \times -7 \times -7 \\ = -(7 \times 7 \times 7) = -343$$

$$(iii) -12 = (-12)^3 = -12 \times -12 \times -12 \\ = -(12 \times 12 \times 12) = -1728$$

$$(iv) -18 = (-18)^3 = -18 \times -18 \times -18 \\ = -(18 \times 18 \times 18) = -5832$$

$$(v) -25 = (-25)^3 = -25 \times -25 \times -25 \\ = -(25 \times 25 \times 25) = -15625$$

$$(vi) -30 = (-30)^3 = -30 \times -30 \times -30 \\ = -(30 \times 30 \times 30) = -27000$$

$$(vii) -50 = (-50)^3 = -50 \times -50 \times -50 \\ = -(50 \times 50 \times 50) = -125000$$

Question 6.

Which of the following are cubes of:

- (i) an even number
- (ii) an odd number

216, 729, 3375, 8000, 125, 343, 4096 and 9261.

Solution:

$$\therefore 216 = 2 \times 2 \times 2 \times 3 \times 3 \times 3$$

$$\begin{array}{r|l} 2 & 216 \\ \hline 2 & 108 \\ \hline 2 & 54 \\ \hline 3 & 27 \\ \hline 3 & 9 \\ \hline 3 & 3 \\ \hline & 1 \end{array}$$

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

$$\therefore 729 = 3 \times 3 \times 3 \times 3 \times 3 \times 3$$

$$\begin{array}{r|l} 3 & 729 \\ \hline 3 & 243 \\ \hline 3 & 81 \\ \hline 3 & 27 \\ \hline 3 & 9 \\ \hline 3 & 3 \\ \hline & 1 \end{array}$$

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

$$\therefore 3375 = 5 \times 5 \times 5 \times 3 \times 3 \times 3$$

$$\begin{array}{r|l} 5 & 3375 \\ \hline 5 & 675 \\ \hline 5 & 135 \\ \hline 3 & 27 \\ \hline 3 & 9 \\ \hline 3 & 3 \\ \hline & 1 \end{array}$$

$$= (5)^3 \times (3)^3 = (15)^3$$

$$\therefore 8000 = 20 \times 20 \times 20 = (20)^3$$

$$\begin{array}{r|l} 20 & 8000 \\ \hline 20 & 400 \\ \hline 20 & 20 \\ \hline & 1 \end{array}$$

$$125 = 5 \times 5 \times 5 = (5)^3$$

$$\begin{array}{r|l} 5 & 125 \\ \hline 5 & 25 \\ \hline 5 & 5 \\ \hline & 1 \end{array}$$

$$\therefore 343 = 7 \times 7 \times 7 = (7)^3$$

$$\begin{array}{r|l} 7 & 343 \\ \hline 7 & 49 \\ \hline 7 & 7 \\ \hline & 1 \end{array}$$

$$\therefore 4096 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$$

$$\begin{array}{r|l} 2 & 4096 \\ \hline 2 & 2048 \\ \hline 2 & 1024 \\ \hline 2 & 512 \\ \hline 2 & 256 \\ \hline 2 & 128 \\ \hline 2 & 64 \\ \hline 2 & 32 \\ \hline 2 & 16 \\ \hline 2 & 8 \\ \hline 2 & 4 \\ \hline 2 & 2 \\ \hline & 1 \end{array}$$

$$= (2)^3 \times (2)^3 \times (2)^3 \times (2)^3 = (16)^3$$

(i) Cubes of an even number are 216, 8000, 4096.

(ii) Cubes of an odd number are 729, 3375, 125, 343, 9261.

Question 7.

Find the least number by which 1323 must be multiplied so that the product is a perfect

cube.

Solution:

The prime factor of 1323 are $= 3 \times 3 \times 3 \times 7 \times 7$

$$= (3 \times 3 \times 3) \times 7 \times 7$$

Clearly, 1323 must be multiplied by 7.

Question 8.

Find the smallest number by which 8768 must be divided so that the quotient is a perfect cube.

Solution:

The prime factor of 8768 are

2	8768
2	4384
2	2192
2	1096
2	548
2	274
137	137
	1

$$= 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 137$$

$$= (2 \times 2 \times 2) \times (2 \times 2 \times 2) \times 137$$

Clearly, 8768 must be divided by 137.

Question 9.

Find the smallest number by which 27783 be multiplied to get a perfect square number.

Solution:

3	27783
3	9261
3	3087
3	1029
7	343
7	49
7	7
	1

$$= 3 \times 3 \times 3 \times 3 \times 7 \times 7 \times 7$$

$$= (3 \times 3 \times 3) \times (7 \times 7 \times 7) \times 3$$

Clearly, 27783 must be multiplied by 3×3

$$= 9$$

Question 10.

With what least number must 8640 be divided so that the quotient is a perfect cube?

Solution:

The prime factors of 8640 are

$$\begin{array}{r|l} 2 & 8640 \\ \hline 2 & 4320 \\ \hline 2 & 2160 \\ \hline 2 & 540 \\ \hline 2 & 270 \\ \hline 3 & 135 \\ \hline 3 & 45 \\ \hline 3 & 15 \\ \hline 5 & 5 \\ \hline & 1 \end{array}$$

$$\begin{aligned} &= 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 5 \\ &= (2 \times 2 \times 2) \times (2 \times 2 \times 2) \times (3 \times 3 \times 3) \\ &\times 5 \end{aligned}$$

Clearly, 8640 must be divided by 5.

Question 11.

Which is the smallest number that must be multiplied to 77175 to make it a perfect cube?

Solution:

The prime factors of 77175 are

$$\begin{array}{r|l} 3 & 77175 \\ \hline 3 & 25725 \\ \hline 5 & 8575 \\ \hline 5 & 1715 \\ \hline 7 & 343 \\ \hline 7 & 49 \\ \hline 7 & 7 \\ \hline & 1 \end{array}$$

$$\begin{aligned} &= 3 \times 3 \times 5 \times 5 \times 7 \times 7 \times 7 \\ &= (7 \times 7 \times 7) \times 3 \times 3 \times 5 \times 5 \end{aligned}$$

Clearly, 77175 must be multiplied by 3×5
 $= 15$

EXERCISE 4(B)

Question 1.

Find the cube-roots of :

(i) 64

(ii) 343

(iii) 729

(iv) 1728

(v) 9261

(vi) 4096

(vii) 8000

(viii) 3375

Solution:

$$(i) 64 = \sqrt[3]{64} = (2 \times 2 \times 2) \times (2 \times 2 \times 2) \\ = 2 \times 2 = 4$$

$$\begin{array}{r|l} 2 & 64 \\ \hline 2 & 32 \\ \hline 2 & 16 \\ \hline 2 & 8 \\ \hline 2 & 4 \\ \hline 2 & 2 \\ \hline & 1 \end{array}$$

$$(ii) 343 = \sqrt[3]{343} = 7 \times 7 \times 7 = 7$$

$$\begin{array}{r|l} 7 & 343 \\ \hline 7 & 49 \\ \hline 7 & 7 \\ \hline & 1 \end{array}$$

$$(iii) 729 = \sqrt[3]{729} = (3 \times 3 \times 3) \times (3 \times 3 \times 3) \\ = 3 \times 3 = 9$$

$$\begin{array}{r|l} 3 & 729 \\ \hline 3 & 243 \\ \hline 3 & 81 \\ \hline 3 & 27 \\ \hline 3 & 9 \\ \hline 3 & 3 \\ \hline & 1 \end{array}$$

$$(iv) 1728 = \sqrt[3]{1728} = (2 \times 2 \times 2) \times (2 \times 2 \times 2) \\ \times (3 \times 3 \times 3) \\ = 2 \times 2 \times 3 = 12$$

$$\begin{array}{r|l} 2 & 1728 \\ \hline 2 & 864 \\ \hline 2 & 432 \\ \hline 2 & 216 \\ \hline 2 & 108 \\ \hline 2 & 54 \\ \hline 3 & 27 \\ \hline 3 & 9 \\ \hline 3 & 3 \\ \hline & 1 \end{array}$$

$$(v) 9261 = \sqrt[3]{9261} = (3 \times 3 \times 3) \times (7 \times 7 \times 7)$$

$$= 3 \times 7 = 21$$

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

$$(vi) 4096 = \sqrt[3]{4096} = (2 \times 2 \times 2) \times (2 \times 2 \times 2)$$

$$\times (2 \times 2 \times 2) \times (2 \times 2 \times 2)$$

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

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

$$(vii) 8000 = \sqrt[3]{8000} = (4 \times 4 \times 4) \times (5 \times 5 \times 5)$$

$$= 4 \times 5 = 20$$

4	8000
4	2000
4	500
5	125
5	25
5	5
	1

$$\begin{aligned} \text{(viii)} \quad 3375 &= \sqrt[3]{3375} = (5 \times 5 \times 5) \times (3 \times 3 \times 3) \\ &= 5 \times 3 = 15 \end{aligned}$$

$$\begin{array}{r|l} 5 & 3375 \\ \hline 5 & 675 \\ \hline 5 & 135 \\ \hline 3 & 27 \\ \hline 3 & 9 \\ \hline 3 & 3 \\ \hline & 1 \end{array}$$

Question 2.

Find the cube-roots of :

(i) $\frac{27}{64}$

(ii) $\frac{125}{216}$

(iii) $\frac{343}{512}$

(iv) 64×729

(v) 64×27

(vi) 729×8000

(vii) 3375×512

Solution:

$$(i) \frac{27}{64} = \sqrt[3]{\frac{27}{64}} = \frac{\sqrt{3 \times 3 \times 3}}{\sqrt{4 \times 4 \times 4}} = \frac{3}{4}$$

$$(ii) \frac{125}{216} = \sqrt[3]{\frac{125}{216}} = \frac{\sqrt{5 \times 5 \times 5}}{\sqrt{6 \times 6 \times 6}} = \frac{5}{6}$$

$$(iii) \frac{343}{512} = \sqrt[3]{\frac{343}{512}} = \frac{\sqrt{7 \times 7 \times 7}}{\sqrt{8 \times 8 \times 8}} = \frac{7}{8}$$

$$(iv) 64 \times 729 = \sqrt[3]{64 \times 729} \\ = \sqrt{4 \times 4 \times 4 \times 9 \times 9 \times 9} = 4 \times 9 = 36$$

$$(v) 64 \times 27 = \sqrt[3]{64 \times 27} \\ = \sqrt{4 \times 4 \times 4 \times 3 \times 3 \times 3} = 4 \times 3 = 12$$

$$(vi) 729 \times 8000 = \sqrt[3]{729 \times 8000} \\ = \sqrt{9 \times 9 \times 9 \times 20 \times 20 \times 20} \\ = 9 \times 20 = 180$$

$$(vii) 3375 \times 512 = \sqrt[3]{3375 \times 512} \\ = \sqrt{15 \times 15 \times 15 \times 8 \times 8 \times 8} \\ = 15 \times 8 = 120$$

Question 3.

Find the cube-roots of :

(i) -216

(ii) -512

(iii) -1331

(iv) $\frac{-27}{125}$

(v) $\frac{-64}{343}$

(vi) $\frac{-512}{343}$

(vii) -2197

(viii) -5832

(ix) -2744000

Solution:

$$(i) -216 = \sqrt[3]{-216} = \sqrt{-6 \times -6 \times -6} = -6$$

$$(ii) -512 = \sqrt[3]{-512} = \sqrt{-8 \times -8 \times -8} = -8$$

$$(iii) -1331 = \sqrt[3]{-1331} \\ = \sqrt{-11 \times -11 \times -11} = -11$$

$$(iv) -\frac{27}{125} = -\frac{\sqrt{27}}{\sqrt{125}} = -\frac{\sqrt{3 \times 3 \times 3}}{\sqrt{5 \times 5 \times 5}} = -\frac{3}{5}$$

$$(v) \frac{-64}{343} = \frac{\sqrt[3]{-64}}{\sqrt[3]{343}} = \frac{\sqrt[3]{-4 \times -4 \times -4}}{\sqrt[3]{7 \times 7 \times 7}} = \frac{-4}{7}$$

$$(vi) -\frac{512}{343} = -\sqrt[3]{\frac{512}{343}} = -\sqrt[3]{\frac{8 \times 8 \times 8}{7 \times 7 \times 7}} = -\frac{8}{7}$$

$$(vii) -2197 = \sqrt[3]{-2197}$$

$$\begin{array}{r|l} 13 & 2197 \\ 13 & 169 \\ 13 & 13 \\ \hline & 1 \end{array}$$

$$= \sqrt[3]{-13 \times -13 \times -13} = -13$$

$$(viii) -5832 = \sqrt[3]{-5832}$$

$$\begin{array}{r|l}
 2 & 5832 \\
 \hline
 2 & 2916 \\
 \hline
 2 & 1458 \\
 \hline
 3 & 729 \\
 \hline
 3 & 243 \\
 \hline
 3 & 81 \\
 \hline
 3 & 27 \\
 \hline
 3 & 9 \\
 \hline
 3 & 3 \\
 \hline
 & 1
 \end{array}$$

$$\begin{aligned}
 &= \sqrt{-2 \times -2 \times -2 \times -3 \times -3 \times -3 \times -3 \times -3 \times -3} \\
 &= -2 \times -3 \times -3 = -18
 \end{aligned}$$

$$(ix) \sqrt[3]{-2744000} = \sqrt[3]{-2744000}$$

$$\begin{array}{r|l}
 2 & 2744000 \\
 \hline
 2 & 1372000 \\
 \hline
 2 & 686000 \\
 \hline
 7 & 343000 \\
 \hline
 7 & 49000 \\
 \hline
 7 & 7000 \\
 \hline
 10 & 1000 \\
 \hline
 10 & 100 \\
 \hline
 10 & 10 \\
 \hline
 & 1
 \end{array}$$

$$\begin{aligned}
 &= \sqrt{-2 \times -2 \times -2 \times -7 \times -7 \times -7} \\
 &= \sqrt{-2 \times -7 \times -7} \\
 &= -2 \times -7 \times -10 = -140
 \end{aligned}$$

Question 4.

Find the cube-roots of :

- (i) 2.744
- (ii) 9.261
- (iii) 0.000027
- (iv) -0.512
- (v) -15.625
- (vi) -125 x 1000

Solution:

$$(i) 2.744 = \sqrt[3]{\frac{2744}{1000}}$$

$$\begin{array}{r|l} 2 & 2744 \\ \hline 2 & 1372 \\ \hline 2 & 686 \\ \hline 7 & 343 \\ \hline 7 & 49 \\ \hline 7 & 7 \\ \hline & 1 \end{array}$$

$$= \sqrt[3]{\frac{2 \times 2 \times 2 \times 7 \times 7 \times 7}{10 \times 10 \times 10}}$$

$$= \frac{2 \times 7}{10} = \frac{14}{10} = 1.4$$

$$(ii) 9.261 = \sqrt[3]{\frac{9261}{1000}} = \sqrt{\frac{3 \times 3 \times 3 \times 7 \times 7 \times 7}{10 \times 10 \times 10}}$$

$$\begin{array}{r|l} 3 & 9261 \\ \hline 3 & 3087 \\ \hline 3 & 1029 \\ \hline 7 & 343 \\ \hline 7 & 49 \\ \hline 7 & 7 \\ \hline & 1 \end{array}$$

$$= \frac{3 \times 7}{10} = \frac{21}{10} = 2.1$$

$$(iii) 0.000027 = \sqrt[3]{\frac{27}{1000000}}$$

$$= \sqrt[3]{\frac{3 \times 3 \times 3}{100 \times 100 \times 100}} = \frac{3}{100} = 0.03$$

$$(iv) -0.512 = \sqrt[3]{\frac{-512}{1000}} = \sqrt{\frac{-8 \times -8 \times -8}{10 \times 10 \times 10}}$$

$$= \frac{-8}{10} = -0.8$$

$$(v) -15.625 = \sqrt[3]{\frac{-15625}{1000}}$$

$$\begin{array}{r|l} 5 & 15625 \\ \hline 5 & 3125 \\ \hline 5 & 625 \\ \hline 5 & 125 \\ \hline 5 & 25 \\ \hline 5 & 5 \\ \hline & 1 \end{array}$$

$$\sqrt{\frac{-(5 \times 5 \times 5) \times (5 \times 5 \times 5)}{10 \times 10 \times 10}}$$

$$= \frac{-5 \times 5}{10} = \frac{-25}{10} = -2.5$$

$$(vi) -125 \times 1000 = \sqrt{-125 \times 100}$$

$$= \sqrt{-(5 \times 5 \times 5) \times (10 \times 10 \times 10)}$$

$$= -5 \times 10 = -50$$

Question 5.

Find the smallest number by which 26244 may be divided so that the quotient is a perfect cube.

Solution:

The prime factors of 26244 are

$$\begin{array}{r|l}
 2 & 26244 \\
 \hline
 2 & 13122 \\
 \hline
 3 & 6561 \\
 \hline
 3 & 2187 \\
 \hline
 3 & 729 \\
 \hline
 3 & 243 \\
 \hline
 3 & 81 \\
 \hline
 3 & 27 \\
 \hline
 3 & 9 \\
 \hline
 3 & 3 \\
 \hline
 & 1
 \end{array}$$

$$\begin{aligned}
 &= 2 \times 2 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3 \\
 &= (3 \times 3 \times 3) \times (3 \times 3 \times 3) \times 3 \times 3 \times 2 \times 2
 \end{aligned}$$

Clearly, 26244 must be divided by
 $3 \times 3 \times 2 \times 2 = 36$

Question 6.

What is the least number by which 30375 should be multiplied to get a perfect cube?

Solution:

The prime factors of 30375 are

$$\begin{array}{r|l}
 3 & 30375 \\
 \hline
 3 & 10125 \\
 \hline
 3 & 3375 \\
 \hline
 3 & 1125 \\
 \hline
 3 & 375 \\
 \hline
 5 & 125 \\
 \hline
 5 & 25 \\
 \hline
 5 & 5 \\
 \hline
 & 1
 \end{array}$$

$$\begin{aligned}
 &= 3 \times 3 \times 3 \times 3 \times 3 \times 5 \times 5 \times 5 \\
 &= (3 \times 3 \times 3) \times (5 \times 5 \times 5) \times 3 \times 3
 \end{aligned}$$

Clearly, 30375 must be multiplied with 3

Question 7.

Find the cube-roots of :

(i) $700 \times 2 \times 49 \times 5$

(ii) -216×1728

(iii) -64×-125

(iv) $\frac{-27}{343}$

(v) $\frac{729}{-1331}$

(vi) 250.047

(vii) -175616

Solution:

(i) $700 \times 2 \times 49 \times 5$

$$\begin{array}{r|l} 2 & 700 \\ \hline 2 & 350 \\ \hline 5 & 175 \\ \hline 5 & 35 \\ \hline 7 & 7 \\ \hline & 1 \end{array}$$

$$\begin{aligned} &= 2 \times 2 \times 5 \times 5 \times 7 \times 2 \times 7 \times 7 \times 5 \\ &= (2 \times 2 \times 2) \times (5 \times 5 \times 5) \times (7 \times 7 \times 7) \\ &= 2 \times 5 \times 10 = 70 \end{aligned}$$

(ii) -216×1728

$$\begin{array}{r|l} 2 & 216 \\ \hline 2 & 108 \\ \hline 2 & 54 \\ \hline 3 & 27 \\ \hline 3 & 9 \\ \hline 3 & 3 \\ \hline & 1 \end{array} \quad \begin{array}{r|l} 2 & 1728 \\ \hline 2 & 864 \\ \hline 2 & 432 \\ \hline & 216 \end{array}$$

$$\begin{aligned} &= -(2 \times 2 \times 2 \times 3 \times 3 \times 3) \times (2 \times 2 \times 2 \times \\ &2 \times 2 \times 2 \times 3 \times 3 \times 3) \\ &= -2 \times 3 \times 2 \times 2 \times 3 = -72 \end{aligned}$$

(iii) -64×-125

$$\begin{aligned} &= -(4 \times 4 \times 4) \times -(5 \times 5 \times 5) \\ &= -4 \times -5 = 20 \end{aligned}$$

(iv) $-\frac{27}{343} = \frac{3 \times 3 \times 3}{7 \times 7 \times 7} = -\frac{3}{7}$

(v) $\frac{729}{-1331} = \frac{(9 \times 9 \times 9)}{-(11 \times 11 \times 11)} = -\frac{9}{11}$

(vi) $250.047 = \frac{250047}{1000}$

$$\begin{array}{r|l} 3 & 250047 \\ \hline 3 & 83349 \\ \hline 3 & 27783 \\ \hline 3 & 9261 \\ \hline 3 & 3087 \\ \hline 3 & 1029 \\ \hline 7 & 343 \\ \hline 7 & 49 \\ \hline 7 & 7 \\ \hline & 1 \end{array}$$

$$= \frac{(3 \times 3 \times 3) \times (3 \times 3 \times 3) \times (7 \times 7 \times 7)}{(10 \times 10 \times 10)}$$

$$= \frac{3 \times 3 \times 7}{10} = \frac{63}{10} = 6.3$$

(vii) -175616

$$\begin{array}{r|l}
 2 & 175616 \\
 \hline
 2 & 27808 \\
 \hline
 2 & 43904 \\
 \hline
 2 & 21952 \\
 \hline
 2 & 10976 \\
 \hline
 2 & 5488 \\
 \hline
 2 & 2744 \\
 \hline
 2 & 1372 \\
 \hline
 2 & 686 \\
 \hline
 7 & 343 \\
 \hline
 7 & 49 \\
 \hline
 7 & 7 \\
 \hline
 & 1
 \end{array}$$

$$\begin{aligned}
 &= -[(2 \times 2 \times 2) \times (2 \times 2 \times 2) \times (2 \times 2 \times 2) \\
 &\times (7 \times 7 \times 7)] \\
 &= -[2 \times 2 \times 2 \times 7] = -56
 \end{aligned}$$