

## EXERCISE 4(B)

1.) Find the cube-root of:

$$\begin{aligned} \text{(i) } 64 &= \sqrt[3]{64} = (2 \times 2 \times 2) \times (2 \times 2 \times 2) \\ &= 2 \times 2 = 4 \end{aligned}$$

$$2 \overline{) 64}$$

$$2 \overline{) 32}$$

$$2 \overline{) 16}$$

$$2 \overline{) 8}$$

$$2 \overline{) 4}$$

$$2 \overline{) 2}$$

$$1$$

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

$$7 \overline{) 343}$$

$$7 \overline{) 49}$$

$$7 \overline{) 7}$$

$$1$$

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

$$\begin{array}{r} 3 \overline{) 729} \\ 3 \overline{) 243} \\ 3 \overline{) 81} \\ 3 \overline{) 27} \\ 3 \overline{) 9} \\ 3 \overline{) 3} \\ 1 \end{array}$$

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

$$\begin{array}{r} 2 \overline{) 1728} \\ 2 \overline{) 864} \\ 2 \overline{) 432} \\ 2 \overline{) 216} \\ 2 \overline{) 108} \\ 2 \overline{) 54} \\ 3 \overline{) 27} \\ 3 \overline{) 9} \\ 3 \overline{) 3} \\ 1 \end{array}$$

$$(v) 9261 = \sqrt[3]{9261} = (3 \times 3 \times 3) \times (7 \times 7 \times 7) \\ = 3 \times 7 = 21$$

$$\begin{array}{r} 3 \overline{) 9261} \\ 3 \overline{) 3087} \\ 3 \overline{) 1029} \\ 7 \overline{) 343} \\ 7 \overline{) 49} \\ 7 \overline{) 7} \\ 1 \end{array}$$

$$(vi) 4096 = \sqrt[3]{4096} = (2 \times 2 \times 2) \times (2 \times 2 \times 2) \times (2 \times 2 \times 2) \\ \times (2 \times 2 \times 2) \\ = 16$$

$2 \overline{) 4096}$   
 $2 \overline{) 2048}$   
 $2 \overline{) 1024}$   
 $2 \overline{) 512}$   
 $2 \overline{) 256}$   
 $2 \overline{) 128}$   
 $2 \overline{) 64}$   
 $2 \overline{) 32}$   
 $2 \overline{) 16}$   
 $2 \overline{) 8}$   
 $2 \overline{) 4}$   
 $2 \overline{) 2}$   
 1

(vii)  $8000 = \sqrt[3]{8000} = (4 \times 4 \times 4) \times (5 \times 5 \times 5)$   
 $= 4 \times 5 = 20$

$4 \overline{) 8000}$   
 $4 \overline{) 2000}$   
 $4 \overline{) 500}$   
 $5 \overline{) 125}$   
 $5 \overline{) 25}$   
 $5 \overline{) 5}$   
 1

(viii)  $3375 = \sqrt[3]{3375} = (5 \times 5 \times 5) \times (3 \times 3 \times 3)$   
 $= 5 \times 3 = 15$

$5 \overline{) 3375}$   
 $5 \overline{) 675}$   
 $5 \overline{) 135}$   
 $3 \overline{) 27}$   
 $3 \overline{) 9}$   
 $3 \overline{) 3}$   
 1

2) Find the cube-root of:

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

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

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

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

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

$$(vi) 729 \times 8000 = \sqrt[3]{3375 \times 512} \\ = \sqrt{15 \times 15 \times 15 \times 8 \times 8 \times 8} \\ = 15 \times 8 = 120$$

3) Find the cube-root of:

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

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

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

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

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

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

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

$$\begin{array}{r} 13 \overline{) 2197} \\ 13 \overline{) 169} \\ 13 \overline{) 13} \\ \hline 1 \end{array}$$

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

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

- 2 | 5832
- 2 | 2916
- 2 | 1458
- 3 | 729
- 3 | 243
- 3 | 81
- 3 | 27
- 3 | 9
- 3 | 3
- 1

$$= \sqrt{-2x - 2x - 2x - 3x - 3x - 3x - 3x - 3x - 3x}$$

$$= -2x - 3x - 3 = -18$$

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

- 2 | 2744000
- 2 | 1372000
- 2 | 686000
- 7 | 343000
- 7 | 49000
- 7 | 7000
- 10 | 1000
- 10 | 100
- 10 | 10
- 1

$$= \sqrt{-2x - 2x - 2x - 7x - 7x - 7x - 10x - 10x - 10x}$$

$$= -2x - 7x - 10 = -140$$

4) Find the cube-root of:

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

$$\begin{array}{r} 2 \overline{) 2744} \\ 2 \overline{) 1372} \\ 2 \overline{) 686} \\ 7 \overline{) 343} \\ 7 \overline{) 49} \\ 7 \overline{) 7} \\ 1 \end{array}$$

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

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

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

$$\begin{array}{r} 3 \overline{) 9261} \\ 3 \overline{) 3087} \\ 3 \overline{) 1029} \\ 7 \overline{) 343} \\ 7 \overline{) 49} \\ 7 \overline{) 7} \\ 1 \end{array}$$

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

(iii)  $0.000027 = \sqrt[3]{\frac{27}{1000000}} = \sqrt[3]{\frac{3 \times 3 \times 3}{100 \times 100 \times 100}} = 3 = 0.03$

(iv)  $-0.512 = \sqrt[3]{\frac{-512}{1000}} = \sqrt[3]{\frac{-8 \times -8 \times -8}{10 \times 10 \times 10}} = \frac{-8}{10} = -0.8$

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

$$5 \overline{) 15625}$$

$$5 \overline{) 3125}$$

$$5 \overline{) 625}$$

$$5 \overline{) 125}$$

$$5 \overline{) 25}$$

$$5 \overline{) 5}$$

1

$$\sqrt{(5 \times 5 \times 5) \times (5 \times 5 \times 5)}$$

$$\sqrt{10 \times 10 \times 10}$$

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

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

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

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

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

Ans) The prime factors of 26244 are

$$2 \overline{) 26244}$$

$$2 \overline{) 13122}$$

$$3 \overline{) 6561}$$

$$3 \overline{) 2187}$$

$$3 \overline{) 729}$$

$$3 \overline{) 243}$$

$$3 \overline{) 81}$$

$$3 \overline{) 27}$$

$$3 \overline{) 9}$$

$$3 \overline{) 3}$$

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

Clearly, 26244 must be divided by

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

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

Ans → The prime factors of 30375 are

$$3 \overline{) 30375}$$

$$3 \overline{) 10125}$$

$$3 \overline{) 3375}$$

$$3 \overline{) 1125}$$

$$3 \overline{) 375}$$

$$5 \overline{) 125}$$

$$5 \overline{) 25}$$

$$5 \overline{) 5}$$

1

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

clearly, 30375 must be multiplied with 5.

7) Find the cube-root of:

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

$$2 \overline{) 700}$$

$$2 \overline{) 350}$$

$$5 \overline{) 175}$$

$$5 \overline{) 35}$$

$$7 \overline{) 7}$$

1

$$= 2 \times 2 \times 5 \times 5 \times 7 \times 2 \times 7 \times 7 \times 5$$

$$= (2 \times 2 \times 7) \times (5 \times 5 \times 5) \times (7 \times 7 \times 7)$$

$$= 2 \times 5 \times 10 = 70$$

(ii)  $-216 \times 1728$



-175616

2 | 175616

2 | 27808

2 | 43904

2 | 21952

2 | 10976

2 | 5488

2 | 2744

2 | 1372

2 | 686

7 | 343

7 | 49

7 | 7

1

$$= [(2 \times 2 \times 2) \times (2 \times 2 \times 2) \times (2 \times 2 \times 2) \times (7 \times 7 \times 7)]$$

$$= -[2 \times 2 \times 2 \times 7] = -56$$

$(10 \times 10 \times 10) \times (8 \times 8 \times 8) \times (8 \times 8 \times 8) =$