

Ch-4

Cube And Cube Roots

Ex - 4(A)

1) i) $7 = 7^3 = 7 \times 7 \times 7 = 343$

ii) $11 = 11^3 = 11 \times 11 \times 11 = 1331$

iii) $16 = 16^3 = 16 \times 16 \times 16 = 4096$

iv) $23 = 23^3 = 23 \times 23 \times 23 = 12167$

v) $31 = 31^3 = 31 \times 31 \times 31 = 29791$

vi) $54 = 54^3 = 54 \times 54 \times 54 = 157464$

2) i) $243 = \text{No}$

ii) $588 = \text{No}$

iii) $1331 = \text{Yes}$

iv) $24000 = \text{No}$

v) $1728 = \text{Yes}$

vi) $1988 = \text{No}$

3) i) $2.1 = 2.1^3 = 2.1 \times 2.1 \times 2.1 = 9.261$

ii) $0.4 = 0.4^3 = 0.4 \times 0.4 \times 0.4 = 0.064$

iii) $1.6 = 1.6^3 = 1.6 \times 1.6 \times 1.6 = 4.096$

iv) $2.5 = 2.5^3 = 2.5 \times 2.5 \times 2.5 = 15.625$

v) $0.12 = 0.12^3 = 0.12 \times 0.12 \times 0.12 = 0.001728$

vi) $0.02 = 0.02^3 = 0.02 \times 0.02 \times 0.02 = 0.000004$

vii) $0.8 = 0.8^3 = 0.8 \times 0.8 \times 0.8 = 0.512$

4) i) $\frac{3}{7} = \frac{3 \times 3 \times 3}{7 \times 7 \times 7} = \frac{27}{343}$

ii) $\frac{8}{9} = \frac{8 \times 8 \times 8}{9 \times 9 \times 9} = \frac{512}{729}$

iii) $\frac{10}{13} = \frac{10 \times 10 \times 10}{13 \times 13 \times 13} = \frac{1000}{2197}$

$$iv) 1 \frac{2}{7} - \frac{9}{9} = \frac{9}{7} \times \frac{9}{7} \times \frac{9}{7} = \frac{729}{343} = 2 \frac{48}{343}$$

$$v) 2 \frac{1}{2} - \frac{5}{2} = \frac{5}{2} \times \frac{5}{2} \times \frac{5}{2} = \frac{125}{8} = 15 \frac{5}{8}$$

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

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

$$iii) -18^3 = -18 \times -18 \times -18 = -5832$$

$$iv) -25^3 = -25 \times -25 \times -25 = -15625$$

$$v) -30^3 = -30 \times -30 \times -30 = -27000$$

$$vi) -12^3 = -12 \times -12 \times -12 = -1728$$

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

6) i) An even number \rightarrow 216, 2000, 4096

ii) An odd number \rightarrow 729, 3375, 125, 343, 9261

7) 1323

$$\begin{array}{r} 3 \overline{) 1323} \\ 3 \overline{) 441} \\ 3 \overline{) 147} \\ 7 \overline{) 49} \\ \hline 7 \end{array}$$

$$1323 = \underline{3 \times 3 \times 3 \times 7 \times 7} = 3^3 \times 7^2$$

8) 8768

$$\begin{array}{r}
 2 \overline{) 8768} \\
 \underline{2 \overline{) 4384}} \\
 \underline{2 \overline{) 2192}} \\
 \underline{2 \overline{) 1096}} \\
 \underline{2 \overline{) 548}} \\
 \underline{2 \overline{) 274}} \\
 \underline{2 \overline{) 137}} \\
 \underline{2 \overline{) 68}} \\
 \underline{2 \overline{) 34}} \\
 17
 \end{array}$$

$$\begin{aligned}
 8768 &= \underline{2 \times 2 \times 2 \times 2 \times 2 \times 2} \times 137 \\
 &= 2 \times 2 \times 137
 \end{aligned}$$

$\therefore 8768$ must be divided by 137

9) 27783

$$\begin{array}{r}
 3 \overline{) 27783} \\
 \underline{3 \overline{) 9261}} \\
 \underline{3 \overline{) 3087}} \\
 \underline{3 \overline{) 1029}} \\
 \underline{7 \overline{) 343}} \\
 7 \overline{) 49} \\
 7
 \end{array}$$

$$\begin{aligned}
 &\underline{3 \times 3 \times 3 \times 3 \times 7 \times 7} \\
 &= 3 \times 7 \times 7 \\
 &=
 \end{aligned}$$

Smallest number to be multiplied

is $3 \times 3 = 9$

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

10) 8640

$$2 \overline{) 8640}$$

$$2 \overline{) 4320}$$

$$2 \overline{) 2160}$$

$$2 \overline{) 1080}$$

$$2 \overline{) 540}$$

$$2 \overline{) 270}$$

$$3 \overline{) 135}$$

$$3 \overline{) 45}$$

$$3 \overline{) 15}$$

$$5 \overline{) 5}$$

1

$$8640 = \underbrace{2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2}_{\times 5} \times 3 \times 3 \times 3$$

$$= 5 \times 5$$

Smallest number to be divided is 5

11)

$$7 \overline{) 9261}$$

$$7 \overline{) 1323}$$

$$7 \overline{) 189}$$

$$3 \overline{) 27}$$

$$3 \overline{) 9}$$

3

$$\sqrt[3]{9261} = \sqrt[3]{\underline{7 \times 7 \times 7 \times 3 \times 3 \times 3}}$$

$$= 7 \times 3$$

$$= 21$$

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

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

$$\sqrt[3]{-125} = \sqrt[3]{-5 \times -5 \times -5} = -5$$

$$1^3 = 1$$

$$2^3 = 8$$

$$3^3 = 27$$

$$4^3 = 64$$

$$5^3 = 125$$

$$6^3 = 216 \rightarrow = 343$$

$$8^3 = 512$$

$$9^3 = 729$$

$$10^3 = 1000$$

$$11^3 = 1331$$

$$12^3 = 1728$$

$$13^3 = 2197$$

$$14^3 = 2744$$

$$15^3 = 3375$$

Ex-4(B)

1) vi) 4096

$$\begin{array}{r}
 2 \overline{) 4096} \\
 2 \overline{) 2048} \\
 2 \overline{) 1024} \\
 2 \overline{) 512} \\
 2 \overline{) 256} \\
 2 \overline{) 128} \\
 2 \overline{) 64} \\
 2 \overline{) 32} \\
 16
 \end{array}$$

$$\begin{aligned}
 4096 &= \underline{2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2} \\
 &\quad \underline{\times 2 \times 2 \times 2 \times 2 \times 2} \\
 &= 2 \times 2 \times 2 \times 2 \\
 &= 16
 \end{aligned}$$

$$\begin{array}{r}
 2 \overline{) 16} \\
 2 \overline{) 8} \\
 2 \overline{) 4} \\
 2
 \end{array}$$

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

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

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

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

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

$$\text{vii)} -2197 = \sqrt[3]{-2197} = \sqrt[3]{-13 \times -13 \times -13} = -13$$

$$\text{viii)} -5832 = \sqrt[3]{5832} = \sqrt[3]{18 \times 18 \times 18} = 18$$

$$\text{ix)} -2744000 = \sqrt[3]{-2744000} = \sqrt[3]{-140 \times -140 \times -140} = -140$$

$$4) \text{i)} 2.744 = \frac{\sqrt[3]{2744}}{\sqrt[3]{1000}} = \frac{\sqrt[3]{2744}}{\sqrt[3]{1000}} = \frac{14}{10} = 1.4$$

$$\text{ii)} 9.261 = \frac{\sqrt[3]{9261}}{\sqrt[3]{1000}} = \frac{\sqrt[3]{9261}}{\sqrt[3]{1000}} = \frac{21}{10} = 2.1$$

$$\begin{aligned} \text{v)} \sqrt[3]{5.625} &= \frac{\sqrt[3]{5625}}{\sqrt[3]{1000}} = \frac{\sqrt[3]{5 \times 5 \times 5 \times 5 \times 5}}{\sqrt[3]{10 \times 10 \times 10}} = \frac{5 \times 5}{10} = \frac{25}{10} \\ &= 2.5 \end{aligned}$$

5) 26244

$$2 \overline{) 26244}$$

$$2 \overline{) 13122}$$

$$3 \overline{) 6561}$$

$$3 \overline{) 2187}$$

$$3 \overline{) 729}$$

$$3 \overline{) 243}$$

$$3 \overline{) 81}$$

$$3 \overline{) 27}$$

$$3 \overline{) 9}$$

$$3$$

$$26244 = 2 \times 2 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3$$

∴ Smallest number to be divided is $2 \times 2 \times 3 \times 3 = 36$

6) 30375

$$3 \overline{) 30375}$$

$$3 \overline{) 10125}$$

$$3 \overline{) 3375}$$

$$3 \overline{) 1125}$$

$$3 \overline{) 375}$$

$$5 \overline{) 125}$$

$$5 \overline{) 25}$$

$$5$$

$$30375 = 3 \times 3 \times 3 \times 3 \times 3 \times 5 \times 5 \times 5$$

∴ Smallest number to be multiplied is 3

Ex - 4(B)

$$1) i) 64 = \sqrt[3]{64} = \sqrt[3]{4 \times 4 \times 4} = 4$$

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

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

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

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

$$vi) 8000 = \sqrt[3]{8000} = \sqrt[3]{20 \times 20 \times 20} = 20$$

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

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

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

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

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

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

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

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

$$\text{iii) } -64x-125 = \sqrt[3]{-64x-125} = \sqrt[3]{-4x-4x-4x-5x-5x-5}$$

$$= -4x-5 = 20$$

$$\text{iv) } -\frac{27}{343} = \sqrt[3]{-\frac{27}{343}} = \sqrt[3]{\frac{3 \times 3 \times 3}{7 \times 7 \times 7}} = -\frac{3}{7}$$

$$\text{v) } \frac{729}{-1331} = \sqrt[3]{\frac{729}{-1331}} = \frac{\sqrt[3]{729}}{\sqrt[3]{-1331}} = \frac{\sqrt[3]{9 \times 9 \times 9}}{\sqrt[3]{-11 \times -11 \times -11}}$$

$$= \frac{9}{-11}$$

vii) $-175616 = 3\sqrt{-175616}$

$= 3\sqrt{-2x-2x-2x-2x-2x-2x-2x-2x-2x-7x-7x-7}$

$= -2x-2x-2x-7$
 $= -8x-7$
 $= 56$

2	175616
2	87808
2	43904
2	21952
2	10976
2	5488
2	2744
2	1372
2	686
7	343
7	49
	7