

4 (A)
Exercise

$$\begin{array}{r} 2 \overline{) 24000} \\ \underline{2 12000} \\ 2 6000 \\ \underline{2 3000} \\ 2 1500 \\ \underline{3 750} \\ 3 375 \\ \underline{5 025} \\ 5 \end{array}$$

4) 1728

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

$$(3) \left(\frac{21}{10}\right)^3 = \left(\frac{21 \times 21 \times 21}{10 \times 10 \times 10}\right)$$

$$= \frac{9261}{1000} = 9.261$$

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

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

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

$$(v) \left(\frac{12}{10}\right)^3 = \left(\frac{12 \times 12 \times 12}{10 \times 10 \times 10}\right) = \frac{1728}{1000} = 1.728$$

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

$$(vii) \left(\frac{8}{10}\right)^3 = \left(\frac{8 \times 8 \times 8}{10 \times 10 \times 10}\right)$$

$$= \frac{512}{1000} = 0.512$$

4 (A)
Exercise

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

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

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

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

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

$$(vi) (42)^3 = 42 \times 42 \times 42 \\ = 74088$$

$$(vii) (54)^3 = 54 \times 54 \times 54 \\ = 157464$$

⑧

Q

(i) $\left(\frac{3}{7}\right)^3$

$$= \frac{|3|^3}{|7|^3} = \frac{3 \times 3 \times 3}{7 \times 7 \times 7} = \frac{27}{243}$$

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

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

(iv) $2\frac{9}{7} = \frac{2 \times 7 + 9}{7} = \frac{23}{7}$
 $\left(\frac{23}{7}\right)^3 = \frac{23 \times 23 \times 23}{7 \times 7 \times 7} = \frac{12167}{343} = 35\frac{43}{343}$

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

(5) (i) -5

$$= (-5) \times (-5) \times (-5)$$

$$= -125$$

(ii) -7

$$= (-7) \times (-7) \times (-7)$$

$$= -343$$

(iii) -12

$$= (-12)^3$$

$$= (-12) \times (-12) \times (-12) = -1728$$

$$\begin{aligned} \text{(v)} \quad & -25 \\ & = (-25) \times (-25) \times (-25) \\ & = -15625 \end{aligned}$$

$$\begin{aligned} \text{(vi)} \quad & -30 \\ & = (-30) \times (-30) \times (-30) \\ & = -27000 \end{aligned}$$

$$\begin{aligned} \text{(vii)} \quad & -50 \\ & = (-50)^3 \\ & = (-50) \times (-50) \times (-50) \\ & = -125000 \end{aligned}$$

- ⑥
- (a) 216, 8000, 4096, done
- (b) 729, 3375, 125, 343, 9261.

$$\begin{array}{r|l} 3 & 1323 \\ \hline 3 & 441 \\ \hline 3 & 147 \\ \hline 7 & 49 \\ \hline & 7 \end{array}$$

$$\text{So, } 3 \times 3 \times 3 \times 7 \times 7 = (3)^3 \times (7)^2$$

∴ Thus 7 is not in triplet, so 7 must be multiplied to 1323 to make it a perfect cube number.

$$\begin{array}{r}
 2 \overline{) 2778} \\
 \underline{2436} \\
 342 \\
 \underline{2100} \\
 548 \\
 \underline{514} \\
 34 \\
 \underline{34} \\
 0
 \end{array}$$

So, $(2 \times 2 \times 2) \times (2 \times 2) \times 137$
 $= (2)^3 \times (2)^2 \times 137$

\therefore Thus, 137 is not in a triple
 So 137 must be divided to make
 8768 a perfect cube number

$$\begin{array}{r}
 3 \overline{) 27783} \\
 \underline{3} \\
 3 \\
 \underline{3} \\
 3 \\
 \underline{3} \\
 7 \\
 \underline{7} \\
 7 \\
 \underline{7} \\
 0
 \end{array}$$

So, $3 \times 3 \times 3 \times 3 \times 7 \times 7 \times 7 = (3)^3 \times 7^3$

\therefore Thus, ~~87783~~ 3 is not in triplet.
 So, 3x3 must be multiplied from
 27783 to make it a perfect cube
 number.

10

2	8640
2	4320
2	2160
2	1080
2	540
2	270
3	135
3	45
3	15
5	5
	1

So, $(2 \times 2 \times 2) \times (2 \times 2 \times 2) \times (3 \times 3 \times 3) \times 5$

11

5	77175
5	15435
3	3087
3	1029
7	343
7	49
7	7
	1

So, $5 \times 5 \times 3 \times 3 \times (7 \times 7 \times 7)$
 $= (5)^2 \times (3)^2 \times (7)^3$

Exercise
(4-B)

(1)

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

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

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

$$= 2 \times 2 = 4$$

(ii) $\sqrt[3]{9261}$

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

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

$$= 3 \times 7 = 21$$

(2)

(vii) $\sqrt[3]{15^3 \times 8^3}$

$$= \sqrt[3]{15^3 \times 8^3}$$

$$= 15 \times 8 = 120$$

(2i)

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

21

$$(2)(ix) \sqrt[3]{3-2744000}$$

$$= \sqrt[3]{-2744} \times \sqrt[3]{1000}$$

$$= \sqrt[3]{(-14)^3} \times \sqrt[3]{10^3}$$

$$= -14 \times 10 = -140$$

$$(4)(i) \frac{\sqrt[3]{27}}{\sqrt{1000}} = \frac{\sqrt[3]{2744}}{\sqrt[3]{1000}} = \frac{\sqrt[3]{143}}{\sqrt[3]{103}}$$

$$(ii) \frac{\sqrt[3]{27}}{\sqrt[3]{1000000}} = \frac{\sqrt[3]{27}}{\sqrt[3]{1000000}} = \frac{\sqrt[3]{3^3}}{\sqrt[3]{10^3}}$$

$$= \frac{3}{100} = 0.03$$

Exercise - 4(B)

(1)

(ii) 343

343

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

729

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

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

4096

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

$$\begin{array}{r}
 \text{(vii)} \quad 2 \overline{) 8000} \\
 \underline{2 \quad 4000} \\
 2 \quad 2000 \\
 \underline{2 \quad 1000} \\
 2 \quad 500 \\
 \underline{2 \quad 250} \\
 2 \quad 125 \\
 \underline{5 \quad 25} \\
 5
 \end{array}$$

$$\begin{array}{r}
 \text{(viii)} \quad 3 \overline{) 3375} \\
 \underline{3 \quad 1125} \\
 3 \quad 375 \\
 \underline{5 \quad 125} \\
 5 \quad 25 \\
 \underline{5 \quad 5} \\
 5
 \end{array}$$

(2)

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

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

$$= \frac{\sqrt[3]{3^3}}{\sqrt[3]{4^3}} = \frac{3}{4}$$

$$\text{(ii)} \quad \frac{\sqrt[3]{343}}{\sqrt[3]{512}} = \frac{\sqrt[3]{7^3}}{\sqrt[3]{8^3}}$$

$$= \frac{7}{8}$$

$$(iv) \sqrt[3]{81} \times 9$$

$$= \sqrt[3]{4^3} \times \sqrt[3]{9^3}$$

$$= 4 \times 9$$

$$= 36$$

$$(v) 64 \times 27$$

$$= \sqrt[3]{4^3} \times \sqrt[3]{3^3}$$

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

$$(5) \begin{array}{r|l} 2 & 26244 \\ \hline 2 & 13122 \\ \hline 3 & 6561 \\ \hline 3 & 2187 \\ \hline 3 & 729 \\ \hline 3 & 243 \\ \hline 3 & 81 \\ \hline 3 & 27 \\ \hline 3 & 9 \\ \hline 3 & 3 \end{array}$$

NOT in triplet

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

⑥

$$\begin{array}{r|l}
 3 & 36375 \\
 \hline
 3 & 10125 \\
 \hline
 3 & 3375 \\
 \hline
 3 & 1125 \\
 \hline
 3 & 375 \\
 \hline
 5 & 125 \\
 \hline
 5 & 25 \\
 \hline
 5 & 5 \\
 \hline
 \end{array}$$

Not in triplet.

$$\begin{aligned}
 &= \underbrace{3 \times 3 \times 3} \times \underbrace{3 \times 3} \times \underbrace{5 \times 5 \times 5} \times \underbrace{5} \\
 &= 3^3 \times 3^2 \times 5^3 \times 5
 \end{aligned}$$

⑦

$$\begin{aligned}
 \text{i)} \quad & \sqrt[3]{100 \times 2 \times 49 \times 5} = \sqrt[3]{7 \times 100 \times 10 \times 49} \\
 &= 7 \times 10 = 70
 \end{aligned}$$

$$\begin{aligned}
 \text{(ii)} \quad & \sqrt[3]{-216} \times \sqrt[3]{1728} \\
 &= \sqrt[3]{(-6)^3} \times \sqrt[3]{(12)^3} \\
 &= -6 \times 12 = -72
 \end{aligned}$$

(iii)

$$\begin{aligned}
 &= \sqrt[3]{-64} \times \sqrt[3]{-125} \\
 &= \sqrt[3]{(-4)^3} \times \sqrt[3]{(-5)^3} \\
 &= -4 \times -5 \\
 &= 20
 \end{aligned}$$

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

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

$$= \frac{\sqrt[3]{(-3)^3}}{\sqrt[3]{(7)^3}} = \frac{\sqrt[3]{-3^3}}{\sqrt[3]{7^3}} = \frac{(-3) \times (-3) \times (-3)}{7 \times 7 \times 7}$$

$$= \frac{-3}{7}$$

$$(v) \frac{\sqrt[3]{229}}{\sqrt[3]{-7331}} = \frac{\sqrt[3]{(9)^3}}{\sqrt[3]{(-11)^3}} = \frac{\sqrt[3]{9^3}}{\sqrt[3]{-11^3}} = \frac{9 \times 9 \times 9}{-11 \times -11 \times -11}$$

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

$$(vi) \frac{\sqrt[3]{250047}}{\sqrt[3]{1000}} = \frac{\sqrt[3]{63^3}}{\sqrt[3]{10^3}} = \frac{63}{10} = 6.3$$

$$(vii) -175616$$

$$= \sqrt[3]{-175616}$$

$$= (-8) \times (-8) \times (-8) \times 7 \times 7 \times 7$$

$$= 8^3 \times 7^3$$

$$= \sqrt[3]{8^3 \times 7^3} = -8 \times 7 = -56$$