CUBES AND CUBE-ROOTS

Exercise-4(A)

(1) Find the cube of :

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) 42

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

vii) 54

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

(2) Find which of the following are perfect cubes:

i) 243

→

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

$243 = 3 \times 3 \times 3 \times 3$

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

$= 3^3 \times 3$

∴ 297 is not a perfect cube.

ii) 588

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

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

∴ 588 is not a perfect cube

iii) 1331

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11 | 1331
11 | 121
11 | 11
   | 1
```

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

∴ 131 is a perfect cube

iv) 24000

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2 | 24000
2 | 12000
2 | 6000
2 | 3000
2 | 1500
2 | 750
3 | 375
5 | 125
5 | 25
5 | 5
  | 1
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$24000 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 5 \times 5 \times 5$
$= (2)^3 \times (2)^3 \times (5)^3 \times 3$

∴ 24000 is not a perfect cube

v) 1728

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

$1728 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3$

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

$\therefore$ 1728 is a perfect cube.

vi) 1938

$$
\begin{array}{r|l}
2 & 1938 \\
\hline
3 & 969 \\
\hline
17 & 323 \\
\hline
19 & 19 \\
\hline
 & 1
\end{array}
$$

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

$\therefore$ 1938 is not a perfect cube

(3) Find the cubes of :

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

→ $(0.02)^3 = 0.02 \times 0.02 \times 0.02 = 0.000008$

vii) 0.8

→ $(0.8)^3 = 0.8 \times 0.8 \times 0.8 = 0.512$

(4) Find the cubes of :

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

$= \frac{3 \times 3 \times 3}{7 \times 7 \times 7} = \frac{24}{343}$

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

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

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

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

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

$= \left(1\frac{2}{7}\right)^3 = \left(\frac{1 \times 7 + 2}{7}\right)^3 = \left(\frac{9}{7}\right)^3$

$= \frac{9 \times 9 \times 9}{7 \times 7 \times 7} = \frac{729}{343} = 2\frac{43}{343}$

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

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

$= \frac{5 \times 5 \times 5}{2 \times 2 \times 2} = \frac{125}{8} = 15\frac{5}{8}$

(5) Find the cubes of :

i) -3

$\rightarrow (-3)^3 = -3 \times -3 \times -3$

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

ii) -7

$\rightarrow (-7)^3 = -7 \times -7 \times -7$

$= -343$

iii) -12

$\rightarrow (-12)^3 = -12 \times -12 \times -12$

$= -1728$

iv) -18

$\rightarrow (-18)^3 = -18 \times -18 \times -18$

$= -5832$

v) -25

$\rightarrow (-25)^3 = -25 \times -25 \times -25$

$= -15625$

vi) -30

$\rightarrow (-30)^3 = -30 \times -30 \times -30$

$= -27000$