

WS
13/5/2021

ch-4

cubes and cube-roots

Exercise 4(A)

1) Find the cube of:

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

2) Find which of the following are perfect cube:

(i) 243

$$\begin{array}{r} 3 \overline{) 243} \\ \underline{6} \\ 18 \\ \underline{18} \\ 0 \end{array}$$

$$\begin{array}{r} 3 \overline{) 81} \\ \underline{6} \\ 21 \\ \underline{21} \\ 0 \end{array}$$

$$\begin{array}{r} 3 \overline{) 27} \\ \underline{6} \\ 21 \\ \underline{21} \\ 0 \end{array}$$

$$\begin{array}{r} 3 \overline{) 9} \\ \underline{6} \\ 3 \\ \underline{3} \\ 0 \end{array}$$

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

$$\therefore 243 = (3 \times 3 \times 3) \times 3 \times 3$$

$$= 3^3 \times 3$$

$\therefore 243$ is not a perfect cube.

(ii) 588

$$\begin{array}{r} 2 \overline{) 588} \\ \underline{4} \\ 18 \\ \underline{16} \\ 2 \end{array}$$

$$\begin{array}{r} 2 \overline{) 294} \\ \underline{4} \\ 14 \\ \underline{14} \\ 0 \end{array}$$

$$\begin{array}{r} 7 \overline{) 147} \\ \underline{7} \\ 7 \\ \underline{7} \\ 0 \end{array}$$

$$\begin{array}{r} 7 \overline{) 21} \\ \underline{7} \\ 14 \\ \underline{14} \\ 0 \end{array}$$

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

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

$\therefore 588$ is not a perfect ^{cube} square.

(iii) 1331

$$\begin{array}{r} 11 \overline{) 1331} \\ \underline{11} \\ 23 \\ \underline{22} \\ 1 \end{array}$$

$$\begin{array}{r} 11 \overline{) 121} \\ \underline{11} \\ 11 \\ \underline{11} \\ 0 \end{array}$$

$$\begin{array}{r} 11 \overline{) 11} \\ \underline{11} \\ 0 \end{array}$$

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

$\therefore 1331$ is a perfect cube.

(iv) $24000 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 5 \times 5 \times 5$
 $= (2)^3 \times (2)^3 \times (5)^3 \times 3$
 $\therefore 24000$ is not a perfect cube.

(v) 1728

$$\begin{array}{r} 2 \overline{) 1728} \\ \underline{2} \\ 864 \\ 2 \overline{) 864} \\ \underline{2} \\ 432 \\ 2 \overline{) 432} \\ \underline{2} \\ 216 \\ 2 \overline{) 216} \\ \underline{2} \\ 108 \\ 2 \overline{) 108} \\ \underline{2} \\ 54 \\ 2 \overline{) 54} \\ \underline{2} \\ 27 \\ 3 \overline{) 27} \\ \underline{3} \\ 9 \\ 3 \overline{) 9} \\ \underline{3} \\ 0 \end{array}$$

$1728 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3$
 $= (2)^3 \times (2)^3 \times (3)^3$
 1728 is a perfect cube.

(vi) 1938

$$\begin{array}{r} 2 \overline{) 1938} \\ \underline{2} \\ 936 \\ 3 \overline{) 936} \\ \underline{3} \\ 323 \\ 17 \overline{) 323} \\ \underline{17} \\ 19 \\ 19 \overline{) 19} \\ \underline{19} \\ 0 \end{array}$$

$1938 = 2 \times 3 \times 17 \times 19$
 1938 is not a perfect cube.

3) Find the cubes of:

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

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

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

$$(viii) 0.8 = (0.8)^3 = \left(\frac{8}{10}\right)^3 = \frac{8 \times 8 \times 8}{10 \times 10 \times 10} = \frac{512}{1000} = 0.512$$

4) Find the cubes of:

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

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

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

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

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

5) Find the cubes of:

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

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

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

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

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

$$\begin{aligned} -30 &= (-30)^3 = -30 \times -30 \times -30 \\ &- (30 \times 30 \times 30) = -27000 \end{aligned}$$

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