

CEW
10.04.21

Cubes and

Ch-4

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. $54^3 = 54 \times 54 \times 54 = 157464$

243

2	243
2	123
2	63
3	33
	11

243

2	243
2	123
2	63
3	33
	11

243 can't be a perfect cube.

ii)

2	588
2	294
7	147
7	21
	3

$= (2 \times 7)(2 \times 7) \times 3$

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

$1323 = 3 \times 3 \times 3 \times 7 \times 7$
 So, 7 is multiplied by 7.

$$\begin{array}{r}
 8) \quad 2 \overline{) 8786} \\
 \quad \underline{2} \quad 4384 \\
 \quad 2 \overline{) 2192} \\
 \quad \underline{2} \quad 1096 \\
 \quad 2 \overline{) 548} \\
 \quad \underline{2} \quad 274 \\
 \quad \quad 137
 \end{array}$$

$8786 = (2 \times 2 \times 2) \times (2 \times 2 \times 2) \times 137 \times 137$
 clearly, 8786 must be divided

$$\begin{array}{r}
 9) \quad \cancel{2783} \quad 3 \overline{) 27783} \\
 \quad \quad \underline{3} \quad 9261 \\
 \quad \quad 9 \overline{) 3087} \\
 \quad \quad \underline{7} \quad 1029 \\
 \quad \quad \quad \underline{7} \quad 343 \\
 \quad \quad \quad \quad \underline{7} \quad 49 \\
 \quad \quad \quad \quad \quad 7
 \end{array}$$

$\cancel{2783} \quad 27783$
 $= (3 \times 3 \times 3) \times (7 \times 7 \times 3)$
 $= 9$

10/

This is the solution!

3 Find the cube of:-

i. $2.1 = 2.1 \times 2.1 \times 2.1 = 9.261$

ii. $0.4 = 0.4 \times 0.4 \times 0.4 = 0.064$

iii. $1.6 = 1.6 \times 1.6 \times 1.6 = 4.096$

iv. $2.5 = 2.5 \times 2.5 \times 2.5 = 15.625$

v. $0.12 = 0.12 \times 0.12 \times 0.12 = \overset{0.001728}{\cancel{0.000000}}$

vi. $0.02 = 0.02 \times 0.02 \times 0.02 = \cancel{0} - 0.000008$

vii. $0.8 = 0.8 \times 0.8 \times 0.8 = 0.512$

4. Find the cube of:-

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. $\frac{10}{13} = \frac{10 \times 10 \times 10}{13 \times 13 \times 13} = \frac{\cancel{1000} 1000}{2197}$

iv. $1\frac{2}{7} = \frac{9}{7} = \frac{9 \times 9 \times 9}{7 \times 7 \times 7} = 2\frac{43}{343}$

v. $-3 = -3^3 = -27$

vi. $-7 = -7^3 = -343$

vii. $-12 = -12^3 = -1728$

viii. $-18 = -18^3 = -5832$

ix. $-25 = -25^3 = -15625$

x. $-30 = -30^3 = -27000$

xi. $-50 = -50^3 = -125000$

Even numbers,

Q. 216, because

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

$$2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 1$$

8000, because

$$\begin{array}{r|l}
 2 & 8000 \\
 \hline
 2 & 4000 \\
 \hline
 2 & 1000 \\
 \hline
 2 & 500 \\
 \hline
 2 & 250 \\
 \hline
 5 & 125 \\
 \hline
 5 & 25 \\
 \hline
 5 & 5 \\
 \hline
 & 1
 \end{array}$$

$$2 \times 2 \times 2 \times 2 \times 2 \times 5 \times 5 \times 5 \times 1$$

Giv. 216, 8000, 4096,

ii. 729, 3375, 125, 343, 9261

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

$$3^3 \times 7 \times 7$$

Hence, the least number is 7. 280, one more 7 is required so, that the product is a perfect cube.

8.	2 8768	2 8768
	2 4384	2 4384
	2 2192	2 2192
	2 1096	2 1096
	2 548	2 548
	2 274	2 274
	2 137	2 137
	2 68	
	2 34	

$$= (2 \times 2 \times 2 \times 2 \times 2 \times 2) (137)$$

$$= 2^3 \times 2^3 \times 137$$

∴ 137 is the smallest number for to obtained for a perfect cube.

9.	3 27783
	3 9261
	3 3087
	3 1029
	3 343
	7 49
	7

$$= (3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 7 \times 7)$$

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

∴ the least number is 3

10.	2 8640
	2 4320
	2 2160
	2 1080
	2 540
	2 270
	5 135
	3 27
	3 9

$$= 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 3 \times 5$$

$$= 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 5$$

$$= 48 \times 15$$

10) Hence

$$\begin{array}{r|l}
 2 & 8640 \\
 2 & 4320 \\
 2 & 2160 \\
 2 & 1080 \\
 2 & 540 \\
 2 & 270 \\
 3 & 135 \\
 3 & 45 \\
 3 & 15 \\
 & 5
 \end{array}$$

$$2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 5$$

Hence, one more 5 required.

11.

$$\begin{array}{r|l}
 3 & 77175 \\
 3 & 25725 \\
 5 & 85725 \\
 5 & 1715 \\
 3 & 345 \\
 5 & 115 \\
 & 23
 \end{array}$$

$$\begin{aligned}
 &= 3 \times 3 \times 3 \times 5 \times 5 \times 5 \times 23 \\
 &= 3^3 \times 5^3 \times 23 \\
 &= 15 \times 23
 \end{aligned}$$

$$21. i. \sqrt[3]{\frac{27}{64}} = \frac{3 \times 3 \times 3}{4 \times 4 \times 4} = \frac{3}{4}$$

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

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

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

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

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

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

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

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

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

$$iv. \sqrt[3]{\frac{87}{125}} = \frac{\sqrt[3]{3 \times 3 \times 3}}{\sqrt[3]{5 \times 5 \times 5}} = \frac{-3}{5}$$

$$4. i. \sqrt[3]{\frac{2744}{1000}} = \frac{\sqrt[3]{14 \times 14 \times 14}}{\sqrt[3]{10 \times 10 \times 10}} = \frac{14}{10} = 1.4$$

$$ii. \sqrt[3]{\frac{9261}{1000}} = \frac{\sqrt[3]{21 \times 21 \times 21}}{\sqrt[3]{10 \times 10 \times 10}} = \frac{21}{10} = 2.1$$

$$\begin{array}{r}
 54 \quad 2 \mid 26244 \\
 \quad 2 \mid 13122 \\
 \quad 3 \mid 6561 \\
 \quad 3 \mid 2187 \\
 \quad 3 \mid 729 \\
 \quad 3 \mid 243 \\
 \quad 3 \mid 81 \\
 \quad 3 \mid 27 \\
 \quad 3 \mid 9 \\
 \quad 3 \mid 3
 \end{array}$$

$$\begin{aligned}
 &= 2 \times 2 \times \overline{3 \times 3 \times 3} \times \overline{3 \times 3 \times 3 \times 3} \\
 &= 2^2 \times 3^3 \times 3^4 \\
 &= 2^2 \times 3^7 \\
 &= 36
 \end{aligned}$$

∴ 26244 divided by 36

$$\begin{array}{r}
 6) \quad 3 \mid 30375 \\
 \quad 3 \mid 10125 \\
 \quad 3 \mid 3375 \\
 \quad 3 \mid 1125 \\
 \quad 3 \mid 375 \\
 \quad 5 \mid 125 \\
 \quad 5 \mid 25 \\
 \quad 5 \mid 5
 \end{array}$$

$$\begin{aligned}
 &= \overline{3 \times 3 \times 3} \times \overline{3 \times 3 \times 3} \times \overline{5 \times 5 \times 5} \\
 &\text{clearly, one more 3 are}
 \end{aligned}$$

$$\begin{aligned}
 \text{viz } \sqrt{2 \times 2 \times 5 \times 5 \times 7 \times 2 \times 7 \times 7 \times 5} \\
 &= (2 \times 2 \times 2) (5 \times 5 \times 5) (7 \times 7 \times 7) = 2 \times 5 \times 7 = 70 \\
 &\bullet \sqrt{-(4 \times 4 \times 4) \times (5 \times 5 \times 5)} = 4 \times 5 = 20
 \end{aligned}$$

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