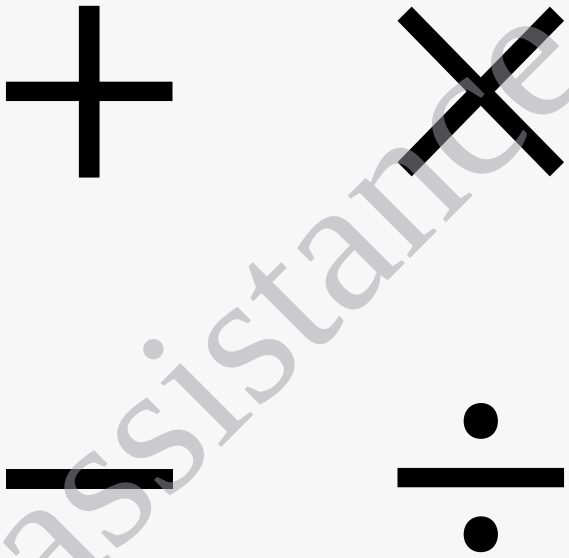
Squares, Cubes And Their Roots
Ex. 3.4



Exc. 3.4

1a. $6^3 = 216$

b. $(-4)^3 = -64$

c. $11^3 = 1331$

d. $(-7)^3 = -343$

e. $(-16)^3 = -4096$

2a. $\left(\frac{2}{5}\right)^3 = \frac{8}{125}$

b. $\left(-\frac{2}{5}\right)^3 = \frac{-8}{125}$

c. $(0)^3 = 0$

d. $\left(\frac{3}{7}\right)^3 = \frac{27}{343}$

e. $\left(\frac{-5}{-11}\right)^3 = \frac{125}{1331}$

3a.

2	2744
2	1372
2	686
7	343
7	49
	7

$2744 = \underline{2 \times 2 \times 2} \times \underline{7 \times 7 \times 7}$

Since 2 and 7 occur in triplets.

$\therefore$ 2744 is a perfect cube.

b.

13 | 2197
13 | 169
13 | 13
13

$-2197 = \underline{(-13) \times (-13) \times (-13)}$

Since (-13) occurs in triplets

$\therefore (-2197)$ is a perfect cube.

c.

3 | 9261
3 | 3087
3 | 1029
7 | 343
7 | 49
7 | 7

$9261 = \underline{3 \times 3 \times 3} \times \underline{7 \times 7 \times 7}$

Since 3 and 7 occur in triplets.

$\therefore$ 9261 is a perfect cube.

d.

2 | 39304
2 | 19652
2 | 9826
17 | 4913
17 | 289
17 | 17

$39304 = \underline{2 \times 2 \times 2} \times \underline{17 \times 17 \times 17}$

Since 2 and 17 occur in triplets

$\therefore$ 39304 is a perfect cube.

e.

2	74088
2	37044
2	18522
3	9261
3	3087
3	1029
7	343
7	49
	7

$74088 = \underline{2\times2\times2}\times\underline{3\times3\times3}\times\underline{7\times7\times7}$

Since 2, 3 and 7 occur in triplets.

∴ 74088 is a perfect cube.

4.

2	2058
3	1029
7	343
7	49
	7

$2058 = 2\times3\times\underline{7\times7\times7}$

Since 2 and 3 do not occur in triplets

∴ We multiply 2058 by $2\times2\times3\times3 = 36$

∴ Required smallest number = 36

5.

2	6912
2	3456
2	1728
2	864
2	432
	216

2	216
2	108
2	54
3	27
3	9
	3

$6912 = \underline{2\times2\times2}\times\underline{2\times2\times2}\times2\times2\times\underline{3\times3\times3}$

Since 2 does not occur in triplets.

∴ We divide 6912 by $2\times2=4$

∴ Required smallest number = 4.

6.

2	5400
2	2700
2	1350
3	675
3	225
3	75
5	25
	5

$5400 = \underline{2\times2\times2}\times\underline{3\times3\times3}\times5\times5$

Since 5 does not occur in a triplet.

∴ We multiply 5400 by 5.

∴ Required smallest number = 5.

7a. $7^3 = 343 = 43+45+47+49+51+53+55$

b. $8^3 = 512 = 57+59+61+63+65+67+69+71$

8a. Since 125 is an odd number, it is cube of an odd number that is 5.

b. Since 512 is an even number, it is cube of an even number i.e. 8.

c. Since 729 is an odd number, it is cube of an odd number i.e. 9.

d. Since 1000 is an even number, it is cube of an even number i.e. 10.

e. Since 2197 is an odd number, it is cube of an odd number i.e. 13.

9a. Since 27 is an odd number, it is cube of an odd number i.e. 3.

b. Since 216 is an even number, it is cube of an even number i.e. 6.

c. Since 343 is an odd number, it is cube of an odd number i.e. 7.

d. Since 1331 is an odd number, it is cube of an odd number i.e. 11.

e. Since 2744 is an even number, it is cube of an even number i.e. 14.

10a. The unit's digit of $(-135)^3$ is 5 as $5^3 = 125$.

b. The unit's digit of $(24)^3$ is 4 as $4^3 = 64$.

c. The unit's digit of $(39)^3$ is 9 as $9^3 = 729$.

d. The unit's digit of $(238)^3$ is 2 as $8^3 = 512$.

e. The unit's digit of $(666)^3$ is 6 as $6^3 = 216$.

11. $1^3 + 2^3 + 3^3 + \_\_\_ + 20^3 = (1+2+3+\_\_\_+20)^2 = (210)^2 = 44100$

12. Let the number be $2x$.

$\therefore (2x)^3 = 8x^3$

Half of $2x = \frac{2x}{2} = x$

Its cube $= x^3$

Ratio $= \frac{x^3}{8x^3} = \frac{1}{8}$

$\therefore$ The cube of half of a given number becomes one-eighth of the cube of the given number.