Exercise 7.1

Question 1:

Which of the following numbers are not perfect cubes:

(i)	216	(ii)	128
(iii)	1000	(iv)	100
(v)	46656		

Answer 1:

(i) 216

Prime factors of 216 = 2 x 2 x 2 x 3 x 3 x 3

Here all factors are in groups of 3's (in triplets)

Therefore, 216 is a perfect cube number.

2	216
2	108
2	54
3	27
3	9
3	3
	1

(ii) 128

Prime factors of 128 = 2 x 2 x 2 x 2 x 2 x 2 x 2

Here one factor 2 does not appear in a 3's group.

Therefore, 128 is not a perfect cube.

2	128
2	64
2	32
2	16
2	8
2	4
2	2
	1

(iii) 1000

Prime factors of 1000 = 2 x 2 x 2 x 3 x 3 x 3
Here all factors appear in 3's group.
Therefore, 1000 is a perfect cube.

2	1000
2	500
2	250
5	125
5	25
5	5
	1

(iv) 100

Prime factors of 100 = 2 x 2 x 5 x 5
Here all factors do not appear in 3's group.
Therefore, 100 is not a perfect cube.

2	100
2	50
5	25
5	5
	1

(v) 46656

Prime factors of 46656 = 2 x 2 x 2 x 2 x 2 x 2 x 3 x 3 x 3 x 3 x 3 x 3
Here all factors appear in 3's group.
Therefore, 46656 is a perfect cube.

2	46656
2	23328
2	11664
2	5832
2	2916
2	1458
3	729
3	243
3	81
3	27
3	9
3	3
	1

Question 2:

Find the smallest number by which each of the following numbers must be multiplied to obtain a perfect cube:

(i) 243 (ii) 256

(iii) 72 (iv) 675

(v) 100

Answer 2:

(i) 243

Prime factors of 243 = 3 x 3 x 3 x 3 x 3

Here 3 does not appear in 3's group.

Therefore, 243 must be multiplied by 3 to make it a perfect cube.

3	243
3	81
3	27
3	9
3	3
	1

(ii) 256

Prime factors of 256 = 2 x 2 x 2 x 2 x 2 x 2 x 2 x 2

Here one factor 2 is required to make a 3's group.

Therefore, 256 must be multiplied by 2 to make it a perfect cube.

2	256
2	128
2	64
2	32
2	16
2	8
2	4
2	2
	1

(iii) 72

Prime factors of 72 = 2 x 2 x 2 x 3 x 3

Here 3 does not appear in 3's group.

Therefore, 72 must be multiplied by 3 to make it a perfect cube.

2	72
2	36
2	18
3	9
3	3
	1

(iv) 675

Prime factors of 675 = 3 x 3 x 3 x 5 x 5
Here factor 5 does not appear in 3's group.
Therefore 675 must be multiplied by 3 to make it a perfect cube.

3	675
3	225
3	75
5	25
5	5
	1

(v) 100

Prime factors of 100 = 2 x 2 x 5 x 5
Here factor 2 and 5 both do not appear in 3's group.
Therefore 100 must be multiplied by 2 x 5 = 10 to make it a perfect cube.

2	100
2	50
5	25
5	5
	1

Question 3:

Find the smallest number by which each of the following numbers must be divided to obtain a perfect cube:

(i) 81 (ii) 128
(iii) 135 (iv) 192
(v) 704

Answer 3:

(i) 81

Prime factors of 81 = 3 x 3 x 3 x 3
Here one factor 3 is not grouped in triplets.
Therefore 81 must be divided by 3 to make it a perfect cube.

3	81
3	27
3	9
3	3
	1

(ii) 128

Prime factors of 128 = 2 x 2 x 2 x 2 x 2 x 2 x 2
Here one factor 2 does not appear in a 3's group.
Therefore, 128 must be divided by 2 to make it a perfect cube.

2	**128**
2	64
2	32
2	16
2	8
2	4
2	2
	1

(iii) 135

Prime factors of 135 = 3 x 3 x 3 x 5
Here one factor 5 does not appear in a triplet.
Therefore, 135 must be divided by 5 to make it a perfect cube.

3	**135**
3	45
3	15
5	5
	1

(iv) 192

Prime factors of 192 = 2 x 2 x 2 x 2 x 2 x 2 x 3
Here one factor 3 does not appear in a triplet.
Therefore, 192 must be divided by 3 to make it a perfect cube.

2	**192**
2	96
2	48
2	24
2	12
2	6
3	3
	1

(v) 704

Prime factors of 704 = 2 x 2 x 2 x 2 x 2 x 2 x 11

Here one factor 11 does not appear in a triplet.

Therefore, 704 must be divided by 11 to make it a perfect cube.

2	704
2	352
2	176
2	88
2	44
2	22
2	11
	1

Question 4:

Parikshit makes a cuboid of plasticine of sides 5 cm, 2 cm, 5 cm. How many such cuboids will he need to form a cube?

Answer 4:

Given numbers = 5 x 2 x 5

Since, Factors of 5 and 2 both are not in group of three.

Therefore, the number must be multiplied by 2 x 2 x 5 = 20 to make it a perfect cube.

Hence he needs 20 cuboids.