Exercise 7.2

Question 1:

Find the cube root of each of the following numbers by prime factorization method:

(i) 64
(ii) 512
(iii) 10648
(iv) 27000
(v) 15625
(vi) 13824
(vii) 110592
(viii) 46656
(ix) 175616
(x) 91125

Answer 1:

(i) 64

$\sqrt[3]{64} = \sqrt[3]{2\times2\times2\times2\times2\times2}$

$\sqrt[3]{64}$ = 2 x 2

= 4

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

(ii) 512

$\sqrt[3]{512} = \sqrt[3]{2\times2\times2\times2\times2\times2\times2\times2\times2}$

= 2 x 2 x 2

= 8

2	512
2	256
2	128
2	64
2	32
2	16
2	8
2	4
2	2
	1

(iii) 10648

$\sqrt[3]{10648} = \sqrt[3]{2\times2\times2\times11\times11\times11}$

= 2 x 11

= 22

2	10648
2	5324
2	2662
11	1331
11	121
11	11
	1

(iv) 27000

$\sqrt[3]{27000} = \sqrt[3]{2\times2\times2\times3\times3\times3\times5\times5\times5}$

= 2 x 3 x 5

= 30

2	27000
2	13500
2	6750
3	3375
3	1125
3	375
5	125
5	25
5	5
	1

(v) 15625

$\sqrt[3]{15625} = \sqrt[3]{5\times5\times5\times5\times5\times5}$

= 5 x 5

= 25

5	15625
5	3125
5	625
5	125
5	25
5	5
	1

(vi) 13824

$\sqrt[3]{13824} = \sqrt[3]{2\times2\times2\times2\times2\times2\times2\times2\times2\times3\times3\times3}$

= 2 x 2 x 2 x 3

= 24

2	13824
2	6912
2	3456
2	1728
2	864
2	432
2	216
2	108
2	54
3	27
3	9
3	3
	1

(vii) 110592

$\sqrt[3]{110592} = \sqrt[3]{2\times2\times2\times2\times2\times2\times2\times2\times2\times2\times2\times2\times3\times3\times3}$

= 2 x 2 x 2 x 2 x 3

= 48

2	110592
2	55296
2	27648
2	13824
2	6912
2	3456
2	1728
2	864
2	432
2	216
2	108
2	54
3	27
3	9
3	3
	1

(viii) 46656

$\sqrt[3]{46656} = \sqrt[3]{2\times2\times2\times2\times2\times2\times3\times3\times3\times3\times3\times3}$

= 2 x 2 x 3 x 3

= 36

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

(ix) 175616

$\sqrt[3]{175616} = \sqrt[3]{2\times2\times2\times2\times2\times2\times2\times2\times2\times7\times7\times7}$

= 2 x 2 x 2 x 7

= 56

2	175616
2	87808
2	43904
2	21952
2	10976
2	5488
2	2744
2	1372
2	686
7	343
7	49
7	7
	1

(x) 91125

$\sqrt[3]{91125} = \sqrt[3]{3\times3\times3\times3\times3\times3\times5\times5\times5}$

= 3 x 3 x 5

= 45

3	91125
3	30375
3	10125
3	3375
3	1125
3	375
5	125
5	25
5	5
	1

Question 2:

State true or false:

(i) Cube of any odd number is even.

(ii) A perfect cube does not end with two zeroes.

(iii) If square of a number ends with 5, then its cube ends with 25.

(iv) There is no perfect cube which ends with 8.

(v) The cube of a two digit number may be a three digit number.

(vi) The cube of a two digit number may have seven or more digits.

(vii) The cube of a single digit number may be a single digit number.

Answer 2:

(i) False

Since, $1^3 = 1, 3^3 = 27, 5^3 = 125, \ldots\ldots$ are all odd.

(ii) True

Since, a perfect cube ends with three zeroes.

e.g. $10^3 = 1000, 20^3 = 8000, 30^3 = 27000, \ldots\ldots$ so on

(iii) False
Since, $5^2 = 25, 5^3 = 125, 15^2 = 225, 15^3 = 3375$ (Did not end with 25)

(iv) False
Since $12^3 = 1728$ [Ends with 8]
And $22^3 = 10648$ [Ends with 8]

(v) False
Since $10^3 = 1000$ [Four digit number]
And $11^3 = 1331$ [Four digit number]

(vi) False
Since $99^3 = 970299$ [Six digit number]

(vii) True
$1^3 = 1$ [Single digit number]
$2^3 = 8$ [Single digit number]

Question 3:

You are told that 1,331 is a perfect cube. Can you guess with factorization what is its cube root? Similarly guess the cube roots of 4913, 12167, 32768.

Answer 3:

We know that $10^3 = 1000$ and Possible cube of $11^3 = 1331$
Since, cube of unit's digit $1^3 = 1$
Therefore, cube root of 1331 is 11.

4913
We know that $7^3 = 343$
Next number comes with 7 as unit place $17^3 = 4913$
Hence, cube root of 4913 is 17.

12167
We know that $3^3 = 27$
Here in cube, ones digit is 7
Now next number with 3 as ones digit $13^3 = 2197$
And next number with 3 as ones digit $23^3 = 12167$
Hence cube root of 12167 is 23.

32768
We know that $2^3 = 8$
Here in cube, ones digit is 8
Now next number with 2 as ones digit $12^3 = 1728$
And next number with 2 as ones digit $22^3 = 10648$
And next number with 2 as ones digit $32^3 = 32768$

Hence cube root of 32768 is 32.