# NCERT SOLUTIONS
# CLASS-VIII MATHS
# CHAPTER-7 CUBE AND CUBE ROOTS

***Exercise 7.1***

***Q1:***

***Mention the numbers that are not perfect cubes.***
***(A) 216***

***(B) 128***

***(C) 1000***

***(D) 100***

***(E) 46656***

**Solution:**

(A) 216

Prime factors of 216: 2x2x2x3x3x3

Here all the factors are in the groups of 3's

Therefore, 216 is said to be a perfect cube number.

| | |
|---|---|
| 02 | 0216 |
| 02 | 0108 |
| 02 | 054 |
| 03 | 027 |
| 03 | 09 |
| 03 | 03 |
| | 01 |

(B) 128

The prime factor of 128 = 2x2x2x2x2x2x2

Here one factor 2 does not appear in groups of 3

Hence, 128 is not a perfect cube.

| | |
|---|---|
| 02 | 0128 |
| 02 | 064 |
| 02 | 032 |
| 02 | 016 |
| 02 | 08 |
| 02 | 04 |
| 02 | 02 |
| | 01 |

(C) 1000

The prime factors of 1000 = 2x2x2x 5x5x5

Here all the factors are in groups of 3

Hence, 1000 is said to be a perfect cube.

| | |
|---|---|
| 02 | 01000 |
| 02 | 0500 |

| | |
|---|---|
| 02 | 0250 |
| 05 | 0125 |
| 05 | 025 |
| 05 | 05 |
| | 01 |

(D) 100

The prime factors of 100 is 2×2 x 5×5

Here all the factors do not appear in groups of 3.

Hence, 100 is not a perfect cube.

| | |
|---|---|
| 02 | 0100 |
| 02 | 050 |
| 05 | 025 |
| 05 | 05 |
| | 01 |

(E) 46656

The prime factors of 46656 = 2x2x2x2x2x2x 3 x3x3x3x3x 3

Here all the factors are in groups of 3

Hence, 46656 is said to be a perfect cube.

| | |
|---|---|
| 02 | 046656 |
| 02 | 023328 |
| 02 | 011664 |
| 02 | 05832 |
| 02 | 02916 |
| 02 | 01458 |
| 03 | 0729 |
| 03 | 0243 |
| 03 | 081 |
| 03 | 027 |
| 03 | 09 |
| 03 | 03 |
| | 01 |

***Q2 :***

***Find the smallest number when multiplied to obtain a perfect cube:***

***(A) 243***

***(B) 256***

***(C) 72***

***(D) 675***

***(E) 100***

**Solution:**

(A) 243

The prime factors of 243 = 3x3x3x3x 3

Here 3 does not appear in groups of 3

Hence, For 243 to be a perfect cube it should be multiplied by 3.

| | |
|---|---|
| 03 | 0243 |
| 03 | 081 |
| 03 | 027 |
| 03 | 09 |
| 03 | 03 |
| | 01 |

(B) 256

The prime factors of 256 is 2x2x2x2x2x 2 x2 x 2

Here one factor of 2 is required for it to make groups of 3.

Hence, for 256 to be a perfect cube it should be multiplied by 2.

| | |
|---|---|
| 02 | 0256 |
| 02 | 0128 |
| 02 | 064 |
| 02 | 032 |
| 02 | 016 |
| 02 | 08 |
| 02 | 04 |
| 02 | 02 |
| | 01 |

(C) 72

The prime factors for 72 = 2 x2x2x 3x 3

Here the factor 3 does not appear in groups of 3

Hence, For 72 to be a perfect cube it should be multiplied by 3.

(D) 675

The prime factors for 675 = 3x3x3x 5×5

Here the factor 5 does not appear in groups of 3

Hence, for 675 to be a perfect cube it should be multiplied by 5.

| | |
|---|---|
| 03 | 0675 |
| 03 | 0225 |
| 03 | 075 |
| 05 | 025 |
| 05 | 05 |
| | 01 |

(E) 100

The prime factors for 100 = 2x2x5x5

Here both the factors 2 and 5 are not in groups of 3

Hence, for 100 to be  a perfect cube it should be multiplied by 2 and 5. ( i.e. 2 x 5 =10 )

| | |
|---|---|
| 02 | 0100 |
| 02 | 050 |
| 05 | 025 |
| 05 | 05 |
| | 01 |

***Q3:***

***Find the smallest number by which when divided obtain a perfect cube.***

***(A) 81***

***(B) 128***

***(C) 135***

***(D) 192***

***(E) 704***

**Solution:**

(A) 81

The prime factors for 81 = 3 x 3 x 3 x 3

Here, there is one factor of 3 which extra from the group of 3

Hence, for 81 to be a perfect cube it should be divided by 3.

| | |
|---|---|
| 03 | 081 |
| 03 | 027 |
| 03 | 09 |
| 03 | 03 |
| | 01 |

(B) 128

The prime factors of 128 = 2 x 2 x 2 x 2 x 2 x 2 x 2

Here there is one factor of 2 which in not in the group of 3

Hence, for 128 to be a perfect cube then it should be divided by 2.

| | |
|---|---|
| 02 | 0128 |
| 02 | 064 |
| 02 | 032 |
| 02 | 016 |
| 02 | 08 |
| 02 | 04 |
| 02 | 02 |
| | 01 |

(C) 135

The prime factors of 135 = 3 x 3 x 3 x 5

Here there is one factor of 5 which is not appearing with its group of 3.

Hence, for 135 to be a perfect cube it should be divided by 5.

| | |
|---|---|
| 03 | 0135 |
| 03 | 045 |
| 03 | 15 |
| 05 | 05 |
| | 01 |

(D)192

The prime factors for 192 = 2 x 2 x 2 x 2 x 2 x 2 x 3

Here there is one factor of 3 which does not appearing with its group of 3.

Hence for 192 to be a perfect cube then it should be divided by 3.

| | |
|---|---|
| 02 | 0192 |
| 02 | 096 |
| 02 | 048 |
| 02 | 024 |
| 02 | 012 |
| 02 | 06 |
| 03 | 03 |
| | 01 |

(E) 704

The prime factor for 704 = 2 x 2 x 2 x 2 x 2 x 2 x 11

Here there is one factor of 11 which is not appearing with its group of 3.

Hence for 704 to be a perfect cube it should be divided by 11.

| | |
|---|---|
| 02 | 0704 |
| 02 | 0352 |
| 02 | 0176 |
| 02 | 088 |
| 02 | 044 |
| 02 | 022 |
| 02 | 011 |
| | 01 |

***Q4:***

***Reuben makes a cuboid of clay of sides 5 cm , 2 cm , 5 cm. If Reuben wants to form a cube how many such cuboids will be needed?***

**Solution:**

The numbers given: 5 x 2 x 5

Since the factors of 2 and 4 are both not in groups of 3.

Then, the number should be multiplied by 2 x 2 x 5 = 20 for it to be made a perfect cube.

Hence Reuben needs 20 cuboids.

*Exercise 7.2*

***Q1 :***

***By the method of prime factorization find the cube root for the following.***

***(A) 64***

***(B) 512***

***(C) 10648***

***(D) 27000***

***(E) 15625***

***(F) 13824***

***(G) 110592***

***(H) 46656***

***(I) 175616***

***(J) 91125***

**Solution:**

(A) 64

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

= 4

| | |
|---|---|
| 02 | 064 |
| 02 | 032 |
| 02 | 016 |
| 02 | 08 |
| 02 | 04 |
| 02 | 02 |
| | 01 |

(B) 512

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

= 2 x 2 x 2

= 8

| | |
|---|---|
| 02 | 0512 |
| 02 | 0256 |
| 02 | 0128 |
| 02 | 064 |
| 02 | 032 |
| 02 | 016 |
| 02 | 08 |
| 02 | 04 |
| 02 | 02 |
| | 01 |

(C) 10648

$\sqrt[3]{10648}=\sqrt[3]{2\times 2\times 2\times 11\times 11\times 11}$

= 2 x 11

=22

| | |
|---|---|
| 02 | 010648 |
| 02 | 05324 |
| 02 | 02662 |
| 011 | 01331 |
| 011 | 0121 |
| 011 | 011 |
| | 01 |

(D) 27000

$\sqrt[3]{27000} = \sqrt[3]{2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 5 \times 5 \times 5}$

=>2 x 3 x 5

=>30

| | |
|---|---|
| 02 | 027000 |
| 02 | 013500 |
| 02 | 06750 |
| 03 | 03375 |
| 03 | 01125 |
| 03 | 0375 |
| 05 | 0125 |
| 05 | 025 |
| 05 | 05 |
| | 01 |

(E) 15625

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

=> 5 x 5

=> 25

| | |
|---|---|
| 05 | 015625 |
| 05 | 03125 |
| 05 | 0625 |
| 05 | 0125 |
| 05 | 025 |
| 05 | 05 |
| | 01 |

(F) 13824

$\sqrt[3]{13824} = \sqrt[3]{2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3}$

=> 2 x 2 x 2 x 3

=> 24

| | |
|---|---|
| 02 | 13824 |
| 02 | 06912 |

| | |
|---|---|
| 02 | 03456 |
| 02 | 01728 |
| 02 | 0864 |
| 02 | 0432 |
| 02 | 0216 |
| 02 | 0108 |
| 02 | 054 |
| 03 | 27 |
| 03 | 09 |
| 03 | 03 |
| | 01 |

(G) 110592

$\sqrt[3]{110592} = \sqrt[3]{2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3}$

=> 2 x 2 x 2 x 2 x 3

=> 48

| | |
|---|---|
| 02 | 0110592 |
| 02 | 055296 |
| 02 | 027648 |
| 02 | 013824 |
| 02 | 06912 |
| 02 | 03456 |
| 02 | 01728 |
| 02 | 0864 |
| 02 | 0432 |
| 02 | 0216 |
| 02 | 0108 |
| 02 | 054 |
| 03 | 027 |
| 03 | 09 |
| 03 | 03 |
| | 01 |

(H) 46656

$\sqrt[3]{46656} = \sqrt[3]{2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3}$

=> 2 x 2 x 2 x 3 x 3 x 3

=> 36

(I) 175616

$\sqrt[3]{175616} = \sqrt[3]{2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 7 \times 7 \times 7}$

=> 2 x 2 x 2 x 7

=> 56

| | |
|---|---|
| 02 | 0175616 |
| 02 | 087808 |
| 02 | 043904 |
| 02 | 021952 |

| | |
|---|---|
| 02 | 010976 |
| 02 | 05488 |
| 02 | 02744 |
| 02 | 01372 |
| 02 | 0686 |
| 07 | 0343 |
| 07 | 049 |
| 07 | 07 |
| | 01 |

(J) 91125

$\sqrt[3]{91125} = \sqrt[3]{3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 5 \times 5 \times 5}$

=> 3 x 3 x 5

=> 45

| | |
|---|---|
| 03 | 091125 |
| 03 | 010125 |
| 03 | 03375 |
| 03 | 01125 |
| 03 | 0375 |
| 05 | 0125 |
| 05 | 025 |
| 05 | 05 |
| | 01 |

***Q2:***

***State whether the following is true of false:***

***(A) Any off number of a cube is even.***

***(B) When a number end with two zeros, it is never a perfect cube.***

***(C) If the square of a given number ends with 5 then its cube will end with 25.***

***(D) There is no number that ends with 8 which is a perfect cube.***

***(E) The cube of a given two digit number will always be a three digit number.***

***(F) The cube of a two digit number will have either seven or more digits.***

***(G) The cube of single digit number may also be a single digit number.***

**Solution:**

(A) The statement given is false.

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

(B) The given statement is true.

Since, a perfect cube ends with three zeroes.

Eg. $10^3 = 1000$, $20^3 = 8000$, $30^3 = 27,000$ , . . . . . . . . . . . . so on.

(C) The given statement is false

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

(D) the given statement is false.

Since $12^3 = 1728$ [the number ends with 8]

$22^3 = 10648$ [ the number ends with 8]

(E) The given statement is false

Since, $10^3 = 1000$ [Four digit number]

And $11^3 = 1331$ [four digit number]

(F) The statement is False.

Since $99^3 = 970299$ [Six digit number]

(G) the given statement is true

$1^3 = 1$ [single digit]

$2^3 = 8$ [single digit]

***Q3 :***

***1331 is told to be a perfect cube. What are the factorization methods in which you can find its cube root? Similarly, find the cube roots for***

***(i)4913***

***(ii)12167***

***(iii)32768.***

**Solution:**

We know that $10^3 = 1000$ and possible cute of $11^3 = 1331$

Since, the cube of units digit is $1^3 = 1$

Then, cube root of 1331 is 11

(i) 4913

We know that $7^3$ is 343

Next number that comes with 7 as the units place is $17^3 = 4913$

Therefore the cube root of 4913 is 17

(ii) 12167

Since we know that $3^3 = 27$

Here in cube, the ones digit is 7

Now the next number with 3 In the ones digit is $13^3 = 2197$

And the next number with 3 in the ones digit is $23^3 = 12167$

Hence the cube root of 12167 is 23

(iii) 32768

We know that $2^3 = 8$

Here in the cube, the ones digit is 8

Now the next number with 2 in the ones digit is $12^3 = 1728$

And the next number with 2 as the ones digit $22^3 = 10648$

And the next number with 2 as the ones digit $32^3 = 32768$

Hence the cube root of 32768 is 32