Mathematics

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(Chapter – 7) (Cubes and Cube Roots)

(Class – VIII)

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
\[ \sqrt[3]{64} = \sqrt[3]{2 \times 2 \times 2 \times 2 \times 2} \]
\[ \sqrt[3]{64} = 2 \times 2 \times 2 \]
\[ = 4 \]

(ii) 512
\[ \sqrt[3]{512} = \sqrt[3]{2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2} \]
\[ = 2 \times 2 \times 2 \]
\[ = 8 \]

(iii) 10648
\[ \sqrt[3]{10648} = \sqrt[3]{2 \times 2 \times 2 \times 11 \times 11 \times 11} \]
\[ = 2 \times 11 \times 11 \]
\[ = 22 \]

(iv) 27000
\[ \sqrt[3]{27000} = \sqrt[3]{2 \times 2 \times 3 \times 3 \times 3 \times 5 \times 5 \times 5} \]
\[ = 2 \times 3 \times 5 \]
\[ = 30 \]

(v) 15625
\[ \sqrt[3]{15625} = \sqrt[3]{5 \times 5 \times 5 \times 5 \times 5 \times 5} \]
\[ = 5 \times 5 \]
\[ = 25 \]

(vi) 13824
\[ \sqrt[3]{13824} = \sqrt[3]{2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3} \]
\[ = 2 \times 2 \times 2 \times 3 \]
\[ = 24 \]
(vii) \[ \sqrt[3]{110592} = \sqrt[3]{2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3} = 2 \times 2 \times 2 \times 2 \times 3 \times 3 = 48 \]

(viii) \[ \sqrt[3]{46656} = \sqrt[3]{2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 3 \times 3} = 2 \times 2 \times 3 \times 3 \times 3 = 36 \]

(ix) \[ \sqrt[3]{175616} = \sqrt[3]{2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 7 \times 7 \times 7} = 2 \times 2 \times 2 \times 7 = 56 \]

(x) \[ \sqrt[3]{91125} = \sqrt[3]{3 \times 3 \times 3 \times 3 \times 3 \times 5 \times 5 \times 5} = 3 \times 3 \times 5 \times 5 = 45 \]

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, \[ 1^3 = 1, \ 3^3 = 27, \ 5^3 = 125, \ldots \ldots \ldots \] 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 \(12^3 = 1728\) \([\text{Ends with 8}]\)
And \(22^3 = 10648\) \([\text{Ends with 8}]\)
(v) False
Since \(10^3 = 1000\) \([\text{Four digit number}]\)
And \(11^3 = 1331\) \([\text{Four digit number}]\)
(vi) False
Since \(99^3 = 970299\) \([\text{Six digit number}]\)
(vii) True
\(1^3 = 1\) \([\text{Single digit number}]\)
\(2^3 = 8\) \([\text{Single digit number}]\)

**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.