

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

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

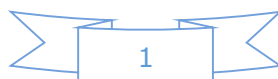
| | |
|---|----|
| 2 | 64 |
| 2 | 32 |
| 2 | 16 |
| 2 | 8 |
| 2 | 4 |
| 2 | 2 |
| | 1 |



(ii) 512

$$\sqrt[3]{512} = \sqrt[3]{2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2}$$
$$= 2 \times 2 \times 2$$
$$= 8$$

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



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(iii) $\sqrt[3]{10648}$

$$\begin{aligned}\sqrt[3]{10648} &= \sqrt[3]{2 \times 2 \times 2 \times 11 \times 11 \times 11} \\ &= 2 \times 11 \\ &= 22\end{aligned}$$

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

(iv) $\sqrt[3]{27000}$

$$\begin{aligned}\sqrt[3]{27000} &= \sqrt[3]{2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 5 \times 5 \times 5} \\ &= 2 \times 3 \times 5 \\ &= 30\end{aligned}$$

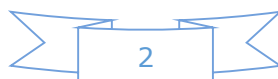
| | |
|---|-------|
| 2 | 27000 |
| 2 | 13500 |
| 2 | 6750 |
| 3 | 3375 |
| 3 | 1125 |
| 3 | 375 |
| 5 | 125 |
| 5 | 25 |
| 5 | 5 |
| | 1 |



(v) $\sqrt[3]{15625}$

$$\begin{aligned}\sqrt[3]{15625} &= \sqrt[3]{5 \times 5 \times 5 \times 5 \times 5 \times 5} \\ &= 5 \times 5 \\ &= 25\end{aligned}$$

| | |
|---|-------|
| 5 | 15625 |
| 5 | 3125 |
| 5 | 625 |
| 5 | 125 |
| 5 | 25 |
| 5 | 5 |
| | 1 |



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(vi) 13824

$$\begin{aligned}\sqrt[3]{13824} &= \sqrt[3]{2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3} \\ &= 2 \times 2 \times 2 \times 3 \\ &= 24\end{aligned}$$

| | |
|---|-------|
| 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

$$\begin{aligned}\sqrt[3]{110592} &= \sqrt[3]{2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3} \\ &= 2 \times 2 \times 2 \times 2 \times 3 \\ &= 48\end{aligned}$$

| | |
|---|--------|
| 2 | 110592 |
| 2 | 55296 |
| 2 | 27648 |
| 2 | 13824 |
| 2 | 6912 |
| 2 | 3456 |
| 2 | 1728 |
| 2 | 864 |
| 2 | 432 |
| 2 | 216 |
| 2 | 108 |



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| | |
|---|----|
| 2 | 54 |
| 3 | 27 |
| 3 | 9 |
| 3 | 3 |
| | 1 |

(viii) 46656

$$\begin{aligned}\sqrt[3]{46656} &= \sqrt[3]{2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3} \\ &= 2 \times 2 \times 3 \times 3 \\ &= 36\end{aligned}$$

| | |
|---|--------------|
| 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

$$\begin{aligned}\sqrt[3]{175616} &= \sqrt[3]{2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 7 \times 7 \times 7} \\ &= 2 \times 2 \times 2 \times 7 \\ &= 56\end{aligned}$$

| | |
|---|---------------|
| 2 | 175616 |
| 2 | 87808 |
| 2 | 43904 |
| 2 | 21952 |
| 2 | 10976 |



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| | |
|---|------|
| 2 | 5488 |
| 2 | 2744 |
| 2 | 1372 |
| 2 | 686 |
| 7 | 343 |
| 7 | 49 |
| 7 | 7 |
| | 1 |

$$\begin{aligned} \text{(x)} \quad & 91125 \\ \sqrt[3]{91125} &= \sqrt[3]{3 \times 3 \times 3 \times 3 \times 3 \times 5 \times 5 \times 5} \\ &= 3 \times 3 \times 5 \\ &= 45 \end{aligned}$$



| | |
|---|-------|
| 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.



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Answer 2:

(i) False

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

(ii) True

Since, a perfect cube ends with three zeroes.

e.g. $10^3 = 1000, 20^3 = 8000, 30^3 = 27000, \dots$ 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 $1^3 = 1$

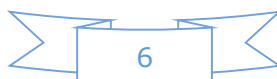
Therefore, cube root of 1331 is 11.

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.



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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.



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