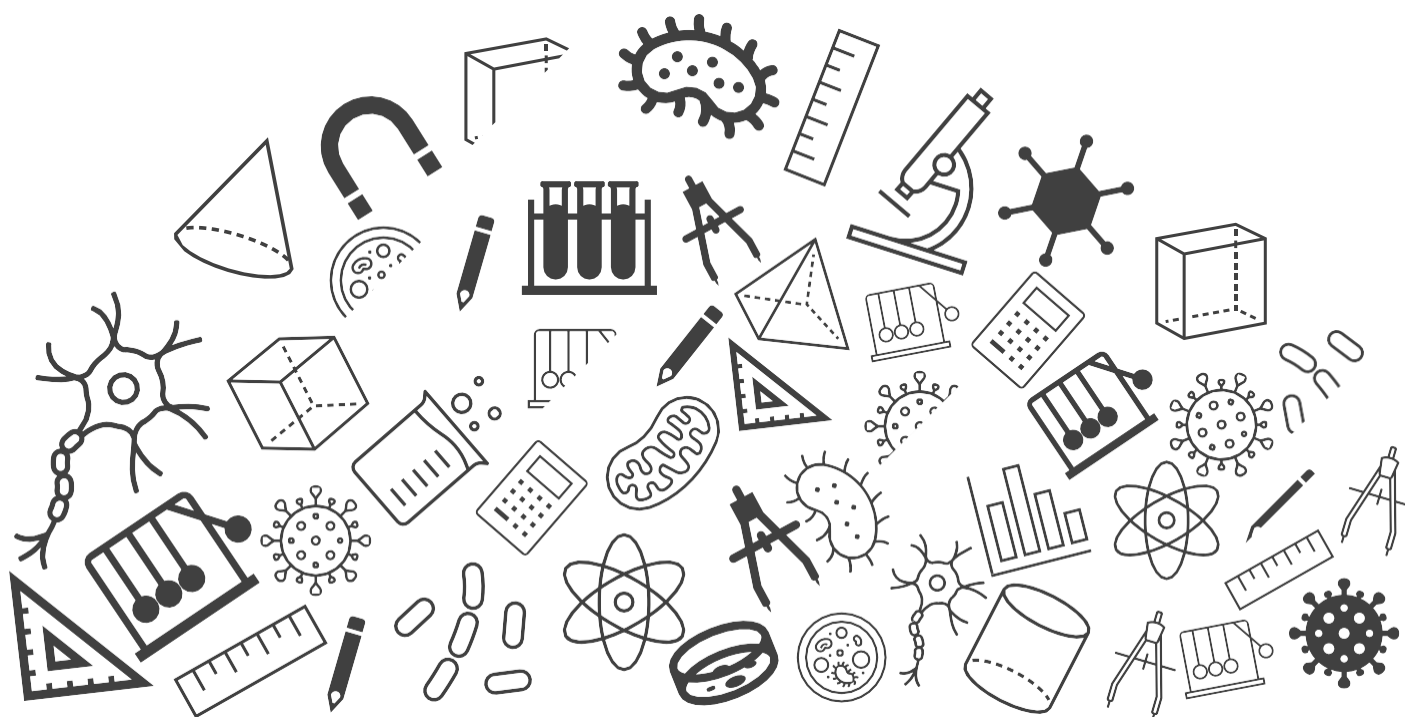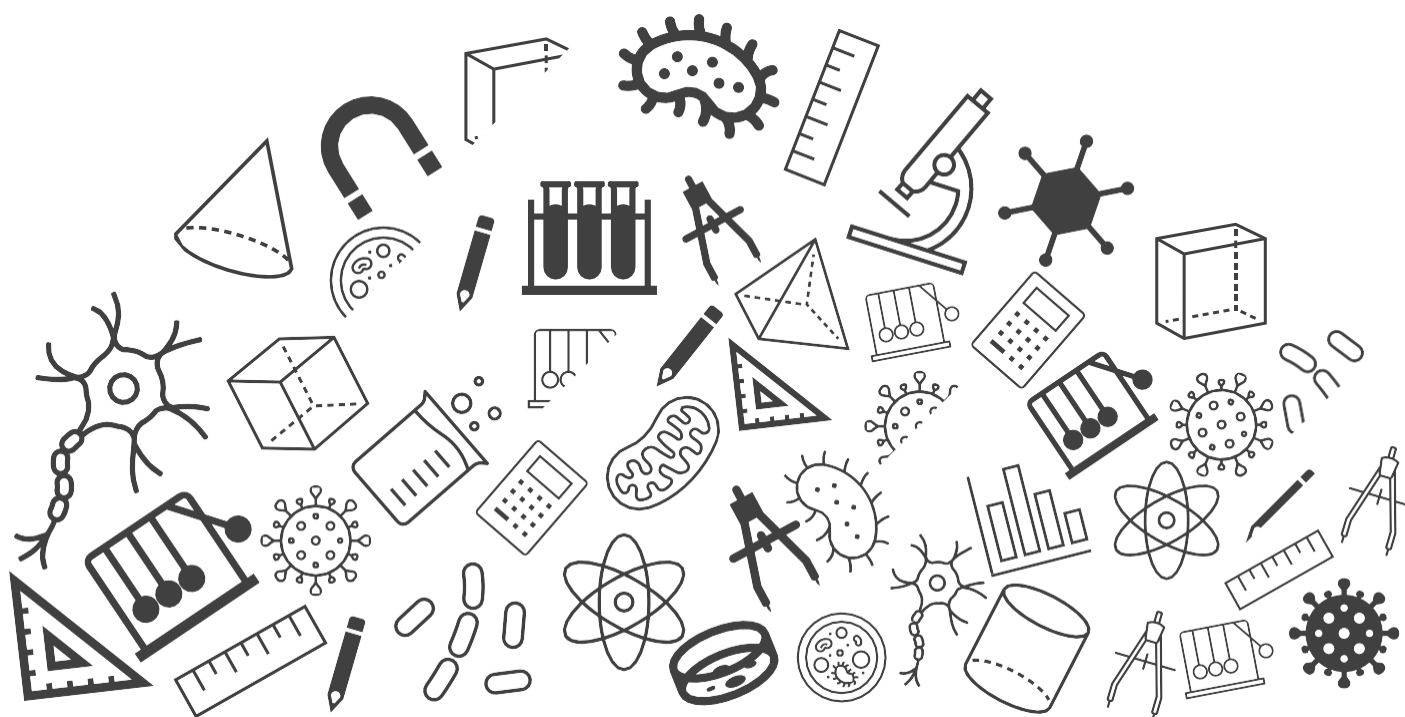# BYJU'S

Grade 08: Maths
Exam Important Questions

Cubes and
Cube Roots

Cubes and Cube Roots

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1. What is the units digit of the cube root of 29791?

   [1 mark]

   We know that, units place of cube root of a number ending with 1 will always be 1.
   Therefore, unit digit of the cube root of 29791 is 1.
   [1 mark]

2. State True or False.

   If square of a number ends with 5, then its cube ends with 25. [1 mark]

   False
   Since, $15^2 = 225, 15^3 = 3375$

   (Did not end with 25)

   [1 mark]

3. State True or False.

   The cube of a two digit number may be a three digit number.   [1 mark]

   False
   Let's take the smallest two digit number 10,
   10^3 = 1000   [Four digit number]
   [1 mark]

Cubes and Cube Roots

4. State whether the number given below is a perfect cube or not.

   (i) 216

   (ii) 128

   [4 marks]

   (i) 216

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

   [1 mark]

   Prime factors of $216 = 2 \times 2 \times 2 \times 3 \times 3 \times 3$

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

   Therefore, 216 is a perfect cube number.

   [1 mark]

   (ii) 128

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

   [1 mark]

   Prime factors of $128 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$

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

   Therefore, 128 is not a perfect cube.

   [1 mark]

5. Is 9720 a perfect cube? If not, find the smallest number by which it should be divided to get a perfect cube.

[4 marks]

2	9720
2	4860
2	2430
3	1215
3	405
3	135
3	45
3	15
5	5
	1

[1.5 marks]

Prime factors of $9720 = 2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 3 \times 3 \times 5$
[0.5 mark]

The prime factors 3 and 5 do not appear in group of triplets.
So, 9720 is not a perfect cube.
[1 mark]

If we divide the number by $3 \times 3 \times 5$, then the prime factorisation of the quotient will not contain $3 \times 3 \times 5 = 45$
$\therefore 9720 \div 45 = \underline{2 \times 2 \times 2} \times \underline{3 \times 3 \times 3}$
$= 216$
$= (6)^3$
Hence, the smallest number by which 9720 should be divided to get a perfect cube, is 45.
[1 mark]

Cubes and Cube Roots

6. By what smallest number should 3600 be multiplied to make it a perfect cube? Also, find the cube root of the product.

[5 marks]

2	3600
2	1800
2	900
2	450
3	225
3	75
5	25
5	5
	1

[1.5 marks]
Prime factors of $3600 = 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 5 \times 5$
[0.5 mark]

Grouping the factors into triplets of equal factors, we get
$3600 = \underline{2 \times 2 \times 2} \times 2 \times 3 \times 3 \times 5 \times 5$

We know that, if a number is to be a perfect cube, then each of its prime factors must occur thrice.
We find that 2 occurs 4 times while 3 and 5 occurs twice only.
Hence, the smallest number, by which the given number must be multiplied in order that the product is a perfect cube $= 2 \times 2 \times 3 \times 5 = 60$
[1 mark]

Also, product $= 3600 \times 60 = 216000$
[0.5 mark]

Now, arranging into triplets of equal prime factors, we have
$216000 = \underline{2 \times 2 \times 2} \times \underline{2 \times 2 \times 2} \times \underline{3 \times 3 \times 3} \times \underline{5 \times 5 \times 5}$
[1 mark]

Taking one factor from each triplets, we get
$\sqrt[3]{216000} = 2 \times 2 \times 3 \times 5 = 60$
[0.5 mark]

7. Find the cube root of the following number by prime factorization method: 512
   [3 marks]

512

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

[2 marks]

$\sqrt[3]{512} = \sqrt[3]{2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2}$
$= 2 \times 2 \times 2$
$= 8$ [1 mark]

8. Find the cube root of:
   $(i)343$
   $(ii)1000$
   $(iii)2744$
   $(iv)74088$
   [4 marks]

$(i)343 = 7 \times 7 \times 7$

$\therefore \sqrt[3]{343} = \sqrt[3]{7 \times 7 \times 7} = 7$

So, the cube root of 343 is 7.
[1 mark]

$(ii)1000 = 10 \times 10 \times 10$

$\therefore \sqrt[3]{1000} = \sqrt[3]{10 \times 10 \times 10} = 10$

So, the cube root of 1000 is 10.
[1 mark]

$(iii)2744 = 2 \times 2 \times 2 \times 7 \times 7 \times 7$

$\therefore \sqrt[3]{2744} = \sqrt[3]{2 \times 2 \times 2 \times 7 \times 7 \times 7} = 2 \times 7 = 14$

So, the cube root of 2744 is 14.
[1 mark]

$(iv)74088 = 2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 7 \times 7 \times 7$

$\therefore \sqrt[3]{74088} = \sqrt[3]{2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 7 \times 7 \times 7}$

$= 2 \times 3 \times 7 = 42$

So, the cube root of 74088 is 42.
[1 mark]