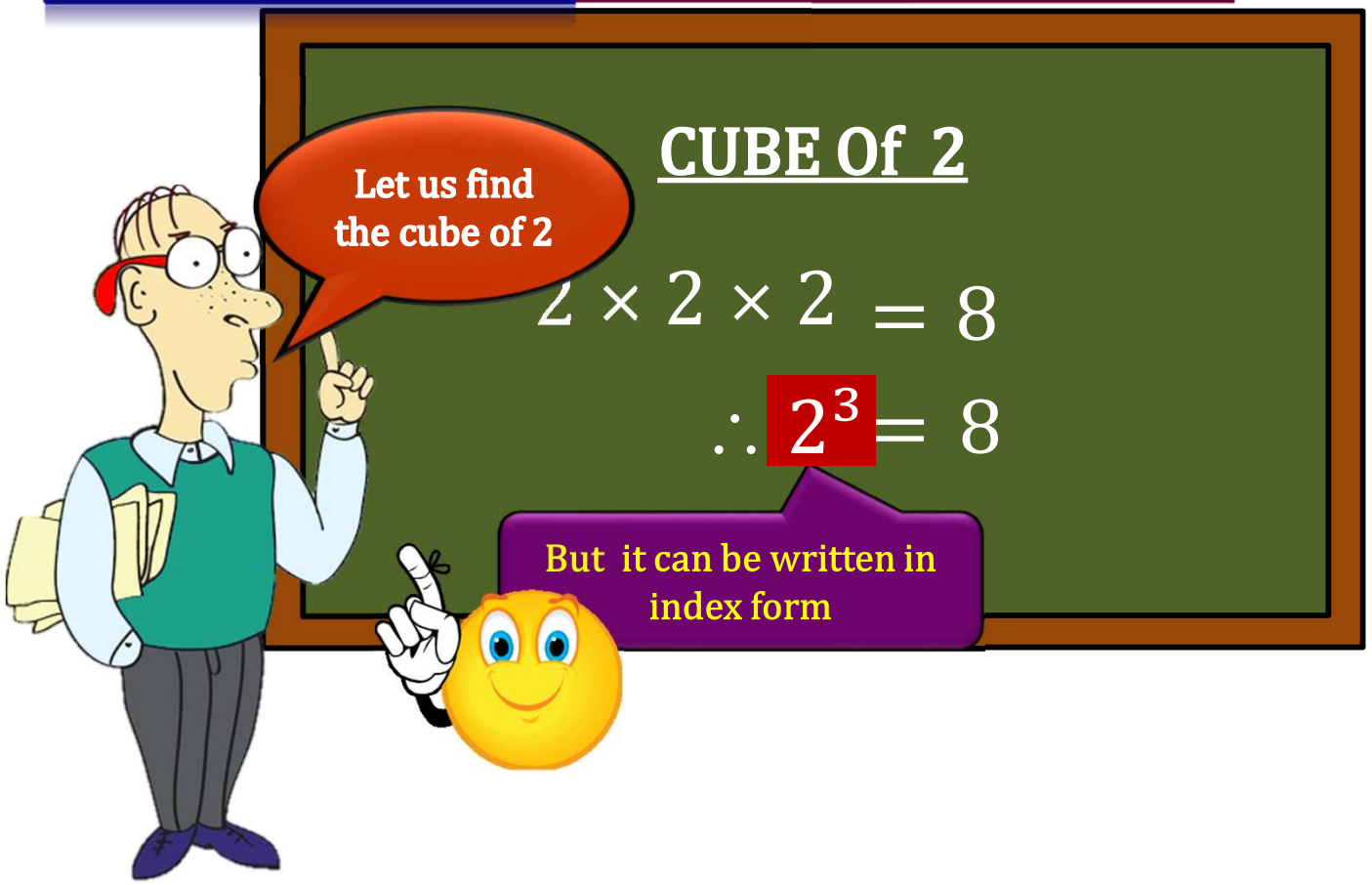
Exercise – 7.1

To find the cube of the number just multiply the number three times



To find the cube of the number just multiply the number three times

Cube of 2

$2 \times 2 \times 2 = 8$

$\therefore \quad 2^3 = 8$

But it can be written in index form

Cube of Positive / Negative Number

Find the cube of 6 and (–6)

6^3

$= 6 \times 6 \times 6$

$= 216$

$(-6)^3$

$= (-6) \times (-6) \times (-6)$

$= -216$

REMEMBER THIS :-

- Cube of positive number is positive
- Cube of negative number is negative

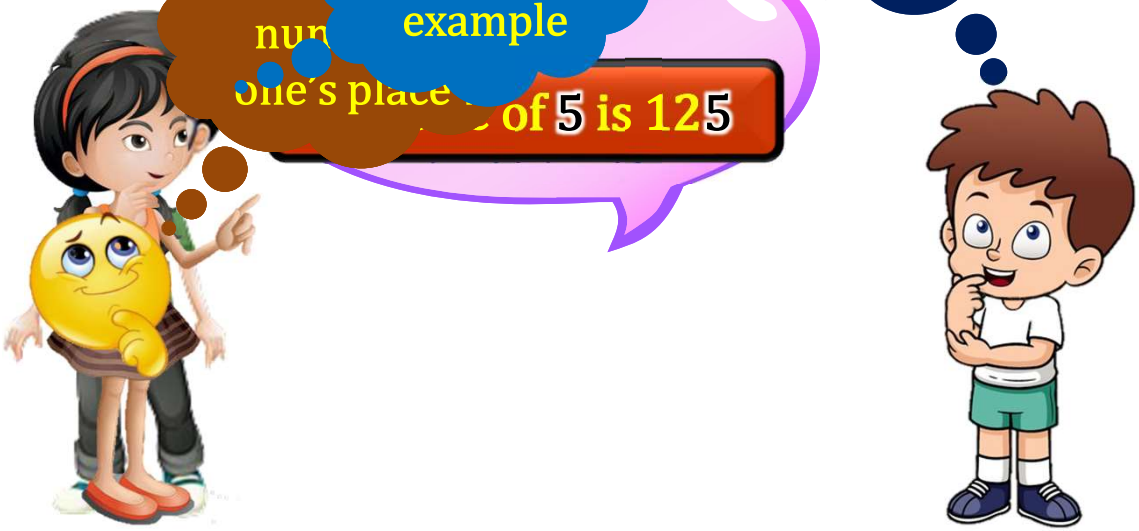
PROPERTIES OF PERFECT CUBES

Property 1: If the digit in the one's place of a number is 0,1,4,5,6 or 9, then the digit in the one's place of its cube will also be the same digit.

Sol . $5^3 = 5 \times 5 \times 5$

Let's take an example

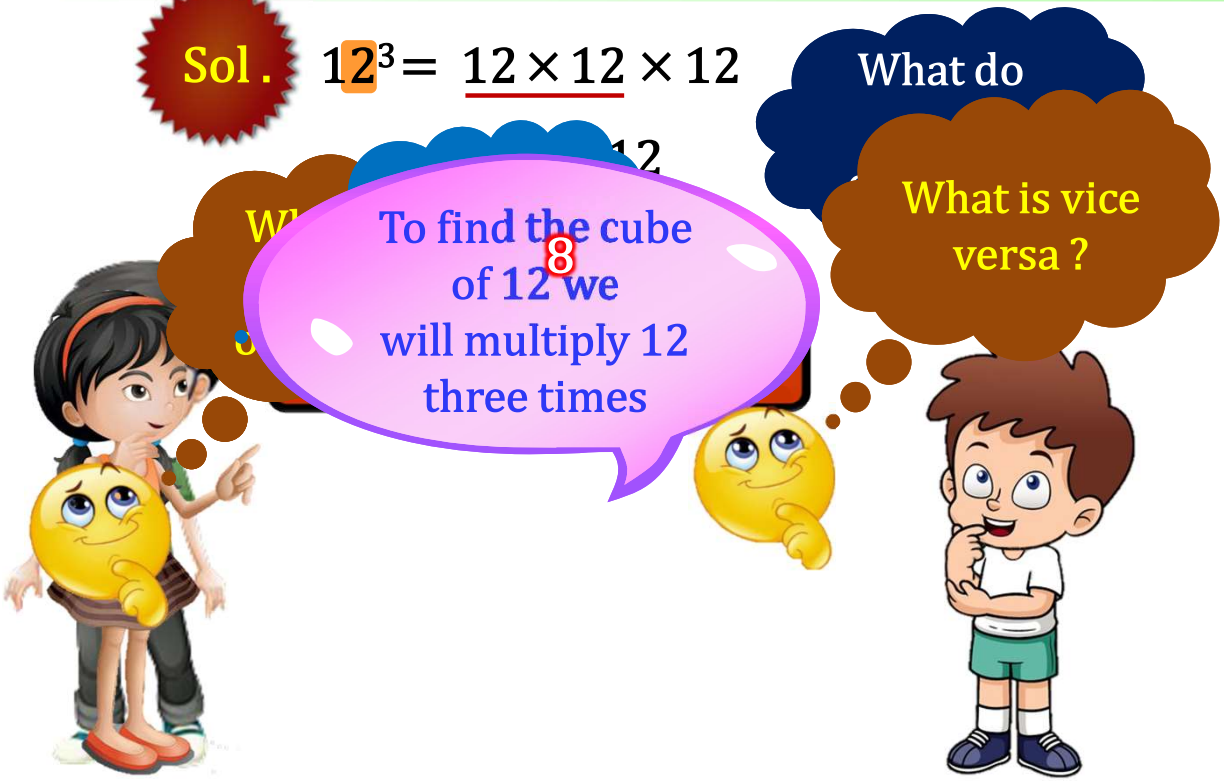
What do you observe ?



PROPERTIES OF PERFECT CUBES

Property 2: If the digit in the one's place of a number is 2, the digit in the one's place of its cube is 8, and vice-versa.

Sol . $12^3 = 12 \times 12 \times 12$



PROPERTIES OF PERFECT CUBES

Property 2: If the digit in the one's place of a number is 8, the digit in the one's place of its cube is 2, and vice-versa.

Sol . $12^3 = 12 \times 12 \times 12$

Sol . $8^3 = 8 \times 8 \times 8$

$= 64 \times 8$

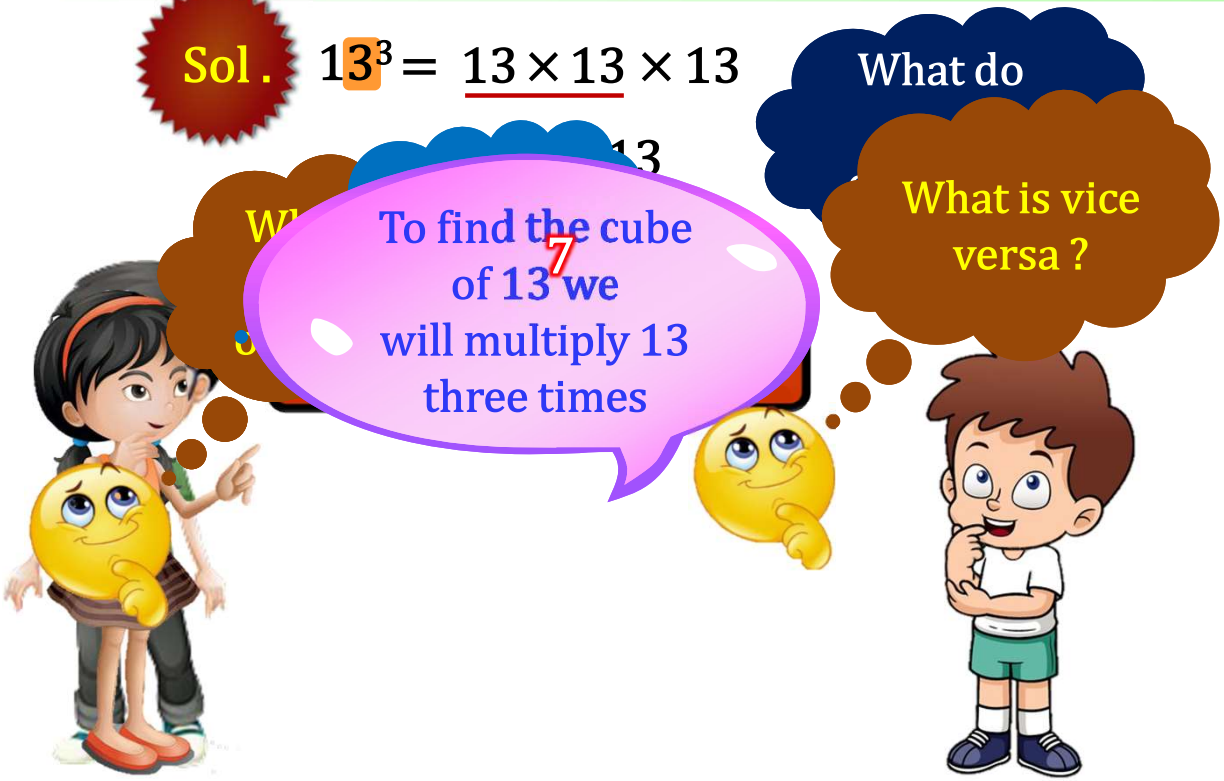
$= 512$

$\therefore$ Cube of 8 is 512

PROPERTIES OF PERFECT CUBES

Property 3: If the digit in the one's place of a number is 3, the digit in the one's place of its cube is 7, and vice-versa.

Sol . $13^3 = 13 \times 13 \times 13$



PROPERTIES OF PERFECT CUBES

Property 3: If the digit in the one's place of a number is 7, the digit in the one's place of its cube is 3, and vice-versa.

Sol . $13^3 = 13 \times 13 \times 13$

Sol . $7^3 = 7 \times 7 \times 7$

$= 49 \times 7$

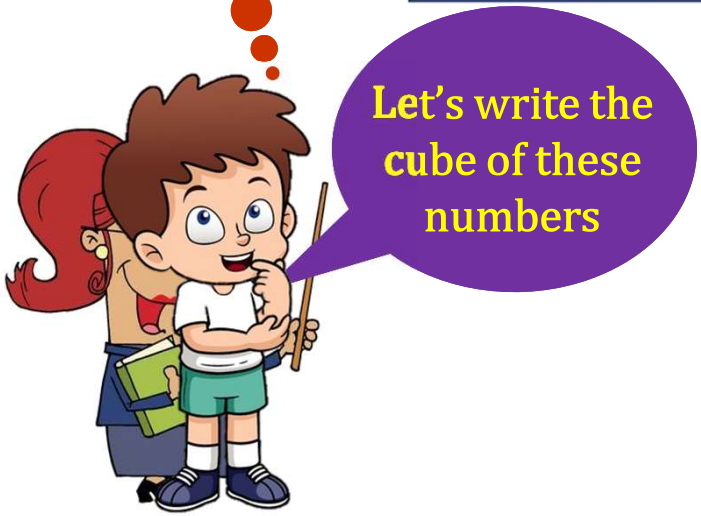
$= 343$

$\therefore$ Cube of 7 is 343

PROPERTIES OF PERFECT CUBES

Property 4: Cubes of even natural numbers are even.

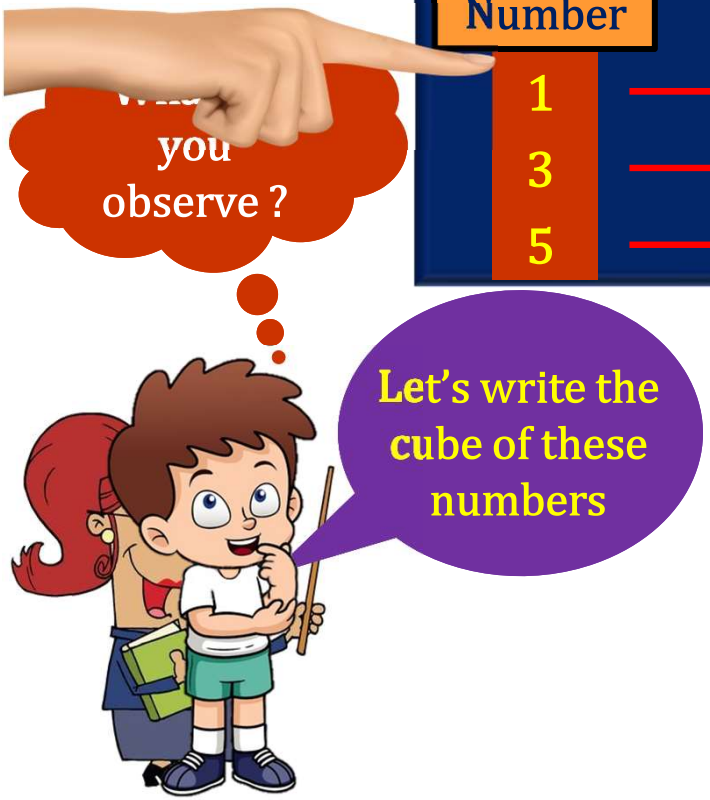
Number	Number's Cube
2	8
4	64
10	1000



PROPERTIES OF PERFECT CUBES

Property 5: Cubes of odd natural numbers are odd.

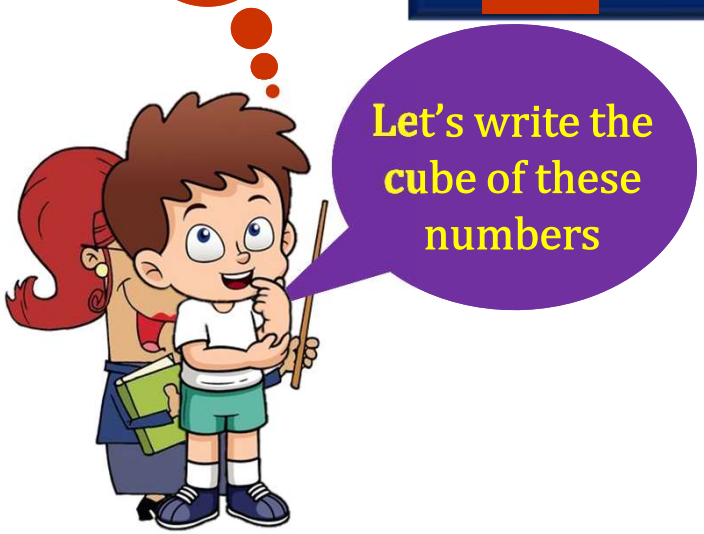
Number	Number's Cube
1	1
3	27
5	125



PROPERTIES OF PERFECT CUBES

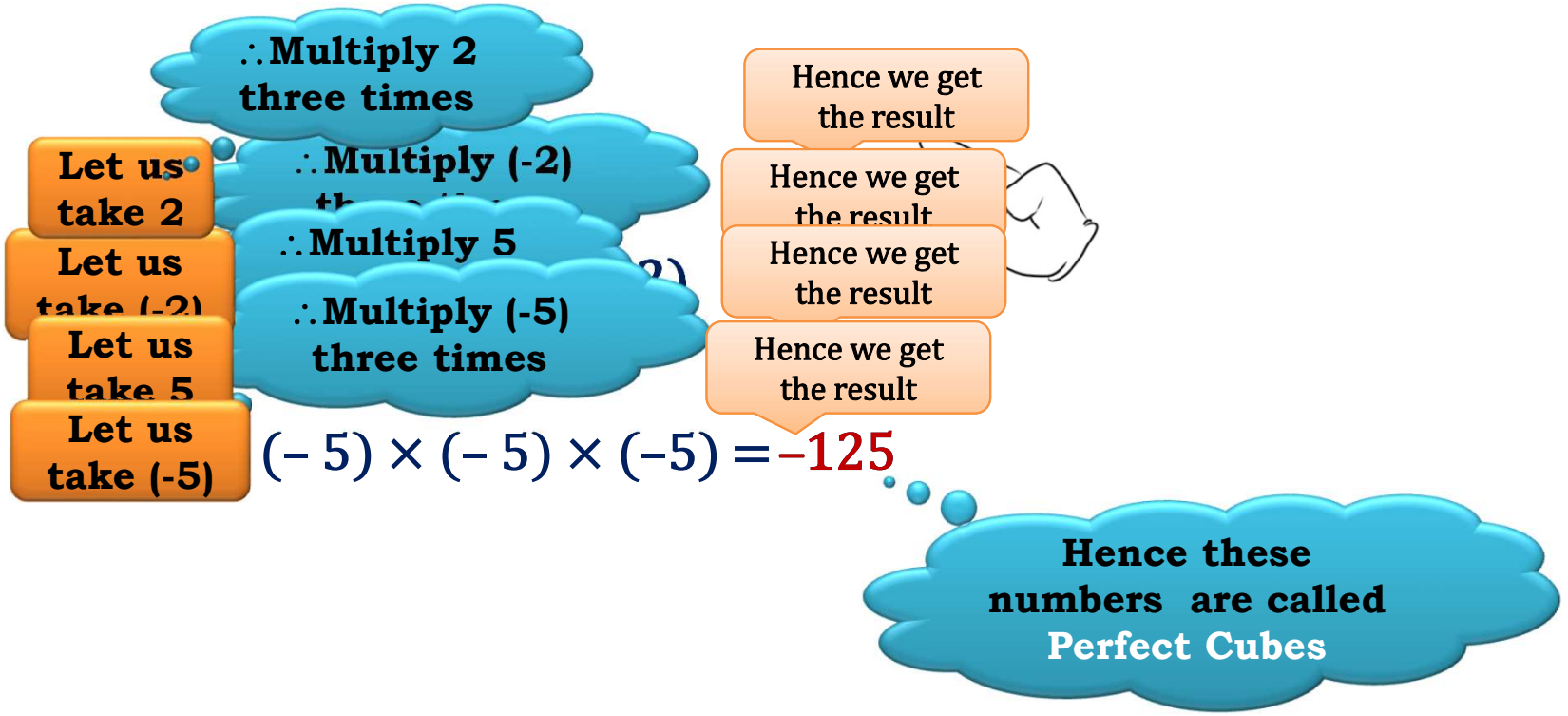
Property 6: Cubes of negative integers are negative.

Number	Number's Cube
– 1	– 1
– 2	– 8
– 3	– 27



PERFECT CUBE

Any number which is the cube of an integer is called a perfect cube.



PERFECT CUBE

Any number which is the **cube of an integer** is called a **perfect cube.**

Her… are c… …s …bes

∴ Multiply (-2) three times

$2^3 = 2 \times 2 \times 2$

$= 8$

$-2^3 = (-2) \times (-2) \times (-2)$

$= -8$

$5^3 = 5 \times 5 \times 5$

$= 125$

$-5^3 = (-5) \times (-5) \times (-5)$

$= -125$

PERFECT CUBE

Yes, Cube of any number?

∴ 8 is a perfect cube

No, Cube of any number?

∴ 10 is not a perfect cube.

INTERESTING FACTS

There are only 4 numbers, less than 100 which are perfect cubes.

Working

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

So, what do you observe ?

There are only 4 number 1, 8, 27 and 64 which are perfect cubes

INTERESTING FACTS

There are only 4 numbers, less than 100 which are perfect cubes.

eq. 1, 8, 27 and 64

There are only 5 numbers between 100 and 1000 which are perfect cubes.

Let us understand in the similar way the number between 100 and 1000 which are perfect cubes.

$125 = 5 \times 5 \times 5$

$= 5^3$

$\therefore$ 125 is a perfect cube

INTERESTING FACTS

There are only 4 numbers, less than 100 which are perfect cubes.

eq. 1, 8, 27 and 64

There are only 5 numbers between 100 and 1000 which are perfect cubes.

Let us understand in the similar way the number between 100 and 1000 which are perfect cubes.

$216 = 6 \times 6 \times 6$

$= 6^3$

$\therefore$ 216 is a perfect cube

INTERESTING FACTS

There are only 4 numbers, less than 100 which are perfect cubes.

eq. 1, 8, 27 and 64

There are only 5 numbers between 100 and 1000 which are perfect cubes.

Let us understand in the similar way the number between 100 and 1000 which are perfect cubes.

$343 = 7 \times 7 \times 7$

$= 7^3$

$\therefore$ 343 is a perfect cube

INTERESTING FACTS

There are only 4 numbers, less than 100 which are perfect cubes.

eq. 1, 8, 27 and 64

There are only 5 numbers between 100 and 1000 which are perfect cubes.

Let us understand in the similar way the number between 100 and 1000 which are perfect cubes.

$512 = 8 \times 8 \times 8$

$= 8^3$

$\therefore$ 512 is a perfect cube

INTERESTING FACTS

There are only 4 numbers, less than 100 which are perfect cubes.

eq. 1, 8, 27 and 64

There are only 5 numbers between 100 and 1000 which are perfect cubes.

Let us understand in the similar way the number between 100 and 1000 which are perfect cubes.

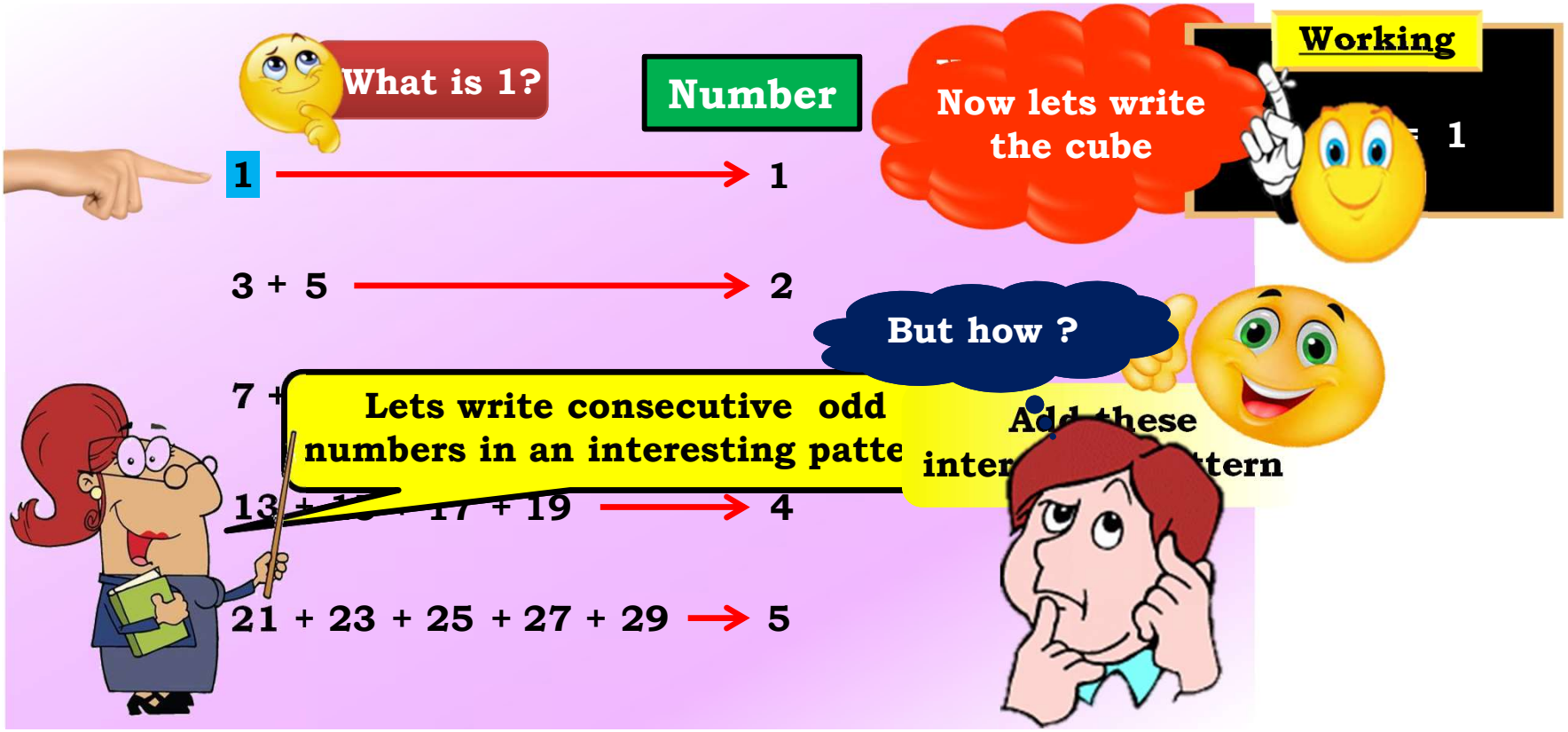
$729 = 9 \times 9 \times 9$

$= 9^3$

$\therefore$ 729 is a perfect cube

PATTERNS IN CUBES

I . Adding consecutive natural numbers



PATTERNS IN CUBES

I . Adding consecutive natural numbers

What is 3 + 5?

Number		Cube
1	→ 1	$1^3 = 1$
3 + 5	→ 2	$2^3 = 8$
7 + 9 + 11	→ 3	
13 + 15 + 17 + 19	→ 4	
21 + 23 + 25 + 27 + 29	→ 5	

Working

3 + 5 = 8

PATTERNS IN CUBES

I . Adding consecutive natural numbers

What is 7 + 9 + 11?

Number		Cube
1	→ 1	$1^3 = 1$
3 + 5	→ 2	$2^3 = 8$
7 + 9 + 11	→ 3	$3^3 = 27$
13 + 15 + 17 + 19	→ 4	
21 + 23 + 25 + 27 + 29	→ 5	

Working

7 + 9 + 11 = 27

PATTERNS IN CUBES

I . Adding consecutive natural numbers

What is 13 + 15 + 17 + 19 ?

	Number	Cube
1	1	$1^3 = 1$
3 + 5	2	$2^3 = 8$
7 + 9 + 11	3	$3^3 = 27$
13 + 15 + 17 + 19	4	$4^3 = 64$
21 + 23 + 25 + 27 + 29	5	

Working

13 + 15 + 17 + 19 = 64

PATTERNS IN CUBES

I . Adding consecutive natural numbers

What is 21 + 23 + 25 + 27 + 29 ?

Number		Cube
1	→ 1	$1^3 = 1$
3 + 5	→ 2	$2^3 = 8$
7 + 9 + 11	→ 3	$3^3 = 27$
13 + 15 + 17 + 19	→ 4	$4^3 = 64$
21 + 23 + 25 + 27 + 29	→ 5	$5^3 = 125$

Working

21 + 23 + 25+ 27 + 29 = 125

PATTERNS IN CUBES

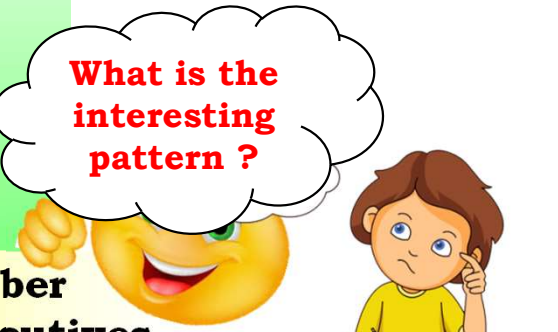
II . Difference of two consecutive cube

$2^3 - 1^3 = 1 + 2 \times 1 \times 3$

$3^3 - 2^3 = 1 + 3 \times 2 \times 3$

$4^3 - 3^3 = 1 + 4 \times 3 \times 3$

$5^3 - 4^3 = 1 + 5 \times 4 \times 3$

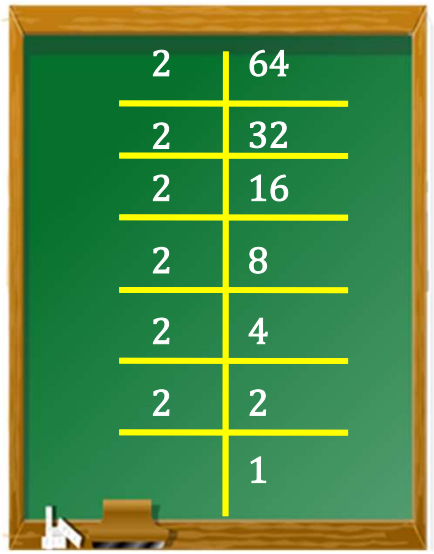


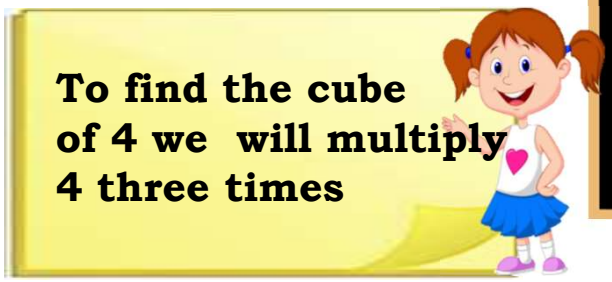
Only the middle number changes as per the consecutives

PATTERNS IN CUBES

III. Cubes and their prime factors

Number	Prime factor	Cube	Prime factors of the cube in its Prime factorization
4	2 × 2	$4^3 = 64$	$2 \times 2 \times 2 \times 2 \times 2 \times 2$ $= 2^3 \times 2^3$



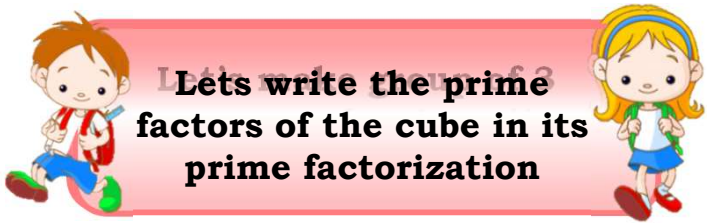


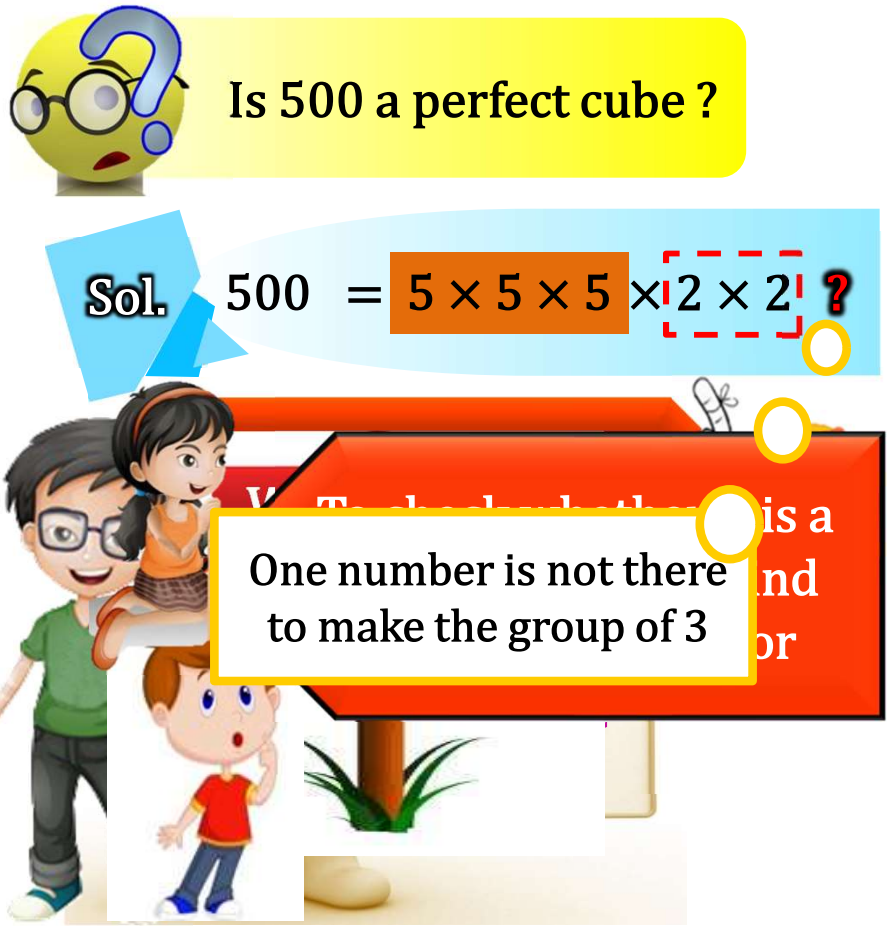
Working

$4 \times 4 \times 4$

$= 16 \times 4$

$= 64$



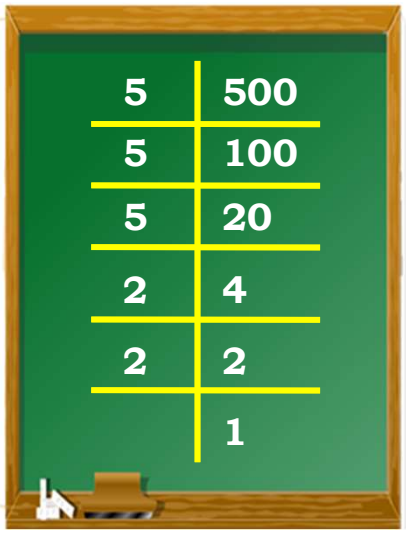


Calculation

5	500
5	100
5	20
2	4
2	2
	1

1 Is 500 a perfect cube ?

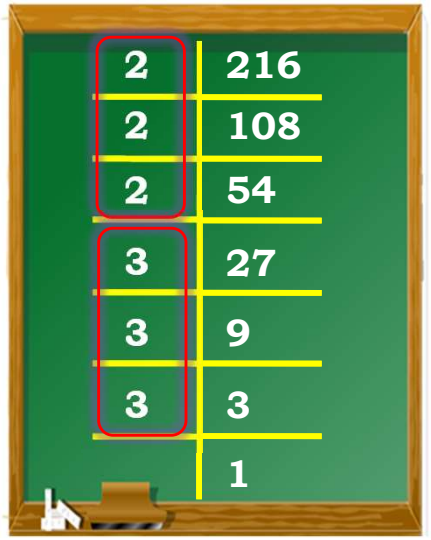
Sol. $500 = 5 \times 5 \times 5 \times 2 \times 2$?



1 **Which of the following are not the perfect cubes ?**

(i) 216

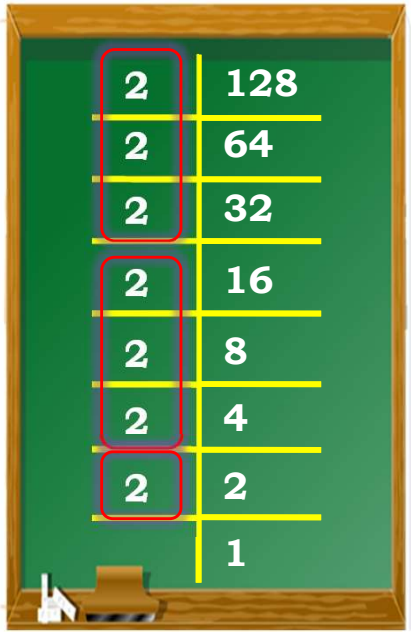
Sol. $216 = 2 \times 2 \times 2 \times 3 \times 3 \times 3$



1 **Which of the following are not the perfect cubes ?**

(ii) 128

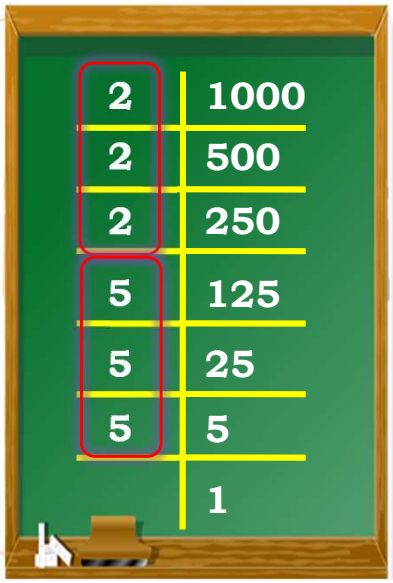
Sol. 128 = 2 × 2 × 2 × 2 × 2 × 2 × 2 ? ?



1 **Which of the following are not the perfect cubes ?**

(iii) 1000

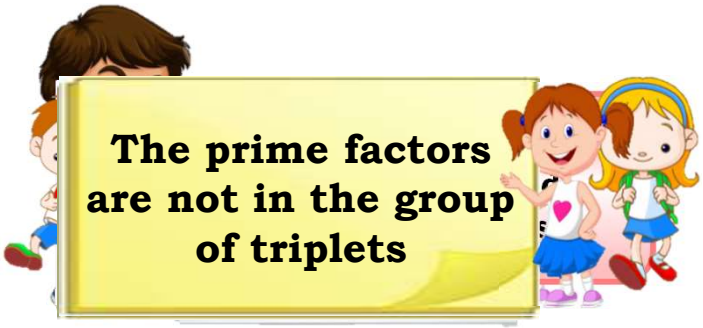
Sol. 1000 = 2 × 2 × 2 × 5 × 5 × 5

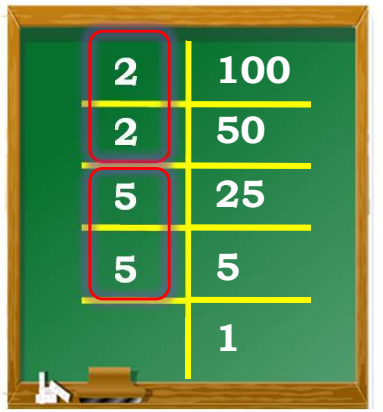


1 **Which of the following are not the perfect cubes ?**

(iv) 100

Sol. $100 = 2 \times 2 \times 5 \times 5$? ?

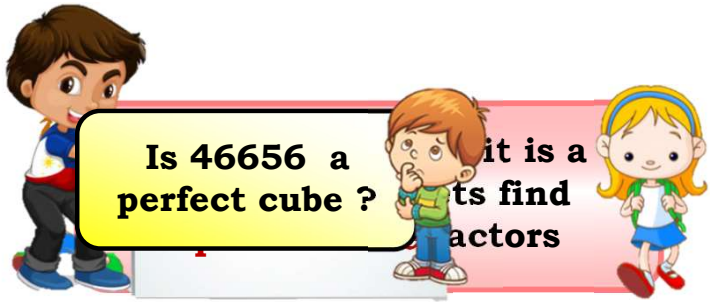


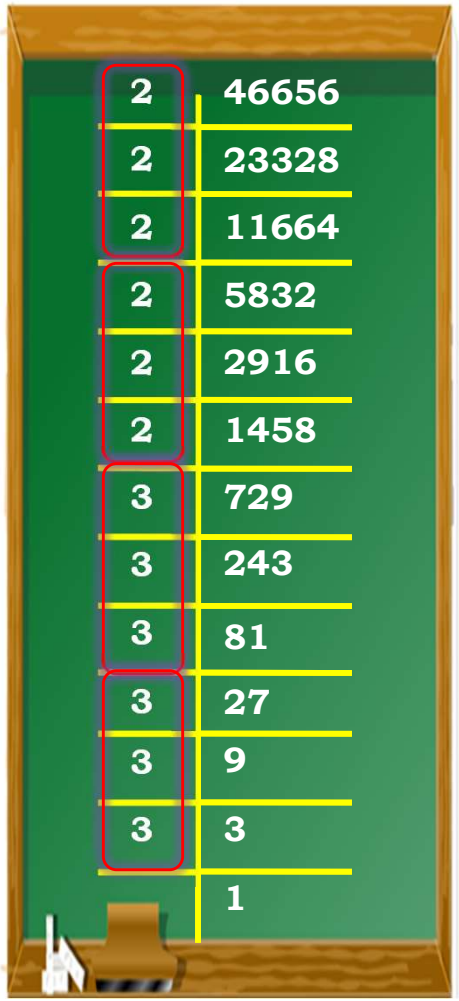


1 **Which of the following are not the perfect cubes ?**

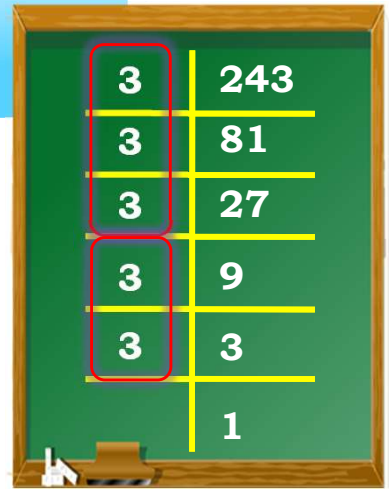
(v) 46656

Sol.46656= $2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3$





2 **Find out the smallest number by which each of the following numbers must be multiplied to obtain a perfect cube :**
(i) 243



Sol. $243 = \underline{3 \times 3 \times 3} \times 3 \times 3$?

3

Is 243 a perfect cube ?

$\therefore$ **243 is not a perfect cube**

Now, $[243] \times 3 = [3 \times 3 \times 3 \times 3 \times 3] \times 3$

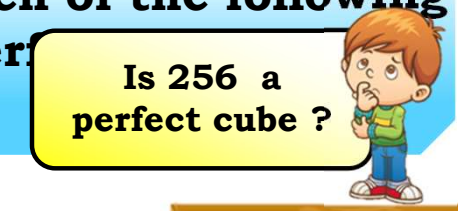
$\therefore \quad 729 = 3 \times 3 \times 3 \times 3 \times 3 \times 3$

Now, 729 becomes a perfect cube.

Thus, th... multiply ... to ... cube is 3.

One number is not there to make the group of 3

2 **Find out the smallest number by which each of the following numbers must be multiplied to obtain a perf**
(ii) 256



Sol. $256 = \underline{2 \times 2 \times 2} \times \underline{2 \times 2 \times 2} \times \underline{2 \times 2}$?

$\therefore$ **256 is not a perfect cube**

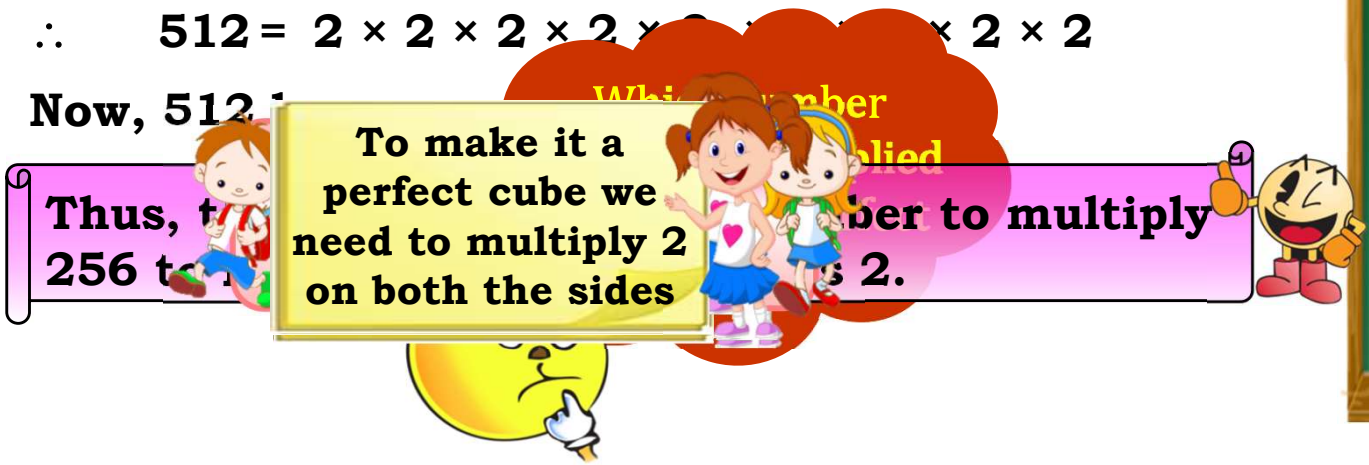
Now,

$[256] \times 2 = [2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2] \times 2$

$\therefore \quad 512 = 2 \times 2 \times 2 \times 2 \times \ldots \times 2 \times 2$

Now, 512 i

Thus, t
256 t
ber to multiply
s 2.

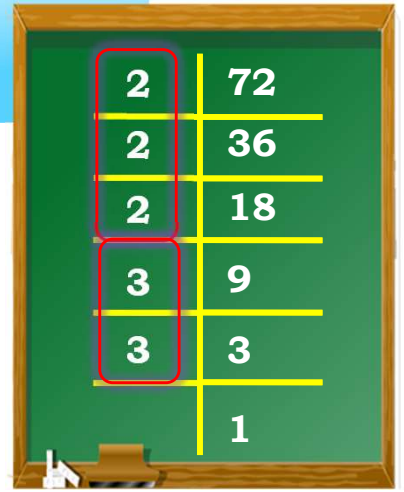


2 **Find out the smallest number by which each of the following numbers must be multiplied to obtain a perfect cube :**
(iii) 72

Sol. $72 = 2 \times 2 \times 2 \times 3 \times 3$?

3

Is 72 a perfect cube ?



$\therefore$ **72 is not a perfect cube**

Now, $[72] \times 3 = [2 \times 2 \times 2 \times 3 \times 3] \times 3$

$\therefore \quad 216 = 2 \times 2 \times 2 \times 3 \times 3 \times 3$

i.e. 216 becomes a perfect cube.

Thus, the smallest required number to multiply 72 to make it a perfect cube is 3.

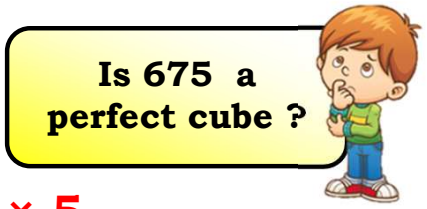
Now multiply 3 on both the sides

2 **Find out the smallest number by which each of the following numbers must be multiplied to obtain a perfect cube :**
(iv) 675

3	675
3	225
3	75
5	25
5	5
	1

5

Sol. $675 = 3 \times 3 \times 3 \times 5 \times 5$?



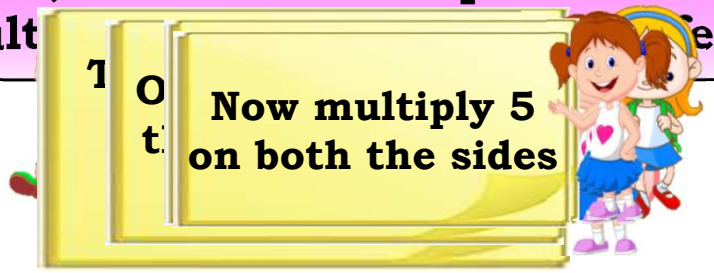
$\therefore$ **675 is not a perfect cube**

Now, $[675] \times 5 = [3 \times 3 \times 3 \times 5 \times 5] \times 5$

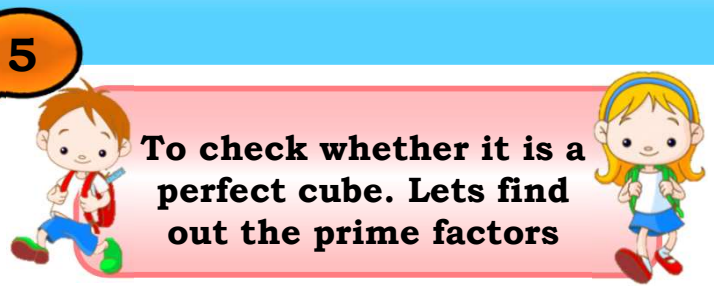
$\therefore$ $3375 = 3 \times 3 \times 3 \times 5 \times 5 \times 5$

Now, 3375 becomes a perfect cube.

Thus, the smallest required number to mult ect cube is 5.



2 **Find out the smallest number by which each of the following numbers must be multiplied to obtain a perfect cube :**
(v) 100



2	100
2	50
5	25
5	5
	1

Sol. $100 = 2 \times 2 \times 5 \times 5$

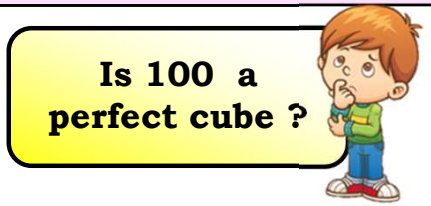
$\therefore$ **100 is not a perfect cube**

Now, $[100] \times 2 \times 5 = [2 \times 2 \times 5 \times 5] \times 2 \times 5$

$\therefore \quad 1000 = 2 \times 2 \times 2 \times 5 \times 5 \times 5$

Now, 1000 becomes a perfect cube.

Thus, the smallest required number to multiply ... cube is 2×5.



3 **Find the smallest number by which each of the following numbers must be divided to obtain a perfect cube :**

(i) 81

Sol. $81 = 3 \times 3 \times 3 \times 3$? ?

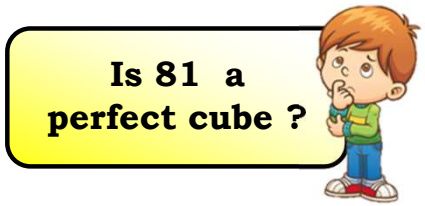
3

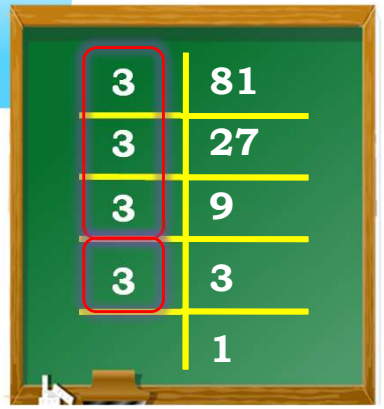
$\therefore$ **81 is not a perfect cube**

Now, $[81] \div 3 = [3 \times 3 \times 3 \times 3] \div 3$

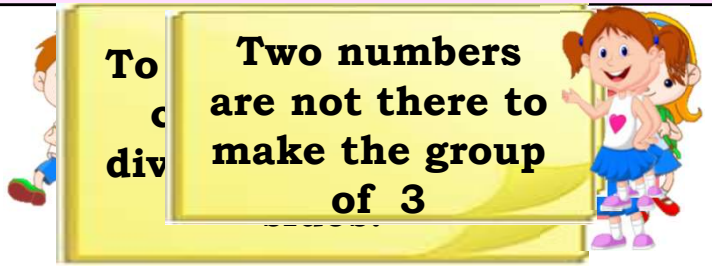
$\therefore \quad 27 = 3 \times 3 \times 3$

i.e. 27 is a perfect cube.





Thus, the smallest required number to divide 81 to make it a perfect cube is 3.



3 **Find the smallest number by which each of the following numbers must be divided to obtain a perfect cube :**

(ii) 128

2

Sol. $128 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$??

$\therefore$ **128 is not a perfect cube**

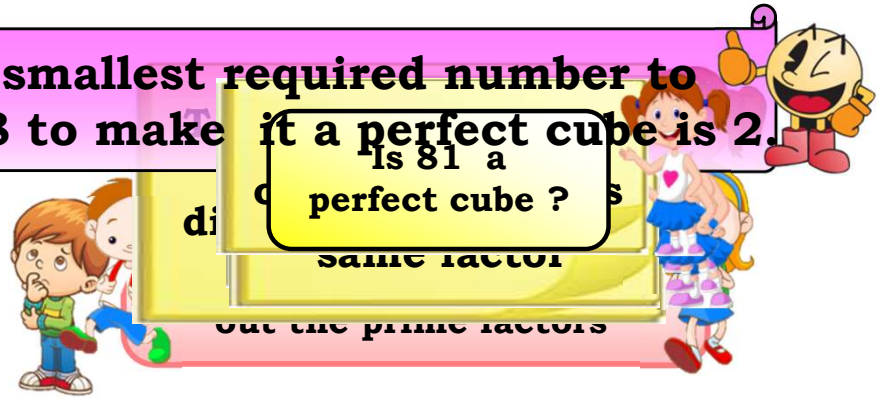
Now, $[128] \div 2 = [2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2] \div 2$

$\therefore \quad 64 = 2 \times 2 \times 2 \times 2 \times 2 \times 2$

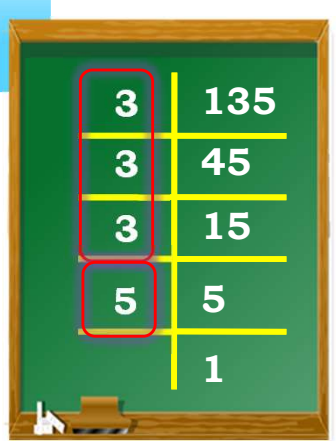
i.e. 64 is a perfect cube.

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

Thus, the smallest required number to divide 128 to make it a perfect cube is 2.



3 **Find the smallest number by which each of the following numbers must be divided to obtain a perfect cube :**
(iii) 135



Sol. $135 = 3 \times 3 \times 3 \times 5$? ?

5

$\therefore$ **135 is not a perfect cube**

Now, $[135] \div 5 = [3 \times 3 \times 3 \times 5] \div 5$

$\therefore \quad 27 = 3 \times 3 \times 3$

i.e. 27 is a perfect cube.

Thus, the smallest required number to divide 135 to make it a perfect cube is 5.

T
d
Now let's make group of three same factor
sides.

3 **Find the smallest number by which each of the following numbers must be divided to obtain a perfect cube :**
(iv) 192

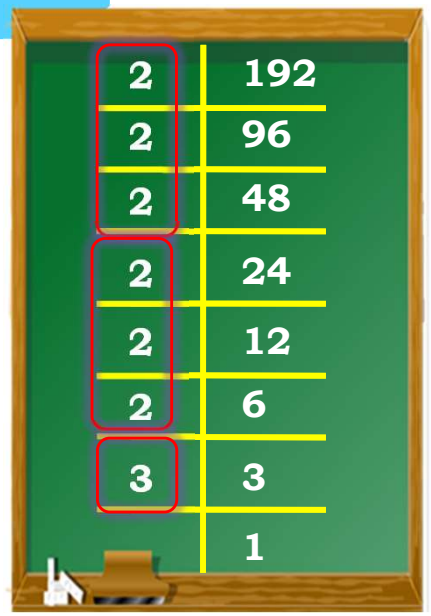
Sol. $192 = \underline{2 \times 2 \times 2} \times \underline{2 \times 2 \times 2} \times \underline{3}$?? (3)

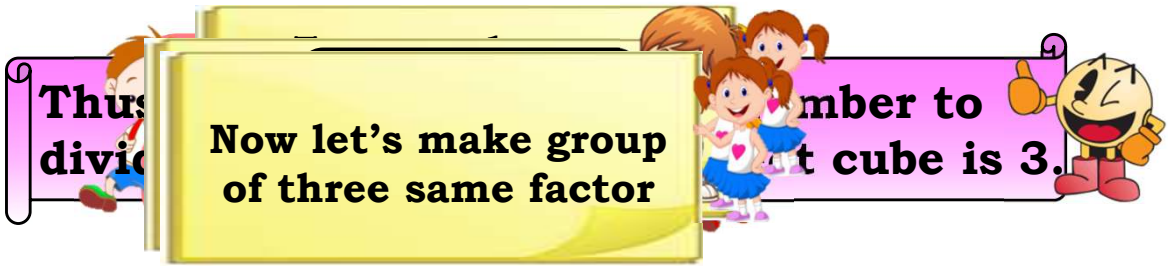
$\therefore$ **192 is not a perfect cube**

Now, $[192] \div 3 = [2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3] \div 3$

$\therefore \quad 64 = 2 \times 2 \times 2 \times 2 \times 2 \times 2$

i.e. 64 is a perfect cube.





3 **Find the smallest number by which each of the following numbers must be divided to obtain a perfect cube**

(v) 704

11

Is 704 a perfect cube ?

Sol. $704 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 11$? ?

$\therefore$ **704 is not a perfect cube**

Now,

$[704] \div 11 = [2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 11] \div 11$

$\therefore \quad 64 = 2 \times 2 \times 2 \times 2 \times 2 \times 2$

Now, 64 becomes a perfect cube.

2	704
2	352
2	176
2	88
2	44
2	22
11	11
	1

Thus, the smallest required number to divide 704 to make it a perfect cube is 11.

Now divide 11 ÷ 11 on both the sides

4 Parikshit makes a cuboid of plasticine of sides 5cm, 2cm, 5cm. How much such cuboids will be need to form a cube ?

Sol. Sides of the cuboid are 5cm , 2cm, 5cm

Volume of the cuboid = 5cm × 2cm × 5cm

Volume of the required cube = [5cm × 5cm × 2cm × 5cm × 2cm × 2cm]

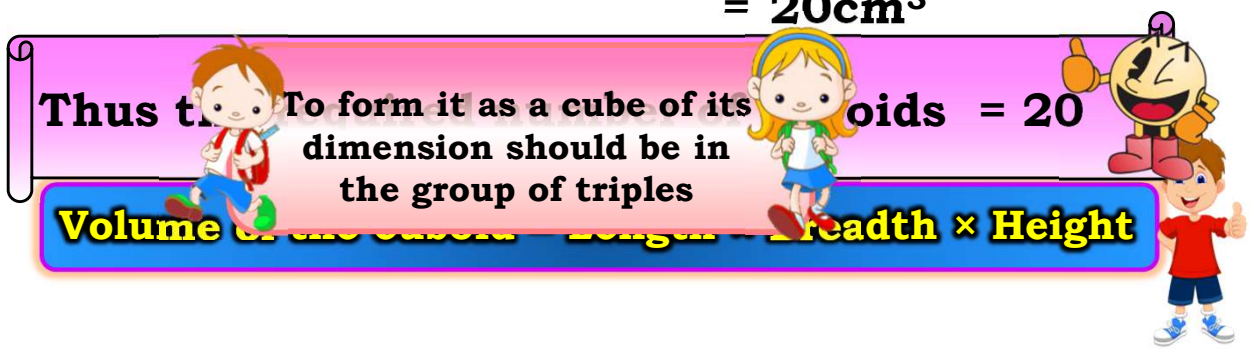
= [5× 5 × 2cm^3]

= 20cm^3

Thus t… oids = 20

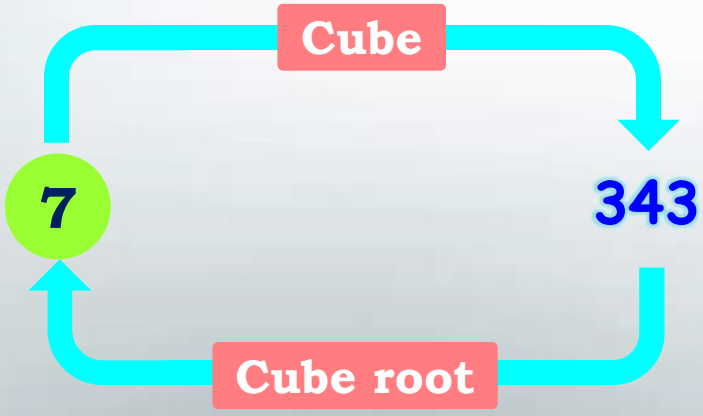
To form it as a cube of its dimension should be in the group of triples

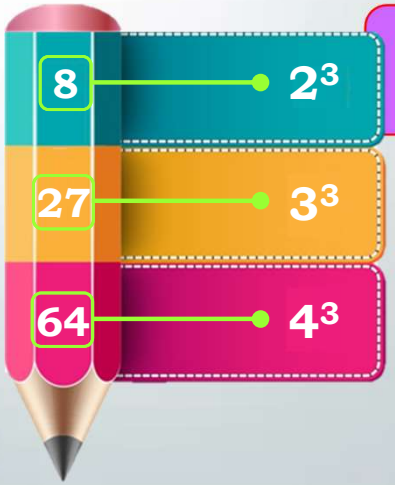
Volume … Length × Breadth × Height



Exercise – 7.2

$\sqrt{}$ CUBE ROOT of a number





Cube root is other way round

Let us take number 7

"$\sqrt[3]{\ }$" is used to denote Cube root of any number

$7^3 = 749$ $\quad \sqrt[3]{343} = 7$

CUBE ROOT OF A NUMBER THROUGH ESTIMATION

1 **Find the cube root of 614125 through estima**

Ten's digit of the required cube root must be 8.

Sol.

1) Form two groups of three digits each starting from the right most"

614125 ➡ **614** (2nd group) **125** (1st group)

Lets follow steps to find the cube root through estimation.

t gr … 's digit of cube root.

C… 5, also ends in 5.

U… t's digit of the cube root is 5.

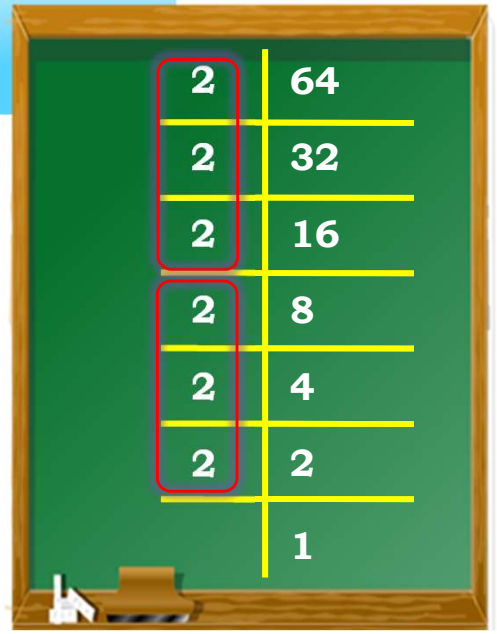
… group (here 614) gives us the ten's digit if the cube root.

Since, $8^3 = 512$ and $9^3 = 729$

Also $512 < 614 < 729$

$\therefore \sqrt[3]{614125} = 85$

1 **Find the cube root of each of the following numbers by prime factorization method :**
(i) 64

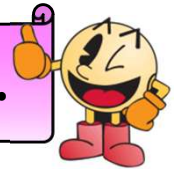


Sol. $64 = \underline{2 \times 2 \times 2} \times \underline{2 \times 2 \times 2}$

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

$\therefore \sqrt[3]{64} = 4$

Thus, Cube root of 64 is 4.



Take one term from each group

1 **Find the cube root of each of the following numbers by prime factorization method :**
(ii) 512

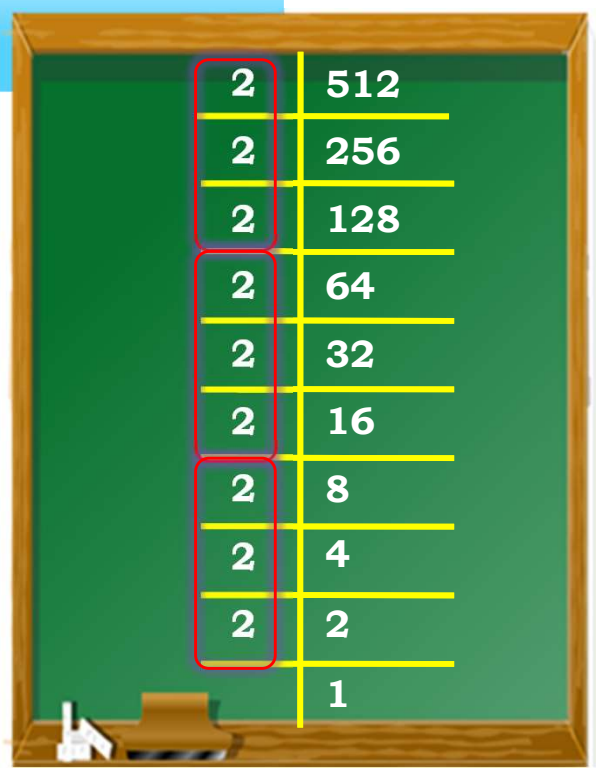
Sol. $512 = \underline{2 \times 2 \times 2} \times \underline{2 \times 2 \times 2} \times \underline{2 \times 2 \times 2}$

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

$\therefore \sqrt[3]{512} = 8$

Thus, Cube root of 512 is 8.

Take one term from each group



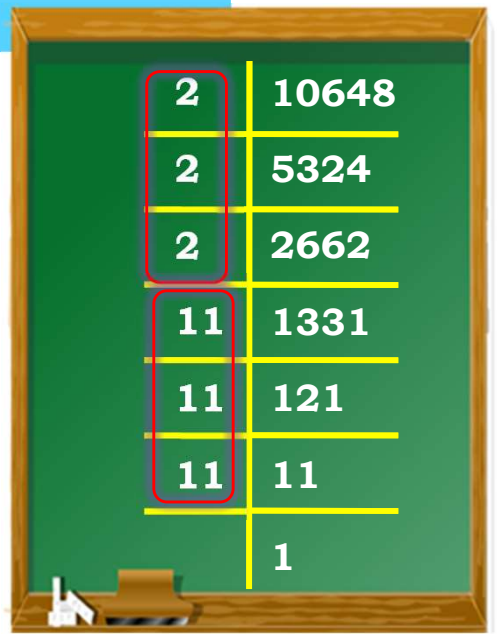
1 **Find the cube root of each of the following numbers by prime factorization method :**
(iii) 10648

Sol. $10648 = 2 \times 2 \times 2 \times 11 \times 11 \times 11$

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

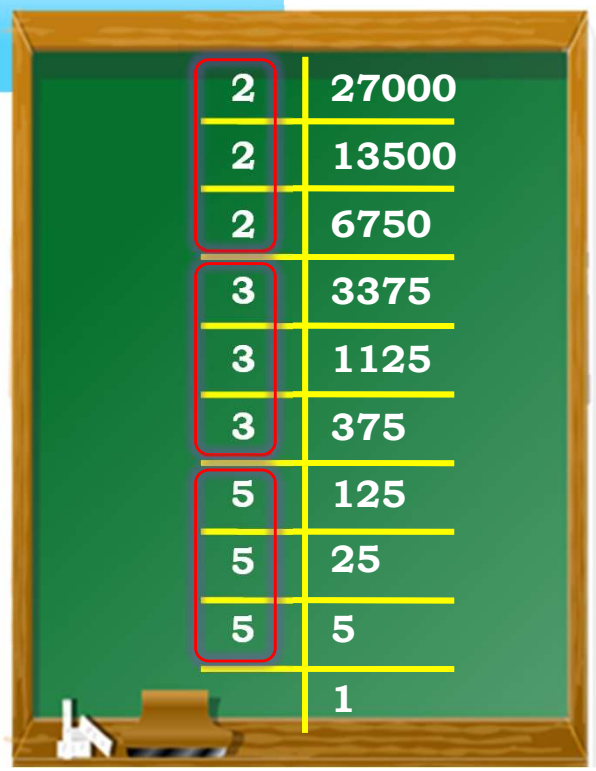
$\therefore \quad \sqrt[3]{10648} = 22$

Thus, Cube root of 10648 is 22.



Let us find the prime factors

1 **Find the cube root of each of the following numbers by prime factorization method :**
(iv) 27000



Sol. $27000 = \underline{2 \times 2 \times 2} \times \underline{3 \times 3 \times 3} \times \underline{5 \times 5 \times 5}$

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

$\therefore \sqrt[3]{27000} = 30$

Thus, Cube root of 27000 is 30.

Take one term from each group

1 **Find the cube root of each of the following numbers by prime factorization method :**
(v) 15625

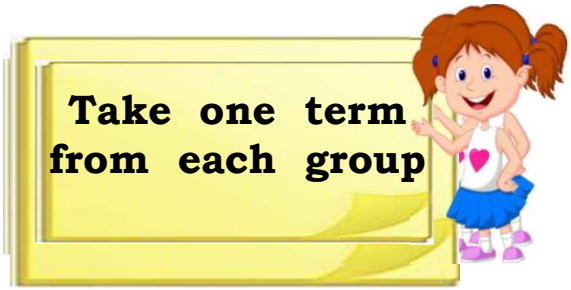
5	15625
5	3125
5	625
5	125
5	25
5	5
	1

Sol. $15625 = 5 \times 5 \times 5 \times 5 \times 5 \times 5$

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

$\therefore \quad \sqrt[3]{15625} = 25$

Thus, Cube root of 15625 is 25.



1 **Find the cube root of each of the following numbers by prime factorization method :**
(vi) 13824

Sol. $13824 = \underline{2 \times 2 \times 2} \times \underline{2 \times 2 \times 2} \times \underline{2 \times 2 \times 2} \times \underline{3 \times 3 \times 3}$

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

$\therefore \quad \sqrt[3]{13824} = 24$

Thus, Cube root of 13824 is 24.

Making group of 3 same prime factors

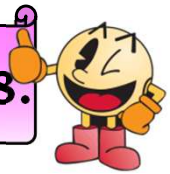
1 **Find the cube root of each of the follov numbers by prime factorization metho (vii) 110592**

Sol. $110592 = \underline{2 \times 2 \times 2} \times \underline{2 \times 2 \times 2} \times \underline{2 \times 2 \times 2} \times \underline{2 \times 2 \times 2} \times \underline{3 \times 3 \times 3}$

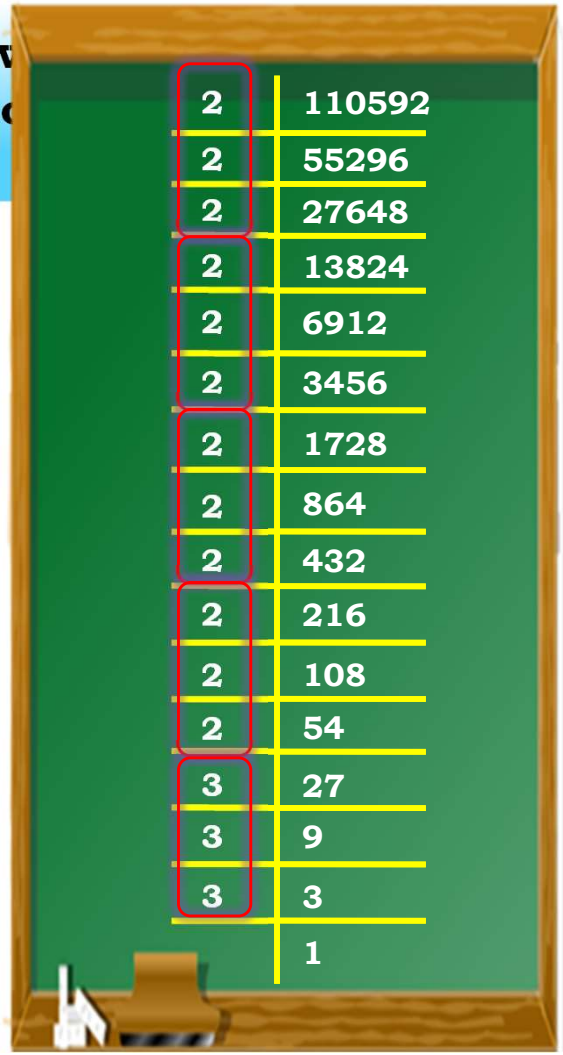
$\therefore \quad \sqrt[3]{110592} = 2 \times 2 \times 2 \times 2 \times 3$

$\therefore \quad \sqrt[3]{110592} = 48$

Thus, Cube root of 10592 is 48.



Making group of same 3 prime factors



1 **Find the cube root of each of the following numbers by prime factorization method :**
(viii) 46656

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

Sol. $46656 = \underline{2 \times 2 \times 2} \times \underline{2 \times 2 \times 2} \times \underline{3 \times 3 \times 3} \times \underline{3 \times 3 \times 3}$

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

$\therefore \quad \sqrt[3]{46656} = 36$

Thus, Cube root of 46556 is 36.

Take one term from each group

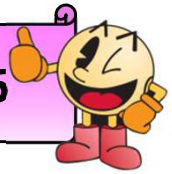
1 **Find the cube root of each of the following numbers by prime factorization method :**
(ix) 175616

Sol $175616 = \underline{2 \times 2 \times 2} \times \underline{2 \times 2 \times 2} \times \underline{2 \times 2 \times 2} \times \underline{7 \times 7 \times 7}$

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

$\therefore \quad \sqrt[3]{175616} = 56$

Thus, Cube root of 175616 is 56



Making group of same 3 prime factors

1 **Find the cube root of each of the following numbers by prime factorization method :**
(x) 91125

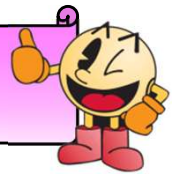
3	91125
3	30375
3	10125
3	3375
3	1125
3	375
5	125
5	25
5	5
	1

Sol. $91125 = \underline{3 \times 3 \times 3} \times \underline{3 \times 3 \times 3} \times \underline{5 \times 5 \times 5}$

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

$\therefore \sqrt[3]{91125} = 45$

Thus, Cube root of 91125 is 45.



Take one term from each group

2 **State whether the following statements are true or false :**

(1) Cube of any odd number is even

Sol. **False**

We know that cube of every odd number is odd

(2) A perfect cube does not end with two zeros.

Sol. **True**

2 **State whether the following statements are true or false :**

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

Sol. **False**

Eg:

$15^2 = 225$

$15^3 = 3375$

(4) If square of a number ends with 5, then its number ends with 8.

Sol. **False**

If the digit in the one's place of a number is 5, the digit in the one's place of its cube will also be the same digit i.e. 5

2 **State whether the following statements are true or false :**

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

Sol. **False**

Hence there are perfect cube which ends with 8.

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

Sol. **False**

The cubes of a two digit number may be a four digit number.

2 **State whether the following statements are true or false :**

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

Sol. **True**

The cube of a single digit number may or may not be a single digit.

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.**

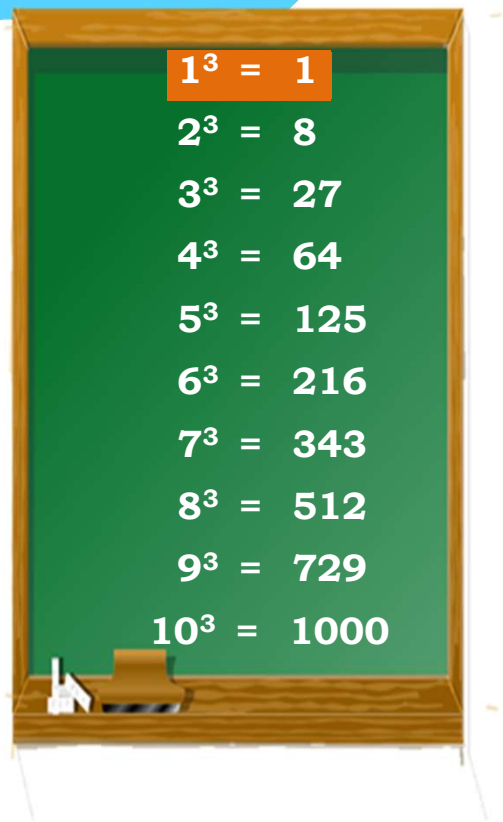
Sol. 1331

We know that $1^3 = 1$

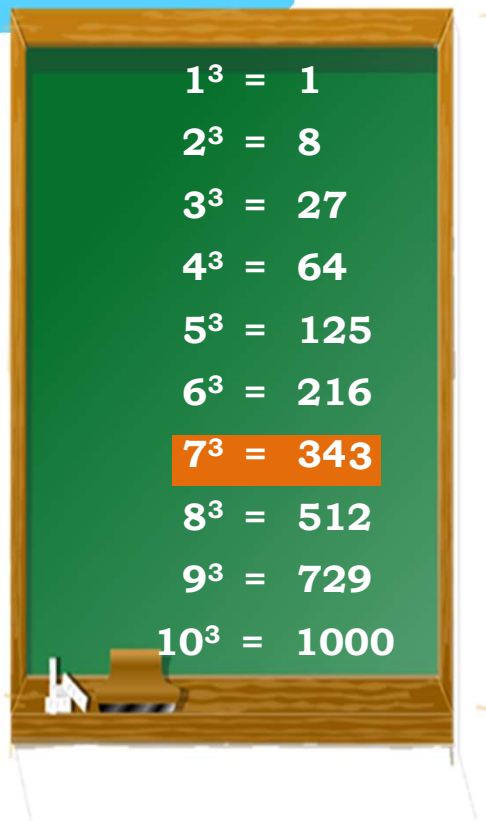
Next number with 1 in its unit's place is 11

$11^3 = 1331$

Hence, cube root of 1331 is 11.



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.**



Sol. 4913

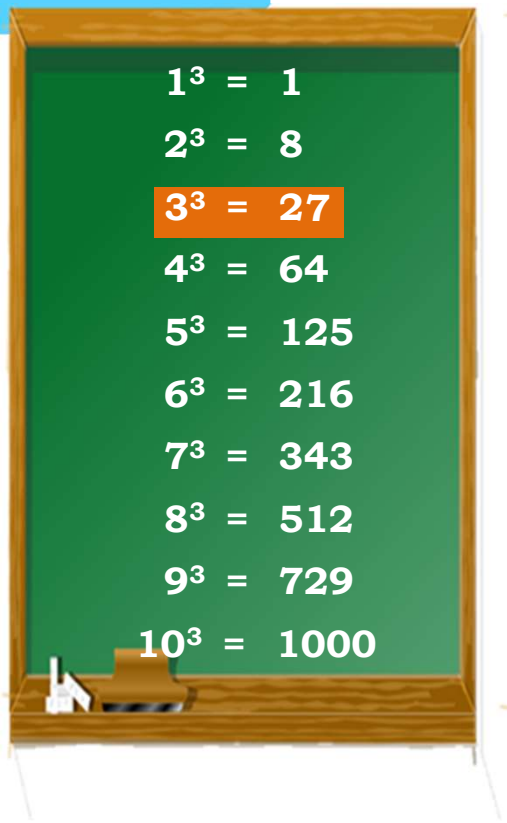
We know that $7^3 = 343$

Next number with 7 in its unit's place is 17

$17^3 = 4913$

Hence, cube root of 4913 is 17.

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.**



Sol. 12167

We know that $3^3 = 27$

Next number with 3 in its unit's place is 13

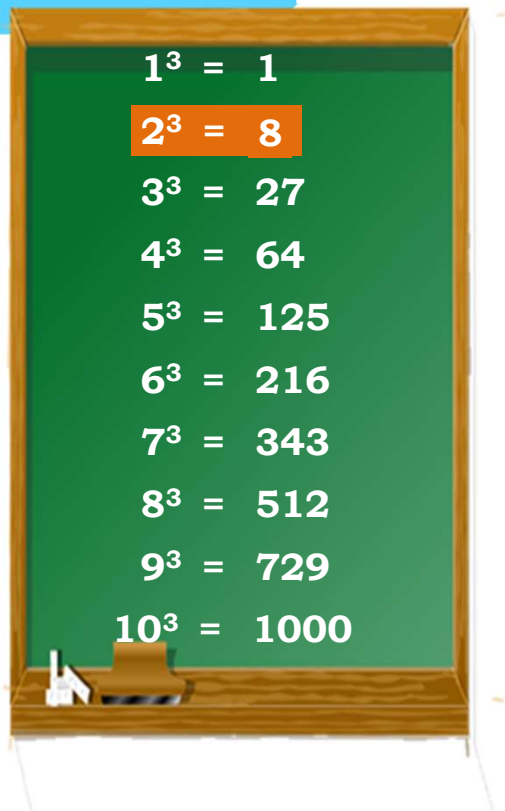
$13^3 = 2197$

Next number with 3 in its unit's place is 23

$23^3 = 12167$

Hence, cube root of 12167 is 23.

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.



Sol. 32768

We know that $2^3 = 8$

Next number with 2 in its unit's place is 12

$12^3 = 1728$

Next number with 2 in its unit's place is 22

$22^3 = 10648$

Next number with 2 in its unit's place is 32

$32^3 = 32768$

Hence, cube root of 32768 is 32.

Additional sums

1 **Is 27000 a perfect cube? What is the number whose cube is 27000 ?**

Sol. $27000 = \underline{2 \times 2 \times 2} \times \underline{3 \times 3 \times 3} \times \underline{5 \times 5 \times 5}$

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

$= 30$

27000 is the cube of 30.

Hence 27000 is

Making group of same 3 prime factors

We find that the prime factors of 27000 can be grouped into triples of equal factor and no factor is left over.

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

2 What is the smallest number by which 392 must be multiplied so that the product is a perfect cube ?

2

Is 392 a perfect cube ?

Sol. $392 = \underline{2 \times 2 \times 2} \times \underline{7 \times 7}$?

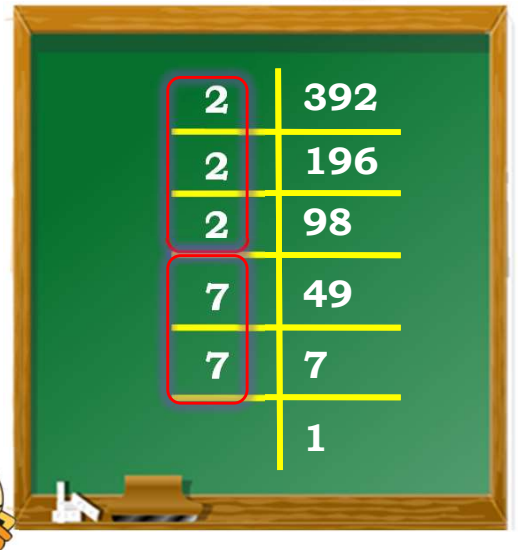
$\therefore$ 392 is not a perfect cube

Now,

$[392] \times 7 = [2 \times 2 \times 2 \times 7 \times 7] \times 7$

$\therefore \quad 2744 = 2 \times 2 \times 2 \times 7 \times 7 \times 7$

Now, 2744 becomes a perfect cube.

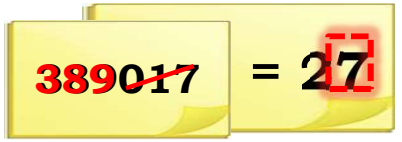


Thus, 392 tc … ber to multiply … 7.

To make it a perfect cube we need to multiply 7 on both the sides

3 **Find the cube root of the following number : 389017**

Sol. The given number is 389017



Clearly, units digit of this number is 7.

Therefore, units digit of its cube root is 3.

After stricking out the last three digit from the right,
we are left with the number 389.

Now,

$7^3 = 343 < 389$ and

$8^3 = 512 > 389$

$\therefore$ Tens digit of the cube root of the given number is 7

Hence, $\sqrt[3]{389017} = 73$

4 **Find the smallest number which when multiplied with 137592 will make the product a perfect cube. Further, find the cube root of the product**

Sol. $137592 = 2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 7 \times 7 \times 13$

$\therefore$ 137592 is not a perfect cube

Now, [137592 ...

To check whether it is a perfect cube. Lets find out the prime factors

three numbers is not there to make a group of 3

$= 2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 7 \times 7 \times 7 \times 13 \times 13 \times 13$

$162771336 = 2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 7 \times 7 \times 7 \times 13 \times 13 \times 13$

$\sqrt[3]{162771336} = 2 \times 3 \times 7 \times 13$

$= 546$

2

Now multiply $7 \times 13 \times 13$ on both the sides

$7 \times 13 \times 13$ on both the sides

3	17199
3	5733
3	1911
7	637
7	91
13	13
	1

4 **Find the smallest number which when multiplied with 137592 will make the product a perfect cube. Further, find the cube root of the product.**

Thus, the smallest required number to multiply with 137592 to make it a perfect cube is 1183.

And the cube root of the product formed i.e, 162771336 is 546.

5 **Find the cube root of 91125.**

Sol. $91125 = \underline{3 \times 3 \times 3} \times \underline{3 \times 3 \times 3} \times \underline{5 \times 5 \times 5}$

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

$\therefore \sqrt[3]{91125} = 45$

Thus, Cube root of 91125is 45.

Making group of 3 same prime factors

3 **Divide the number 26244 by the smallest number so that the quotient is a perfect cube. Also, find the cu… of the quotient.**

Sol. $26244 = 2 \times 2 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3$

$\therefore$ **26244 is not a perfect cube**

Now,

$$26244 = 2 \times 2 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3$$

$$\frac{26244}{3 \times 3 \times 2 \times 2} = \frac{2 \times 2 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3}{3 \times 3 \times 2 \times 2}$$

$$\therefore \quad 729 = 3 \times 3 \times 3 \times 3 \times 3 \times 3$$

$$\therefore \quad \sqrt[3]{729} = 3 \times 3$$

$$\therefore \quad \sqrt[3]{729} = 9$$

Now, 729 becomes a perfect cube.

Thus, the smallest required number to divide 704 to make it a perfect cube is 11.