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PRINCIPAL SHANKAR BAGDE'S METHOD OF SQUARE ROOT

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If n is non zero integer, then n x n written as n^2 is called square of n.

Hence square of a number can be found by multiplying it by itself.

Only perfect squares have square roots, finding the squre root is just inverse operation to finding the square.Every natural number does not has a square root.No number multiplied by itself gives 57, so 57 does not has a square root.Only perfect squares have squre roots.

At present, there are two methods of finding square root at secondary and junior college levele

i) By Prime factors method and
ii) By Long Division method

At the time of teaching perfect squares in mathematics, The Author flashed a new method of finding square root.

Let us study the table of squares up to nine.

$1^2 = 1$		$6^2 = 36$
$2^2 = 4$	$5^2 = 25$	$7^2 = 49$
$3^2 = 9$		$8^2 = 64$
$4^2 = 16$		$9^2 = 81$

Observing the above table we get,two squares of digit having the same digit at its unit place.

The digit at unit place	Number	Number
1	$1^2 = 1$	$9^2 = 81$
4	$2^2 = 4$	$8^2 = 64$
9	$3^2 = 9$	$7^2 = 49$

16	$4^2 = 16$	$6^2 = 36$

Remember, $5^2 = 25$ ***has no partner having unit place digit 5.***

Now to find square root of any perfect square.

PRINCIPAL SHANKAR BAGDE'S METHOD OF SQUARE ROOT

We have seen that there are some numbers having same unit place digit, so there must be two trials to find square roots of perfect squares.

Find the square root of 541696 i.e.

$\sqrt{541696} = ?$

The given number has unit place digit is 6

Hence there are two trials if necessary, because there are two numbers 16 and 36 having unit place digit 6

Solution:- Trial one for 16

- ***Given number*** — 541696
- ***Subtract number 16*** — 16
-
- ***We get answer and cancelled zero*** — $54168\cancel{0}$
- ***Here*** $5329 < 5416 > 5476$ ***i.e.*** $73^2 < 5416 > 74^2$
- ***So dvide by 73*** — $54168 \ / \ 73$
- ***Here 54168 is not divisible by 73 so we have***
- ***To go trial No. Two***

Solution:- Trial two for 36

- ***Given number*** — 541696
- ***Subtract number 36*** — 36
-
- ***We get answer and cancelled zero*** — $54166\cancel{0}$
- ***Here*** $5329 < 5416 > 5476$ ***i.e.*** $73^2 < 5416 > 74^2$
- ***So dvide by 73*** — $54166 / 73$
- ***Here 54166 is divisible by 73***

We get answer — 742

Now subtract by $\sqrt{36} = 6$ — 6

We get square root of 541696 — $7\ 3\ 6$

$\sqrt{541696} = \pm 736$ ***To write the above solution as –***

A B

541696 - 36 = 5 4 1 6 6 0 = 54166 ÷ 73 = 742 – 6 = 73 6

A B

Note A and B must be tally with the answer.

$\sqrt{541696} = \pm\ 736$

Example Two:- find the square root of 625.

In the given number 5 is at unit place therefore there is only one trial.

Solution *625 –2 5 = 600 = 60 ÷ 2 = 30 - 5 = 2 5*

A B A B

Answer $\sqrt{625} = \pm\ 25$

Example Three $\sqrt{1002001} = ?$

1002001 = 1002001 - 1 = 1002000 = 100200 ÷ 100 = 1002 - 1 = 1 0 0 1

A B

A B

Answer $\sqrt{1002001} = \pm\ 1001$

Example Four $\sqrt{6561} = ?$

Solution for 81

6 5 6 1 - 81 = 6 4 8 0 = 6 4 8 ÷ 8 = 8 1 - 9 = 7 2

A_1 B_1 A_2 B_2

Here $A_1 \neq A_2$ **and** $B_2 \neq B_1$ **And hence** $\sqrt{6561} \neq 72$

So Trial No. Two Solution for 1

$6561 - 1 = 6560 = 656 \div \underset{A}{8} = 82 - \underset{B}{1} = \underset{A}{8}\underset{B}{1}$

Answer $\sqrt{6561} = \pm 81$