



VIDYA BHAWAN, BALIKA VIDYAPITH

Shakti Utthan Ashram, Lakhisarai-811311(Bihar)

(Affiliated to CBSE up to +2 Level)

CLASS:VIII

SUB.: MATHS

DATE: 25 -05-2021

Square root

- A perfect square root exists for a perfect square number only.
- The square root of an even perfect square is even.
- An odd perfect square will have an odd square root.
- A perfect square cannot be negative and hence the square root of a negative number is not defined.
- Numbers ending with (having unit's digit) 1, 4, 5, 6, or 9 will have a square root.
- If the unit digit of a number is 2, 3, 7, or 8 then a perfect square root is not possible.
- If a number ends with an odd number of zeros, then it cannot have a square root. A square root is only possible for even number of zeros.
- Two square roots can be multiplied. $\sqrt{5}$, when multiplied by $\sqrt{2}$, gives $\sqrt{10}$ as a result.
- Two same square roots are multiplied to give a non- square root number. When $\sqrt{25}$ is multiplied by $\sqrt{25}$ we get 25 as a result.

Prime Factorization Method

- ❖ The perfect square is factorized into its prime factors by successive division.
- ❖ The pairs of the prime factors are paired.
- ❖ Taking the product of one factor from each pair will result in the square root of the perfect square.

Let us find the square root of 144.

The prime factorization of 144 is $144 = (2 \times 2) \times (2 \times 2) \times (3 \times 3)$.

Pairing the prime factors and selecting one from each pair gives

$$2 \times 2 \times 3 = 12.$$

So,

the square root of $144 = \sqrt{144} = 12$.

Division Method

This method basically uses the division operation by a divisor whose square is either less than or equal to the dividend.

- Take the number whose square root is to find.
- Place a bar over every pair of the digit of the number starting from that in unit's place (rightmost side).
- We divide the leftmost number by the largest number whose square is less than or equal to the number under the leftmost bar.
- Take this number as the divisor and the quotient. The number under the leftmost bar is considered to be the dividend.
- Divide and get the number.
- Bring down the number under the next bar to the right of the remainder.
- Double the divisor (or add divisor to itself).
- To the right of this divisor find a suitable number which together with divisor forms a new divisor for the new dividend. The new number in the quotient will have the same number as selected in the divisor. The condition is the same as being either less or equal to that of the dividend.

This process continues till we get zero as the remainder. The quotient thus obtained will be the square root of the number.

Example for Division Method

Let's find out the square root of 225. Placing bar over the pair of digits in 225 starting from the unit place

225

Start the division from the leftmost side. Here 1 is the number whose square is less than 2. Putting it in the divisor and the quotient and then doubling it will give

$$\begin{array}{r} 1 \quad _ \\ +1 \quad _ \\ \hline 2 \quad _ \end{array} \quad \begin{array}{r} \overline{225} \\ \underline{1} \\ 125 \end{array}$$

$$\begin{array}{r} 1 \quad 5 \\ \hline 1 \quad 2 \quad 25 \\ - 1 \\ \hline 25 \quad 1 \quad 25 \\ - 1 \quad 25 \\ \hline 0 \quad 0 \end{array}$$