SQUARE AND SQUARE ROOT

- **If a number is multiplied by itself, the product obtained is called square of that number. Ex:** $5 \times 5 = 25\ ;\ 5^2 = 25\ \therefore 25$ **is the square of** 5
- **The square root of a given number** x **is the number whose square is** x
  Ex: $Square\ root\ of\ 64 = \sqrt{64} = \sqrt{8 \times 8} = 8$

(i) • Square of even numbers are always even

(ii) • Square of odd numbers are always odd

(iii) • Square of positive or negative number is always positive

(iv) • A number whose exact square root can be obtained is called a perfect square. Ex: 16, 9, 1.21, 9/16 .....

$$Square\ root\ of\ fraction = \frac{Square\ root\ of\ numerator}{Square\ root\ of\ denominator}$$

Methods of finding Square Root

Prime Factor method

Resolve the number into prime factors, make pairs of same factors and take one factor from each pair. **Ex:** $\sqrt{484}$

$= \sqrt{(2 \times 2) \times (11 \times 11)} = 2 \times 11 = 22$

Division method

For Perfect Square and Non- Perfect Square

1. Group the digits in pairs starting from right to left. Take first pair and find out quotient.
2. Bring down second pair find the double the quotient and find the quotient of the dividend
3. Repeat the procedure until all pairs are brought down and remainder=0. **Ex:** $\sqrt{276676}$

$$\begin{array}{r|l} & 5\ 2\ 6 \\ \hline 5 & \overline{27\ 66\ 76} \\ & -25 \\ \hline 102 & 2\ 66 \\ & -\ 2\ 04 \\ \hline 1046 & 62\ 76 \\ & -62\ 76 \\ \hline & \end{array}$$

Properties of Square Numbers

- The ending digit (unit's place) of square number is 0,1,4,5,6,or 9
- If a number has 1 or 9 at its unit's place, then square of this number always has 1 at its units place
- If the digit at unit's place of a number is 4 or 6, then its square will have only 6 at its unit's place.
- If a number ends with 'n' zeroes, its square ends with '2n' zeroes.