PRINCIPLE OF MATHEMATICAL INDUCTION

- One key basis for mathematical thinking is deductive reasoning. In contrast to deduction, inductive reasoning depends on working with different cases and developing a conjecture by observing incidences till we have observed each and every case. Thus, in simple language we can say the word 'induction' means the generalisation from particular cases or facts.
- **Statement**: A sentence is called a statement, if it is either true ot false.
- **Motivation**: Motivation is tending to initiate an action. Here Basis step motivate us for mathematical induciton.
- **Principle of Mathematical Induction**: The principle of mathematical induction is one such tool which can be used to prove a wide variety of mathematical statements. Each such statement is assumed as P(n) associated with positive integer n, for which the correctness for the case n = 1 is examined. Then assuming the truth of P(k) for some positive integer k, the truth of P (k+1) is established.
- **Working Rule**:

  Step 1: Show that the given statement is true for n = 1.

  Step 2: Assume that the statement is true for n = k.

  Step 3: Using the assumption made in step 2, show that the statement is true for n = k + 1. We have proved the statement is true for n = k. According to step 3, it is also true for k + 1 (i.e., 1 + 1 = 2). By repeating the above logic, it is true for every natural number.