MATHEMATICS

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AIM POINT
MATHEMATICS
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MATHEMATICAL INDUCTION

& Their Properties

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THINGS TO REMEMBER

✵ Introducation

In an algebra there are certain results that are formulated in tersm of n, where n is a positive intege.Such results can be proved by specific technique, which is known as the principle of mathematical induction.

✵ First Principle of Mathematical Induction

Step I **Verification step** Actual verification of the proposition for the starting value 'i'.

Step II **Induction step** Assuming the proposition to be true for 'k', $k \geq i$ and then providing that it is true for the value (k + 1) which is the next higher integer.

Step III **Generalization step** Combina the above two steps.

OR

Let P(n) be a statement involving natural number n. To prove statement P(n) is true for all natural number, we following process.

1. Prove that P(1) is true.
2. Assume P(k) is true
3. Using (1) and (2) prove that statement is true for n = k + 1, ie, P(k + 1) is true.

This is first principle of Mathematical Induction.

✵ Second Principle of Mathematical Induction

Step I **Verification step** Actual verification of the proposition for the starting value i and (i +1).

Step II **Induction step** Assuming the proposition to be true for k – 1 and k and then prove that it is true for the value (k + 1) : $k \geq i + 1$.

Step III **Generalization step** Combina the above two steps.

OR

In secon principle of Mathematical Induction following steps are used

1. Prove that P(1) is true.
2. Assume P(n) is true for all natural number such that $2 \leq n < k$.
3. Using (1) and (2) prove that P(k + 1) is true.