

proof by induction



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- use the principle of mathematical induction to show that some result is true for all natural numbers n
- the proof, step by step:
 1. **The base case**: prove that $P(0)$ is true
 2. **Inductive step**: prove that if $P(k)$ is true then $P(k + 1)$ is true
 3. Conclude by induction that $P(n)$ is true for all $n \in \mathbb{N}$



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Proof.