The principle of mathematical induction says: If $p(\cdot)$ is a proposition over the universe of positive integers such that $p(1)$ is true and such that $p(n) \Rightarrow p(n + 1)$ is true for all $n \geq 1$, then $p(n)$ is true for all $n$.

Let’s expand this: If $p(\cdot)$ is a proposition over the universe of positive integers such that $p(1), p(1) \Rightarrow p(2), p(2) \Rightarrow p(3), p(3) \Rightarrow p(4), \ldots$ are all true, then $p(n)$ is true for all $n$.

We can re-index this as follows: If $p(\cdot)$ is a proposition over the universe of positive integers such that $p(1)$ is true and such that $p(n - 1) \Rightarrow p(n)$ is true for all $n \geq 2$, then $p(n)$ is true for all $n$.

Sometimes this can be a handier form to use, in terms of keeping the algebra simple.

Induction and indexing