 Proof by induction scaffold

Question:

Initial statement

Step 1 – first case or base case

Prove the initial statement for the first natural number, for example, $n=1$

Step 2

Assume that the statement is true for $n=k$ where $k$ is a natural number. Rewrite the statement by replacing $n$ with $k.$

Step 3 – inductive step

Prove the statement to be true for $n=k+1$.

Write the initial statement by replacing $n$ with $k+1$.

Use the statement from step 2 to prove the statement for $k+1.$

Step 4 – concluding statement