

The following template is a guideline for what to write in completing a proof by mathematical induction. You're expected to write **entire sentences**, not just the missing formulaic parts, to create a complete proof.

Prove that  $\sum_{i=1}^n i = \frac{n(n+1)}{2}$  for every positive integer  $n$ .

1. (Introduction) Let  $P(n)$  be the statement ...
2. (Basis Step) (NTS:  $P(\underline{\quad})$  is true, meaning ...
3. ("IHOP") Assume that ...

That is, (rewrite the formula)...

4. (Inductive Step) (NTS:  $P(\underline{\quad})$  is true, meaning ...

5. (Conclusion) By the Principle of Mathematical Induction (PMI), ...

In your notes, imitate the template to prove:  $\sum_{i=1}^n i^2 = \frac{n(n+1)(2n+1)}{6}$  for every  $n \in \mathbf{Z}^+$ .