

1 Induction Proof Template

Theorem: For all $n \in \mathbb{N}$, [fact for n].

Proof: Let $P(n)$ be the statement "[fact for n]". We will prove by induction that $P(n)$ holds for all $n \in \mathbb{N}$, from which the theorem follows.

As our base case, we prove $P(0)$, that [fact for 0]. [logic showing that $P(0)$ holds].

For our inductive step, pick some $k \in \mathbb{N}$ and assume $P(k)$ is true, meaning that [fact for k]. We want to show that $P(k + 1)$, meaning that [fact for $k + 1$].

[Show that $P(k + 1)$ holds]

[concluding fact], so $P(k + 1)$ holds, completing the induction. ■