P1 Let $T_n$ be a recurrence defined as follows:

$$T_0 = 1, \ T_{n+1} = (n + 1) + \frac{1}{2}T_n, \ n \in \mathbb{N}.$$  

We wish to prove that $T_n \geq 2n + 1$ for all $n \in \mathbb{N}$.

**Proof:** Proof is by weak induction on $n$.

**Base Case:**

(Write down and verify base case)

**Ind. Hyp.**

(Write down the statement of the ind. hyp.)

**Proof of Ind. Hyp.**

(prove the ind. hyp.)

P2 Let $F_n, \ n \geq 0$ be the Fibonacci series. **Theorem:** For all $n \in \mathbb{N}$, \[ \sum_{j=0}^{n} F_j = F_{n+2} - 1. \]

**Proof:** Proof is by **weak induction** on $n$.

**Base Case:**

(Write down and verify base case)

**Ind. Hyp.**

(Write down the statement of the ind. hyp.)

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P3 Let $F_n$, $n \geq 0$ be the Fibonacci series.

**Theorem:** For all $n \in \mathbb{N}$, if $n \geq 2$ then $F_n \geq 1.2^n$.

**Proof:** Proof is by **strong induction** on $n$.

**Base Case:** (Write down and verify base case)

**Ind. Hyp.** (Write down the statement of the ind. hyp.)

**Proof of Ind. Hyp.** (prove the ind. hyp.)