The purpose of this exercise is to test your ability to construct proofs by mathematical induction.

1. Use mathematical induction to show that the function \( f(n) = 1 - 1/(n + 1) \) solves the recurrence equation
   \[
   f_n = f_{n-1} + \frac{1}{n(n+1)}
   \]
   with initial condition \( f(0) = 0 \).

2. Use mathematical induction to show that the function \( f(n) = n^2 \) solves the recurrence equation
   \[
   f_n = f_{n-1} + (2n - 1)
   \]
   with initial condition \( f(0) = 0 \).