Section 4.2.
Exercise 14. Prove that \( n^2 > n + 1 \) for \( n \geq 2 \).

SOLUTION.
For each integer \( n \geq 2 \), let \( p(n) \) be the statement \( n^2 > n + 1 \).

Base case. \( \text{DONE} \)

Inductive step. We want to prove that for all \( n \geq 2 \), if \( p(n) \) is true, then \( p(n+1) \) is true.

Proof (of inductive step). Suppose \( n \geq 2 \) and \( p(n) \) is true, i.e., \( n^2 > n + 1 \).

We want to prove that \( p(n+1) \) is true, i.e., \( (n+1)^2 > (n+1) + 1 \).

\[
(n+1)^2 = n^2 + 2n + 1 > (n+1) + 2n + 1 = 3n + 2 > n + 2 = (n+1) + 1, \text{ since } n \geq 2.
\]

I.e., why is the inequality true?