Last name: First name: Student ID:

In this exercise, we prove universal statements of the form

$$\text{for any integer } n \geq n_0, \ P(n) \text{ holds,}$$

where n_0 is some integer and $P(n)$ is a predicate, using weak induction

(1) Claim: For every integer $n \geq 4$, $2^n < n!$.

Proof.

$n_0 =$

$P(n) :$

(1) Check the base case:

(2) Wite down the induction hypothesis:

(3) Prove the induction hypothesis:

(2) Claim: For every integer $n \geq 1$, $\sum_{j=1}^{n}(2^j - 1) = 2^{n+1} - n - 2$.

Proof.

$n_0 =$

$P(n) :$

(1) Check the base case:

(2) Wite down the induction hypothesis:

(3) Prove the induction hypothesis: