3.1 We can express “there is a smallest natural number” as follows:
\[ \exists n : \text{nat} \ \forall m : \text{nat} \ n \leq m \]

(a) Now how do we say “Denote that smallest natural number by 0.” formally? In other words, how do we say “Let’s call that smallest natural number 0.” formally?
\[ 0 : \text{nat} \ \land \ \forall m : \text{nat} \ 0 \leq m \]

(b) Prove that there are not two different natural numbers that are tied for smallest.
Let \( a \) and \( b \) be smallest natural numbers.
\[ a : \text{nat} \ \land \ (\forall m : \text{nat} \ a \leq m) \ \land \ b : \text{nat} \ \land \ (\forall m : \text{nat} \ b \leq m) \]
Specialize the first \( \forall \) with \( b \) for \( m \) and specialize the last \( \forall \) with \( a \) for \( m \).
\[ \Rightarrow a \leq b \ \land \ b \leq a \]
Now, from a generic law (antisymmetry) we have
\[ a = b \]