1. Study Section 8.4.

2. Do Exercise 8.5.
These are all one-step proofs!

3. Prove (8.23b), Split off term.

4. The proof of (8.23a) Split off term uses the fact that

\[ 0 \leq i < n + 1 \equiv 0 \leq i < n \lor i = n \]

under the assumption that \( n: \mathbb{N} \), that is, \( 0 \leq n \). Give a detailed proof of this fact by filling in the steps of the formal proof below from the hints.

\[
0 \leq i < n + 1 \\
= (\text{Remove the conjunctive abbreviation}) \\
= \langle i < n + 1 \equiv i < n \lor i = n \rangle \\
= \langle (3.46) \land \text{distributes over } \lor \rangle \\
= \langle (3.84a) \text{ Substitution} \rangle \\
= \langle \text{Assumption } 0 \leq n \rangle \\
= \langle (3.39) \text{ Identity of } \land \rangle \\
= \langle \text{Reintroduce conjunctive abbreviation}\rangle \\
0 \leq i < n \lor i = n \]