Consider the following language.

\[ pn ::= 0 | \text{succ} \, pn \]
\[ nn ::= 0 | \text{pred} \, nn \]
\[ v ::= \text{true} | \text{false} | nn | pn \]
\[ t ::= v | \text{isZero} \, t | \text{succ} \, t | \text{pred} \, t | \text{if} \, t \, \text{then} \, t \, \text{else} \, t \]

Give a small-step semantics and a typing relation for this language and prove type safety. You will need to show both progress and preservation. State and prove other required lemmas.