103  Are the binary expressions
\[
\begin{align*}
\text{nil} \rightarrow x &= x \\
(S; T) \rightarrow x &= S \rightarrow T \rightarrow x
\end{align*}
\]
(a) consistent with the theory in Chapters 2 and 3?
(b) theorems according to the theory in Chapters 2 and 3?

After trying the question, scroll down to the solution.
According to Chapter 2, $\text{nil}\rightarrow x \mid L = x$. Together with $\text{nil}\rightarrow x = x$, that means we would have $x \mid L = x$. Letting $x$ be a list, we can easily turn this into a contradiction. There is a similar clash between $(S;T) \rightarrow x \mid L = S\rightarrow (T\rightarrow x \mid L S) \mid L$ from Chapter 2 and $(S;T) \rightarrow x = S\rightarrow T\rightarrow x$. Too bad. It would be nice to have these elegant axioms and extend arguments to strings.

I think the theory in Chapters 2 and 3 is consistent, so I think these binary expressions cannot be theorems.