1. Exercise 3.12 of Abelson and Sussman.

2. Suppose that the following definitions have been provided.

\[
\text{(define } x \text{(cons 1 3))}
\]
\[
\text{(define } y \text{2)}
\]

A CS 61A student, intending to change the value of \textit{x} to a pair with \texttt{car} equal to 1 and \texttt{cdr} equal to 2, types the expression \texttt{(set! (cdr x) y)} instead of \texttt{(set-cdr! x y)} and gets an error. Explain why.

3a. Provide the arguments for the two \texttt{set-cdr!} operations in the blanks below to produce the indicated effect on \texttt{list1} and \texttt{list2}. Do not create any new pairs; just rearrange the pointers to the existing ones.

\[
\texttt{> (define list1 (list (list 'a) 'b))}
\]
\[
\texttt{list1}
\]
\[
\texttt{> (define list2 (list (list 'x) 'y))}
\]
\[
\texttt{list2}
\]
\[
\texttt{> (set-cdr! ___________ ___________ )}
\]
\[
\texttt{okay}
\]
\[
\texttt{> (set-cdr! ___________ ___________ )}
\]
\[
\texttt{okay}
\]
\[
\texttt{> list1}
\]
\[
\texttt{((a x b) b)}
\]
\[
\texttt{> list2}
\]
\[
\texttt{((x b) y)}
\]

3b. After filling in the blanks in the code above and producing the specified effect on \texttt{list1} and \texttt{list2}, draw a box-and-pointer diagram that explains the effect of evaluating the expression \texttt{(set-car! (cdr list1) (cadr list2))}.