(To accompany Sections 1-14
in my notes)

1. After defining procedures dec

    ; pre: x is an integer
      (dec x)
    ; post: returns x-1

and inc

    ; pre: x is an integer
    (inc x)
    ; post: returns x+1

write and prove correct a recursive procedure MyAdd of two integer arguments x and y which returns the sum x+y, computed by repeated application of inc and dec. Do not otherwise use + or - .

2. Write and prove correct a recursive procedure sum-digits which inputs an integer x and which returns the sum of the digits in x. Thus

$$(sum\text{-}digits \ 123) = 6$$

3. Write and prove correct a procedure myLength satisfying

    ; l is a list
    (myLength l)
    ; returns the length of l

You should of course not use the built-in length function.

4. Write and prove correct a recursive procedure first-n which inputs a list ℓ and an integer n, and which outputs the list consisting of the first n elements of ℓ.

(Be careful to correct this informal specification, after noting what's wrong with it)

5. Write and prove correct a recursive procedure myAppend which inputs two lists x and y and which returns the single list formed by concatenating x and y. Do not use the built-in procedure append. How much time (θ) does your procedure require?