MAP AND FILTER.

Consider the following procedure, which generates a series of integers beginning with “a” and ending with “b” (inclusive):

(define (enumerate-range a b)
  (if (> a b)
      ()
      (cons a (enumerate-range (+ a 1) b)))))

For example, (enumerate-range 1 3) produces the list '(1 2 3).

Problem 1. Using the substitution model, write the series of expansions that occurs when evaluating the expression (enumerate-range 1 3), ultimately producing the list above.
**Problem 2.** Suppose we have the list of the first 100 integers, from 1 to 100:

\[(\text{define list-of-nums (enumerate-range 1 100)})\]

Write a function that when mapped onto this list, would produce the list \(2, 4, 6, 8, 10, \ldots, 200\). That is, the mapping function should double its input.

\[(\text{map }<??\text{ list-of-nums})\]

Write the thing that goes in the position of \(<??>\).

**Problem 3.** Again we have the same \texttt{list-of-nums}.

Write a filter function that keeps only the ones that are evenly divisible by 3. You may wish to use the \texttt{remainder} function; e.g. \((\text{remainder 100 3})\) is 1.

\[(\text{filter }<??\text{ list-of-nums})\]

Write the thing that goes in the position of \(<??>\).

**Problem 4.** Using a series of map and/or filter expressions, write an expression that produce a list of all the square numbers less than 10,000 which are divisible by 3.