Extra Practice Problems (Module 2)

You may use only features covered until the end of M2

1. Create a function add-num-to-str that consumes a string st and a positive integer n and produces a string by adding n to the end of st.
   Example:
   \[(\text{add-num-to-str} \text{ "CS" 115}) \Rightarrow \text{"CS 115"}\]

2. Create a function add-bonus that consumes two numbers grade and bonus, where your grade is between 0 and 100 and the bonus is between 1 and 10. The function produces a new grade not exceeding 100%.
   Examples:
   \[(\text{add-bonus} 98 5) \Rightarrow 100\]
   \[(\text{add-bonus} 60 4) \Rightarrow 64\]

3. Create a function sum-digits3 that consumes a positive integer n and produces the sum of the digits of n.
   Examples:
   \[(\text{sum-digits3} 100) \Rightarrow 1\]
   \[(\text{sum-digits3} 143) \Rightarrow 8\]

4. Create a function official that consumes two strings, fname and lname, and produces the last name followed by a comma and the initial of the first name followed by a period.
   Example:
   \[(\text{official} \text{ "Mbabi" "Tema"}) \Rightarrow \text{"Tema, M. "}\]

5. Create a function introduction that consumes one string fname and produces an introductory sentence.
   Example:
   \[(\text{introduction} \text{ "Bettina"}) \Rightarrow \text{"Hello, my name is Bettina"}\]

6. Create a function sodd? that consumes a string s and produces true if the length of s is odd and false otherwise.
   Examples:
   \[(\text{sodd?} \text{ "CS"}) \Rightarrow \text{false}\]
   \[(\text{sodd?} \text{ "uni"}) \Rightarrow \text{true}\]
7. Write the Purpose, Contract (& requirements), Examples and Tests of the following two functions (i.e. part a and b):

a. 
```
(define (root-plus a b c)
  (+ (* -1 b)
      (sqrt (- (sqr b) (* 4 a c))))
  (* 2 a))
```

b. 
```
(define (root-minus a b c)
  (- (* -1 b)
      (sqrt (- (sqr b) (* 4 a c))))
  (* 2 a))
```

c. Write a function `x-values` that consumes three numbers `(a, b, c)` and produces a string in the following format:

"For \(ax^2 + bx + c = 0\), the values of \(x\) which are the solutions of the equation are `x-value1` and `x-value2`."

Note: Where `x-value1` is the bigger root of the equation and the `x-value2` is the smaller root.

Example:
```
(x-values 1 2 -15) => "For 1x^2 + 2x + -15 = 0, the values of x which are the solutions of the equation are 3 and -5."
```

**Hint:** Use the function `number->string` to convert numbers to strings

8. Write a function `pad3` that consumes a natural number `n` and produces a `Str`. The produced `Str` contains the most left 3 digits of `n`. For \(n\) that has less than 3 digits, zeros are added at the left to make it of length 3.

Examples:
```
(pad3 7) => "007"
(pad3 42) => "042"
(pad3 245) => "245"
(pad3 3141592) => "314"
```