Aims

- practice writing simple functions in python that perform numerical computation and string operations
- learn how to test python functions using *nosetools*

Problem 1

- Write a function **quad**(a, b, c, x) that takes as input three floats a, b, c, a value x and returns the value of the quadratic function $f(x) = ax^2 + bx + c$. For example, $quad(1, 2, 0, 1) = 5$ and $quad(1, 0, 0, 1) = 1$.
- Write a function **quadIsZero**(a, b, c, x) that takes similar arguments as **quad**, calls **quad** and returns True if the quadratic expression evaluates to zero, otherwise False (return type is boolean). For example, $quadIsZero(1, 2, 0, 1) = False$ and $quad(1, 0, -1, 1) = True$.
- Write a function **quadSolver**(a, b, c, x) that takes similar arguments as **quad** and returns the two roots of a quadratic equation with coefficients a,b,c. The roots value can be calculated using the following formula:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

  There are two main cases:

  - if $\sqrt{b^2 - 4ac} \geq 0$ then the roots are real, in which case return them as a tuple (x_1, x_2) where $x_1 < x_2$.
  - if $\sqrt{b^2 - 4ac} < 0$ then the roots are imaginary, in which case return NaN instead of the tuple.

Problem 2

- write a function **toUpperCase(s)** which takes a lowercase string s and converts the letters at the beginning of every word to uppercase. For example:

```
1  toUpperCase('a very simple example') = 'A Very Simple Example'
```

  Perform this in two ways:

  - Perform a for loop ever every character:

```
1 for char in s:
    # check if letter is at the beginning of the word. This requires
      checking a boolean variable isAtBegWord at every loop
3     # if letter is at beginning of word, then transform it to
      uppercase.

5   # if the current character is a space ' ', set the boolean variable
       isAtBegWord to True, else False.
```

– Use the **str.split** function with delimiter ' ', which splits the string into words, then update the first letter of each word and assemble the words back together using **str.join**(wordList). Check on google the documentation of these two functions.