Problem 3:

In this problem, we observe the iterative and the recursive approaches for the calculation of the value of the given function. The main difference between these two approaches is that iterative approach relies on the finite loop (with the number of steps corresponding to the value of n), and the recursive approach relies on the conditionals (with the function calling itself until it reaches the initial condition and then "unfolds", passing the value at each step back to the previously called function until it reaches the original function and returns the value).

In both these approaches, we have the variable S where the final value is meant to be stored. In the iterative function, the value of S is set to 0, and the value of the next term is added to S with each iteration of the finite loop; upon the completion of the loop, the value of S contains the value of the function for the given argument. In the recursive function, the value of S is set to the sum of the current term and the previous term; the previous term itself is also the sum of the term that came before the current one and the one preceding it, and this "chain" of "previous terms" unfolds until the value of n is 1, and this is where the very first term has a set value.

Problem 5:

For the limit to exist, the value of has to converge. This is only possible when (with going to 0). Thus, the limiting value is **1**.