DEN Homework # 7

Solve the problems and then bring your work to the lab in the eighth week of school.

1. We are looking for the root of $f(x) = x^2 - 3x + 1$.

a) Apply the bisection method to this problem and the initial interval $[1, 5]$, show the first two iterative steps.
Comment on your steps, above all on your decision making, so that the examiner can see that you know what you are doing. (A novice should be able to understand how the bisection method works based on your comments.)

b) Apply the Newton method to this problem with the initial guess $x_0 = 1$. Find the first three approximations (that is, do two steps of iteration).

c) A customer asked for an approximation of a root with precision $\varepsilon = 0.25$. Is the number x_2 from part b) good enough?
(Using a calculator for this one is not considered cowardly.)

2. Apply the Newton method to the problem of finding a root of the function $f(x) = x^2 - x + 1$, with the initial guess $x_0 = 2$. First prepare and simplify a dedicated iterative formula and then find the first five approximations (that is, do four steps of iteration).
What do you think about this situation? Based on what you learned in the lecture, can you make a guess regarding the situation?