1. For the initial guess (1,1), Lazy Newton does not converge and Broyden takes 12 iterations and 0.000575 seconds to converge while Newton took 7 iterations and 0.000298 seconds so Newton performs better than both.

   For the initial guess (1,-1), Lazy Newton takes 36 iterations and 0.000855 seconds and Broyden takes 6 iterations and 0.000517 seconds to converge while Newton took 5 iterations and 0.000820 seconds. Newton took the fewest iterations but one could argue Broyden performs better because it only takes one more iteration and takes substantially less time because its iterations aren't as computationally expensive.

   For the initial guess (0,0), the initial Jacobian is ((0,0),(1,1)), which has a determinant of zero thus is not invertible, so none of the methods converge.

2. Using the initial guess [0.5,0.5,0.5], Newton's method converges in 3 iterations, steepest descent converges in 5 iterations, and first steepest descent requires 5 iterations before passing the initial guess to Newton's method. This is because Newton's method usually converges quadratically if in the basin of convergence while steepest descent converges slower.