HW6

Implement the augmented Lagrangian method with regularization and the steplength and solve the following problems:

a) $\min 2x_1 - 3x_2$, s.t. $x_1^2 + x_2^2 = 25$.

b) $\min x_1^2 + 2x_1x_2 + x_2^2$, s.t. $3x_1^2 + x_2^2 = 9$.

c) $\min 3x_1^3 + 2x_2^3 + x_3^3 + x_4^3$, s.t. $x_1^2 + x_2^2 + x_3^2 + x_4^2 = 4$, $x_1 + x_2 + 2x_3 + 3x_4 = 1$.

Perform unconstrained minimizations using Newton's method. After each unconstrained minimization display the number Newton steps it took to perform the unconstrained minimization, the norm of the gradient of augmented Lagrangian when the unconstrained minimization is finished (before the Lagrange multipliers update) and the constraint violation (the norm of g(x) vector). Use k = 100, and solve up to accuracy 10^{-6}.