1. Consider the following static optimization problem: Min : $L = 100(x_2 - x_1^2)^2 + (1 - x_1)^2$ subject to

$$g_1(x) = x_1 + 1 \geq 0$$
$$g_2(x) = 1 - x_2 \geq 0$$
$$g_3(x) = 4x_2 - x_1 - 1 \geq 0$$
$$g_4(x) = 1 - 0.5x_1 - x_2 \geq 0$$

Use the feasible guess $x = [-0.5, 0.5]^T$.

a) Use *fmincon* to solve the problem.

b) Use the bracket-multiplier penalty function approach to solve the problem. Let $\sigma_2 = 1$ and start with $\tau = 0$. Use Newton's method to perform the unconstrained minimization. Let the step size for the line search be 1.