Problem 9.6. Refer to the appropriate python notebook.

Problem 9.7. Refer to the appropriate python notebook.

Problem 9.10. Consider the quadratic function $f(x) = \frac{1}{2}x^T Q x - b^T x$ where $Q \in M_n(\mathbb{R})$ is symmetric and positive definite and $b \in \mathbb{R}^n$. Consider an initial guess $x_0 \in \mathbb{R}^n$. The derivative is $Df = Qx - b$ and the second derivative is $D^2 f = Q$. The minimum is achieved when $Df = Qx - b = 0$. Apply Newton's method and consider $x_1 = x_0 - Q^{-1}Df(x_0) = x_0 - Q^{-1}(Qx_0 - b)$. This implies that $Qx_1 = b$ and that $Qx_1 - b = 0$ which means x_1 is the minimum so the minimum is achieved after 1 iteration.