Math 4553, Homework 5, Due on 4/18/2011

1. (10 points) Consider the following linear programming problem

$$\begin{aligned} \min \quad & f = -x_1 - 2x_2 \\ \text{subject to} \quad & -2x_1 + x_2 + x_3 = 2 \\ & -x_1 + 2x_2 + x_4 = 7 \\ & x_1 + x_5 = 3 \\ & x_i \geq 0, \text{ for } i = 1, \ldots, 5 \end{aligned}$$

   Given the starting interior point $\mathbf{x}^0 = (0.5, 0.5, 2.5, 6.5, 2.5)^t$ Use the primal affine scaling method to compute the next point $\mathbf{x}^1$, with $\beta = 0.9999$. Write down the details including y^0, T^0, A^0, d^0, α^0 and y^1.

2. (10 points) Use the Newton's method, with initial condition $x_0 = 1$, to find the third approximation x_2 to the root of equation

$$x^3 - x^2 - 1 = 0$$