Midterm Examination II

CS 525, Semester II, 1996-97

Wednesday March 19, 1997

If a problem has no solution or an infinite number of solutions, you must clearly state so and *justify* your claim.

Each problem can be solved in 3 tableaus or less including the initial tableau.

1. (a)

$$\begin{array}{lrcl} \max & -x_2 - 3x_3 + 0.5 & & \\ \text{subject to} & x_1 - 4.5x_2 + 12x_3 & \geq & 2 \\ & x_3 & = & 3 \\ & x_1 - 4.5x_2 + 9x_3 & \geq & -11.5 \\ & x_2, x_3 & \geq & 0 \\ & x_1 & & \text{free} \end{array}$$

   (b) What is the maximum if $= 3$ is replaced by ≥ 3?

2. Consider the problem

$$\begin{array}{lrcl} \min & 7x_1 + x_2 + 2x_3 & & \\ \text{subject to} & -x_1 - x_2 + 3x_3 & \geq & -1 \\ & -4x_1 + x_2 + 2x_3 & \geq & 0 \\ & x_1, x_2, x_3 & \geq & 0 \end{array}$$

   Write down an optimal solution of the dual of this problem. Does the dual have another solution?