Math 482 **HW7** **3/28/2014** Name: ______________________________

Due Friday, April 4, 2014

Students in section B13 (three credit hours) need to solve any four of the following five problems. Students in section B14 (four credit hours) must solve all five problems.

1. THIS PROBLEM IS COUNTED AS TWO PROBLEMS. TO EARN ONE PROBLEM CREDIT, IT IS ENOUGH TO PERFORM TWO ITERATIONS CORRECTLY.

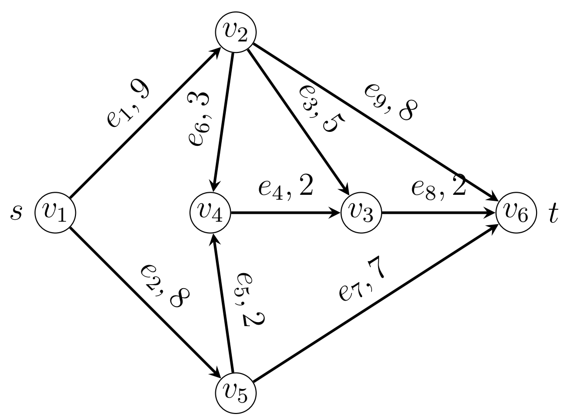
   Starting from the dually feasible vector $\pi^T = (0, 1/3, 0)$, use the primal-dual simplex method to find an optimal solution to the problem

$$\text{Minimize } z = 4x_1 + x_2 + 3x_3 + x_4$$

subject to

$$\begin{aligned} x_1 + x_2 + x_3 \qquad &= 3, \\ x_1 \quad + x_3 + 3x_4 &= 2, \\ x_2 + x_3 + x_4 &= 2, \\ x_1, x_2, x_3, x_4 &\geq 0. \end{aligned}$$

2. On the following drawing of a graph, interpret the numbers following the edge name as the edge weight/length. Write the shortest path problem from $s(v_1)$ to $t(v_6)$ as an LP and write its dual.



3. THIS PROBLEM IS COUNTED AS TWO PROBLEMS. TO EARN ONE PROBLEM CREDIT, IT IS ENOUGH TO PERFORM TWO ITERATIONS CORRECTLY.

   Begining with the vector $\pi = (0, 0, 0, 0, 0, 0)^T$ which is feasible for the dual, use the primal dual method as described in class and in the book to find the shortest path from s to t in the weighted graph shown in the previous problem. For each iteration, you must write π, J, π^r and draw the edges corresponding to J. The worksheet provided may be helpful.