Math 482 **HW3** Name: ______________________

Due Friday, February 13, 2015

1. (4 points) Solve the problem on the tableau using the simplex method and draw the corresponding picture in the plane Ox_1x_2. Mark the points corresponding to the b.f.s. of your solution.

		x_1	x_2	x_3	x_4	x_5
-z	0	3	4	0	0	0
$\mathbf{x_3}$	6	2	1	1	0	0
$\mathbf{x_4}$	2	1	-2	0	1	0
$\mathbf{x_5}$	1	-3	9	0	0	1

2. (8 points) Introduce 3 artificial variables and solve with two-phase simplex algorithm the LP represented by the tableau below.

		x_1	x_2	x_3	x_4	x_5
-z	0	-4	-8	-14	-2	-10
	14	2	2	4	2	4
	12	2	4	6	2	2
	8	2	2	2	4	2

3. (4 points) Suppose that at a stage of the simplex algorithm, we have the have the basic $B = \{1, 4, 6\}$ and the following tableau $\mathcal{T}(B)$

$$\begin{array}{rclcccc}
x_1 & = & 4 & -\frac{2}{3}x_2 & & -\frac{4}{3}x_5 \\
x_4 & = & 2 & +\frac{7}{3}x_2 & -3x_3 & +\frac{2}{3}x_5 \\
x_6 & = & 2 & +\frac{2}{3}x_2 & +2x_3 & -\frac{2}{3}x_5 \\
\hline
z & = & 8 & +\frac{8}{3}x_2 & -11x_3 & +\frac{4}{3}x_5
\end{array}.$$

The inverse of the current basis is

$$A_B^{-1} = [A_1, A_4, A_6]^{-1} = \frac{1}{3}\begin{pmatrix} 1 & 1 & -1 \\ 1 & -2 & 2 \\ -1 & 2 & 1 \end{pmatrix}$$

and

$$c_B^T = [c_1, c_4, c_6] = [-1, -3, 1].$$

Find vectors c and b and the matrix A that correspond to the original linear program.

4. (4 points) Solve the LP in the handout `http://www.math.uiuc.edu/~molla/2015_spring_math482/cycle.pdf` according to Bland's anticycling algorithm. You do not need to repeat any initial steps that are identical to the solution in the handout.