Math 482 Spring 2006 **Test #3** Name: ____________________________

Do FOUR problems in Part I, THREE problems from Part II, and TWO problems from Part III (no more!). In Part I, give a one-line justification of your answer. Appropriate justification is required in Parts II and III for full credit. Results from class, the book, or homeworks may be used without proof if correctly stated.

Calculators may be used for scalar arithmetic. Use of matrix operations and other linear algebra and linear programming functions (eg, having the calculator do a pivot in a tableau) is NOT permitted. By initialing to the right, you indicate you have read, understood, and agreed to this policy on calculators. Initials: _______

Part I	#6	#7	#8	#9	#10	#11	#12	Total

HW Pts	Test 1	Test 2	Total	%

Some Useful Facts

Simplex algorithm: If A_j is a profitable column, pivot on the entry x_{ij} that minimizes $\min\limits_{i:x_{ij}>0}\left[\frac{x_{i0}}{x_{ij}}\right]$.

Dual simplex algorithm: If row i is a profitable row, pivot on the entry x_{ij} that maximizes $\max\limits_{j:x_{ij}<0}\left[\frac{x_{0j}}{x_{ij}}\right]$.

Revised simplex algorithm: Generate costs by $\bar{c}_j = c_j - \pi' A_j$ and columns by $B^{-1}A_j$.

Primal-dual algorithm: Update $\pi^* = \pi + \theta\bar{\pi}$, where $\theta = \min\limits_{j\notin J:\bar{\pi}'A_j>0}\left[\frac{c_j - \pi' A_j}{\bar{\pi}' A_j}\right]$.

Duality: The dual of min $c'x$ subject to $Ax = b,\ x \geq 0$ is max $\pi' b$ subject to $\pi' A \leq c,\ \pi$ unconstrained.

Bland's anticycling rules: Choose the leftmost profitable column and pivot as above. If there is a tie in the minimum, choose the lowest numbered column to leave the basis.

Lexicographic anticycling rules: Choose any profitable column, and pivot in the row i that attains the minimum in lex-$\min\limits_{i:x_{ij}>0}\left[\frac{x_i}{x_{ij}}\right]$.

Lexicographic anticycling rules for dual simplex: Choose any profitable row, and pivot in the column j that attains the maximum in lex-$\max\limits_{i:x_{ij}<0}\left[\frac{X_j}{x_{ij}}\right]$.

Gomory cut: For row i, the corresponding cut is $-f_{i0} = -\sum_{j\notin\mathcal{B}} f_{ij}x_j + s$.