Homework Day 3 - ECON 186

Problem 1. Chiang and Wainwright 5.1 #3, 5(a,b)

(Show the work, not just yes or no)

#3 Are the rows linearly independent in each of the following?

(a) $\begin{bmatrix} 24 & 8 \\ 9 & -3 \end{bmatrix}$ (b) $\begin{bmatrix} 2 & 0 \\ 0 & 2 \end{bmatrix}$ (c) $\begin{bmatrix} 0 & 4 \\ 3 & 2 \end{bmatrix}$ (d) $\begin{bmatrix} -1 & 5 \\ 2 & -10 \end{bmatrix}$

#5 Find the rank of each of the following matrices from its echelon matrix, and comment on the question of nonsingularity.

(a) $\begin{bmatrix} 1 & 5 & 1 \\ 0 & 3 & 9 \\ -1 & 0 & 0 \end{bmatrix}$ (b) $\begin{bmatrix} 0 & -1 & -4 \\ 3 & 1 & 2 \\ 6 & 1 & 0 \end{bmatrix}$

Problem 2. Chiang and Wainwright 5.2 #1,2

#1 Evaluate the following determinants:

(a) $\begin{vmatrix} 8 & 1 & 3 \\ 4 & 0 & 1 \\ 6 & 0 & 3 \end{vmatrix}$ (b) $\begin{vmatrix} 1 & 2 & 3 \\ 4 & 7 & 5 \\ 3 & 6 & 9 \end{vmatrix}$ (c) $\begin{vmatrix} 4 & 0 & 2 \\ 6 & 0 & 3 \\ 8 & 2 & 3 \end{vmatrix}$ (d) $\begin{vmatrix} 1 & 1 & 4 \\ 8 & 11 & -2 \\ 0 & 4 & 7 \end{vmatrix}$ (e) $\begin{vmatrix} a & b & c \\ b & c & a \\ c & a & b \end{vmatrix}$ (f) $\begin{vmatrix} x & 5 & 0 \\ 3 & y & 2 \\ 9 & -1 & 8 \end{vmatrix}$

#2 Determine the signs to be attached to the relevant minors in order to get the following cofactors of a determinant:$|C_{13}|,|C_{23}|,|C_{33}|,|C_{41}|$,and $|C_{34}|$.

Problem 3. Chiang and Wainwright 5.4 #4a

(solve using both the cofactor method and the augmented matrix method)

#4 Find the inverse of each of the following matrices:

(a)$E = \begin{bmatrix} 4 & -2 & 1 \\ 7 & 3 & 0 \\ 2 & 0 & 1 \end{bmatrix}$

Problem 4. Chiang and Wainwright 5.5 #3a

#3 Use Cramer's rule to solve the following equation systems:

(a)

$$8x_1 - x_2 = 16$$
$$2x_2 + 5x_3 = 5$$
$$2x_1 + 3x_3 = 7$$