Math 5230 **Homework #Dos**[I☺] **Due: Fri., Sept. 2nd, 2016**

#α Row, Column, Null Let $A = \begin{bmatrix} 1 & 3 & 1 & 6 & 1 & 2 \\ 4 & 12 & -1 & 4 & 1 & 9 \\ 3 & 9 & -2 & -2 & 0 & 7 \\ 2 & 6 & 0 & 4 & -1 & -1 \end{bmatrix}$. Find a bases for Row($A$), Col($A$), and Null($A$).

#ii Linear Correspondence Fill in the missing entries. A is a matrix with real entries and R is its RREF.

(a) $A = \begin{bmatrix} 1 & ? & 1 & ? & ? & 3 & ? & ? \\ 0 & ? & 2 & ? & ? & 1 & ? & ? \\ 2 & ? & 2 & ? & ? & -1 & ? & ? \\ -1 & ? & 1 & ? & ? & 2 & ? & ? \end{bmatrix} \overset{\text{RREF}}{\sim} R = \begin{bmatrix} 1 & 3 & 0 & -1 & -1 & 0 & 0 & 2 \\ 0 & 0 & 1 & 2 & 1 & 0 & 1 & -1 \\ 0 & 0 & 0 & 0 & 0 & 1 & 1 & 1 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$

(b) $A = \begin{bmatrix} ? & ? & -2 & ? & -2 & ? \\ ? & ? & -4 & ? & 5 & ? \\ ? & ? & -6 & ? & 7 & ? \\ ? & ? & -2 & ? & 0 & ? \end{bmatrix} \overset{\text{RREF}}{\sim} R = \begin{bmatrix} 0 & 1 & -2 & 0 & 3 & 3 \\ 0 & 0 & 0 & 1 & -1 & 2 \\ 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$

(c) $A = \begin{bmatrix} 1 & ? & ? & 4 & ? & 0 \\ 2 & ? & ? & 2 & ? & 3 \\ 3 & ? & ? & 8 & ? & 2 \end{bmatrix} \overset{\text{RREF}}{\sim} R = \begin{bmatrix} ? & 2 & ? & 2 & 1 & ? \\ ? & 0 & ? & 2 & 3 & ? \\ ? & 0 & ? & 0 & 0 & ? \end{bmatrix}$

#$\lceil \pi/\sqrt{5}+1 \rceil$ Coordinates, Spanning, Bases Let $\beta = \{E_{11}, E_{12}, E_{21}, E_{22}\}$ be the standard basis for $\mathbb{R}^{2\times 2}$.

[*Note:* As discussed in class, even though β is a set, treat it like a list and maintain the order as shown above.]

$A_1 = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}, \quad A_2 = \begin{bmatrix} 1 & 2 \\ 2 & 1 \end{bmatrix}, \quad A_3 = \begin{bmatrix} -1 & -2 \\ -1 & 2 \end{bmatrix}, \quad A_4 = \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}, \quad A_5 = \begin{bmatrix} 1 & 3 \\ 6 & 10 \end{bmatrix}$

(a) Does A_4 belong to Span$\{A_1, A_2, A_3\}$?

(b) Let $S = \{A_1, A_2, A_3, A_4\}$ and $W = \text{Span}(S)$. Find a subset of S which forms a basis for W.

(c) Using your basis found in part (b), find coordinates for $A_1, \ldots, A_5$.

(d) Extend $\{A_5\}$ to a basis for W.

For no reason a tree of π's and χ's...

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χ

[I] Enumeration scheme inspired by class discussion. Thanks for participating!

[☺] If you aren't getting clean answers, double check that you copied the problems correctly.