

## Quiz One, MTH 221, Spring 2012

Ayman Badawi

**QUESTION 1.** Consider the following system:

$$x_2 + x_3 = a$$

$$x_1 - x_2 + 2x_3 = 4$$

$$-x_1 - x_2 + kx_3 = 2$$

a) For what values of  $a$  and  $k$  will the system have infinitely many solutions?

b) For what values of  $a$  and  $k$  will the system have unique solution?

c) For what values of  $a$  and  $k$  will the system be INCONSISTENT?

**QUESTION 2.** Find the set of solutions to :

$$x_2 + x_3 - x_5 = 2$$

$$x_1 - x_2 - x_3 + x_4 = 6$$

$$-x_1 + 3x_2 + 3x_3 - x_5 = 4$$

Give me one particular solution to the system above

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**Quiz TWO, MTH 221, Spring 2012**

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**QUESTION 1.** Let  $W = \begin{bmatrix} 2 & -3 & 1 & 0 \\ -1 & 1 & 0 & 7 \\ 2 & 3 & -1 & 0 \end{bmatrix}$  and let  $F = \begin{bmatrix} 0 & 1 & 1 \\ -2 & 2 & 1 \\ 0 & 0 & 5 \\ 1 & 2 & -3 \end{bmatrix}$

1) Let  $D = WF$ .a) FIND the second row of  $D$  ONLY.b) Find the third column of  $D$  only.2) Let  $K = FW$ 1) Find the third row of  $K$  only.2) Find the 4th column of  $K$  only.**Faculty information**

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**Quiz three , MTH 221, Spring 2012**

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**QUESTION 1.** Let  $A = \begin{bmatrix} 0 & 1 & -2 \\ 2 & 2 & -4 \\ 4 & -3 & 7 \end{bmatrix}$ . Find  $A^{-1}$  if possible.

**QUESTION 2.** Given  $A$  is a  $2 \times 4$  matrix such that

$$A \begin{array}{l} 2R_1 + R_2 \rightarrow R_2 \\ A_1 \quad -3R_2 \quad A_2 \end{array}$$

a) Find an elementary matrix  $F$ , such that  $FA_2 = A_1$ .

b) Find two elementary matrices  $W, D$  such that  $WDA = A_2$ .

c) Find a matrix  $T$  such that  $TA = A_2$

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**Quiz Four , MTH 221, Spring 2012**

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**QUESTION 1.** Let  $A$  be a  $2 \times 3$  matrix such that  $\begin{bmatrix} 0 & 1 \\ 1 & -1 \end{bmatrix} A + 2A = \begin{bmatrix} 1 & 0 & 1 \\ -1 & -1 & 0 \end{bmatrix}$ . Find  $A$ .

**QUESTION 2.** Given  $A$  is  $4 \times 4$  such that  $A \xrightarrow{0.2R_1} A_1 \xrightarrow{-R_2 + R_4 \rightarrow R_4} B = \begin{bmatrix} 1 & 1 & 1 & 1 \\ -1 & 1 & 1 & 1 \\ -1 & -1 & -1 & 1 \\ -1 & -1 & 2 & 2 \end{bmatrix}$

a) Find  $\det(A)$ b) Find the matrix  $A$ .**Faculty information**

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**Quiz Five , MTH 221, Spring 2012**

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**QUESTION 1.** Let  $A = \begin{bmatrix} 1 & 0 & 1 & 0 \\ 0 & 2 & 0 & 1 \\ 0 & 0 & 3 & 0 \\ 0 & 0 & 0 & 3 \end{bmatrix}$ .

a) Find the eigenvalues of  $A$

b) For each eigenvalue of  $A$  find the corresponding eigenspace and then write it as a span.

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**Quiz Six, MTH 221, Spring 2012**

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**QUESTION 1.** Let  $A = \begin{bmatrix} 1 & -2 & 1 & 4 \\ 0 & -3 & 1 & 1 \\ 0 & 0 & -2 & 0 \\ 0 & 0 & 0 & -2 \end{bmatrix}$ . If  $A$  diagonalizable, then find invertible matrix  $Q$  and a diagonal matrix  $D$  such that  $Q^{-1}AQ = D$

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**Quiz seven (take home), MTH 221, Spring 2012**

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**QUESTION 1.** Let  $F = \text{span}\{(1, -2, 0, 1), (2, 0, 0, 1), (5, -2, 0, 3)\}$ . Find  $\dim(F)$  and a basis for  $F$ . Is  $(9, -2, 0, 5) \in F$ ?

**QUESTION 2.** Find a basis for  $R^5$  say  $B$  such that  $B$  contains the two independent points  $(2, 0, 0, 4, 1), (-2, 0, 0, -4, \pi)$

**QUESTION 3.** Let  $H = \begin{bmatrix} -2 & 2 & 2 & 2 \\ -4 & 4 & 4 & 5 \\ -6 & 6 & 6 & 6 \end{bmatrix}$ . Find  $N(H)$ , Basis for  $\text{Row}(H)$ , Basis for  $\text{Column}(H)$ .

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