**Name**————————————————————, **ID** ————————————

 

# MTH 221, Linear Algebra, Quiz one at 2:00pm, Fall 2012

Ayman Badawi

**QUESTION 1.** Find the solution-set for the following system of linear equations:

$$x_2 + 2x_3 + 4x_4 = 8$$

$$x_1 + x_2 + 2x_3 = 5$$

$$-x_1 - x_3 + 4x_4 = 2$$

$$x_1 - x_2 - x_3 + 5x_4 = 3$$

**QUESTION 2.** Find the solution-set for the following system

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

$$-x_1 + 3x_2 - x_3 = 0$$

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

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# MTH 221, Linear Algebra, Quiz Two at 2:00pm, Fall 2012

Ayman Badawi

**QUESTION 1.** Consider the following system

$$x_1 + x_2 + x_3 + ax_4 = b$$
$$-3x_1 - 3x_2 - 3x_3 + 12x_4 = -18$$
$$x_2 + x_3 + x_4 = 4$$
$$-2x_2 - x_3 - 2x_4 = 2$$

1) For what values of $a, b$ will the system have infinitely many solutions?

2) For what values of $a, b$ will the system have unique solution?

3) For what values of $a, b$ will the system be inconsistent?

**QUESTION 2.** For what values of $a$ will the following system be consistent?

$$x_1 - 2x_2 + ax_3 = -2$$
$$-x_1 + 2x_2 - 2x_3 = a$$
$$2x_1 - 4x_2 + 4x_3 = 26$$

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# MTH 221, Linear Algebra, Quiz Three at 2:00 PM, Fall 2012

Ayman Badawi

**QUESTION 1.** Let $A = \begin{bmatrix} 2 & 4 & -1 & 1 \\ -2 & 1 & 2 & 0 \\ 0 & 4 & 0 & 0 \\ 1 & 1 & 1 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 1 & 1 & -1 \\ 0 & -1 & -1 & 2 \\ 2 & 2 & 1 & -4 \\ 1 & 0 & 0 & 1 \end{bmatrix}$

(i) Let $D = BA$. Find $d_{4\,4}$

(ii) Let $F = AB$. Find $f_{4\,4}$.

(iii) Note that $D$ and $F$ are $4 \times 4$. Is $D = F$? Explain

(iv) Find the second column of $D = BA$[ Use L.Comb. of columns].

(v) Find the second row of $F = AB$ [ Use L. Comb of rows].

(vi) Find a symmetric matrix $E$ and a skew-symmetric matrix $L$ such that $A = E + L$

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# MTH 221, Linear Algebra, Quiz FOUR at 2:00 PM, Fall 2012

Ayman Badawi

**QUESTION 1.** Let $A = \begin{bmatrix} -4 & 3 \\ -1 & 1 \end{bmatrix}$. If $A$ is invertible find $A^{-1}$.

**QUESTION 2.** Let $A = \begin{bmatrix} 0 & 1 & 4 & 0 \\ 2 & 0 & -2 & 4 \\ -2 & 0 & 3 & -4 \\ 4 & 0 & -6 & 9 \end{bmatrix}$. If $A$ is invertible find $A^{-1}$

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# MTH 221, Linear Algebra, Quiz Five at 2pm, Fall 2012

Ayman Badawi

**QUESTION 1.** Solve for $A$ where $A$ is a $2 \times 3$ matrix such that

$$\left(\begin{bmatrix} 2 & 0 \\ 4 & 0 \end{bmatrix} A\right)^T - A^T = \begin{bmatrix} 1 & -1 \\ 0 & 4 \\ 2 & 1 \end{bmatrix}$$

**QUESTION 2.** Let $A = \begin{bmatrix} 4 & 2 & 1 \\ -4 & 6 & 0 \\ -2 & -1 & 2.5 \end{bmatrix}$ Find det(A) by definition (i.e. you must choose a row or a column to calculate det(A))

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# MTH 221, Linear Algebra, Quiz SIX at 2:00pm, Fall 2012

Ayman Badawi

**QUESTION 1.** Let $A$ be a $4 \times 4$ matrix such that

$$A \quad \underline{-4R_2} \quad B \quad \underline{R_2 \leftrightarrow R_4} \quad C \quad \underline{2R_2 + R_4 \rightarrow R_4} \quad D = \begin{bmatrix} 2 & -3 & 4 & 0 \\ -2 & 6 & -2 & 1 \\ -2 & 3 & -4 & 1 \\ -4 & 6 & -5 & -1 \end{bmatrix}$$

(i) Find an elementary matrix $E$ such that $EC = D$

(ii) Find three elementary matrices $H, E, L$ such that $HELD = A$

(iii) Find $det(A)$

(iv) Find $det(-2B^T C^{-1})$

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# MTH 221, Linear Algebra, Quiz SEVEN at 12:00, Fall 2012

Ayman Badawi

**QUESTION 1.** Let $A = \begin{bmatrix} 1 & 0 & 2 & 4 \\ 0 & 1 & -1 & 1 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{bmatrix}$

Is $A$ diagnolizable? If yes, find a diagonal matrix $D$ and invertible matrix $Q$ such that $A = QDQ^{-1}$.

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# MTH 221, Linear Algebra, Quiz EIGHT at 14:00, Fall 2012

Ayman Badawi

**QUESTION 1.** Let $F = span\{(1,-2,1,2),(-1,2,-1,0),(-1,2,0,2),(3,-6,3,4)\}$.

a) Find $dim(F)$.

b) Find a basis for $F$, and rewrite $F$ as a span of a basis.

c) Is $F = R^4$? Explain

d) Is $(-2,4,-4,-6) \in F$? if yes or no, verify your answer.

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