Quiz I, MTH 221, Spring 2016

Ayman Badawi

QUESTION 1. Find the solution set to the following system:

$$x_1 - x_3 + x_4 = 10$$
$$-x_1 + x_2 + 2x_4 = 6$$
$$2x_2 - x_2 - 2x_3 + 3x_4 = 8$$

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Quiz II, MTH 221, Spring 2016

Ayman Badawi

QUESTION 1. Let $A = \begin{bmatrix} 3 & 2 & -1 \\ -1 & 2 & 0 \\ 1 & 2 & -1 \end{bmatrix}, B = \begin{bmatrix} 1 & 1 & -1 & 2 \\ -1 & 1 & 4 & 1 \\ 4 & 1 & -1 & 2 \end{bmatrix}$

1. Find the Fourth column of AB (use column-spanning method).

2. Let $AB = H$. Find h_{32}, h_{21}

QUESTION 2. Given A is a 2×3 matrix and $A \xrightarrow{2R_1 + R_2 \to R_2} B \xrightarrow{-3R_2} C$. Find two elementary matrices, say E, F, such that $EFA = C$.

QUESTION 3. Consider the system of linear equations $AX = B$, where A is 3×3 and first column of A is identical to the third column of A, B is the third column of A. Convince me that the system has infinitely many solutions. Give me 3 different points in the solution set of the system.

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Quiz III, MTH 221, Spring 2016

Ayman Badawi

QUESTION 1. Find a matrix A, 3×2, such that

$$A \begin{bmatrix} -4 & 6 \\ 0 & -4 \end{bmatrix} + 5A = \begin{bmatrix} -1 & 0 \\ 0 & 4 \\ 0 & 0 \end{bmatrix}$$

QUESTION 2. Let $A = \begin{bmatrix} 0 & 1 & -1 \\ 2 & 4 & -4 \\ 0 & -1 & 2 \end{bmatrix}$. If possible find A^{-1}.

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Quiz IV, MTH 221, Spring 2016

Ayman Badawi

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

a) Find the LU-Factorization of A.

b) Find the solution set to the system of linear equations $AX = \begin{bmatrix} 4 \\ 2 \\ -2 \end{bmatrix}$

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Quiz VI, MTH 221, Spring 2016

Ayman Badawi

QUESTION 1. Let A be a $4{\times}4$ matrix such that $A \xrightarrow{2R_1} A_1 \xrightarrow{R_2 \leftrightarrow R_4} A_2 \xrightarrow{-2R_3 + R_1 \ \to R_1} B = \begin{bmatrix} 2 & -2 & -4 & 0 \\ 0 & 1 & 2 & 4 \\ 0 & -1 & 2 & 1 \\ 0 & 2 & 4 & 0 \end{bmatrix}$.

a) Find $|A|$.

b) Find $|2A_2|$

QUESTION 2. Let $A = \begin{bmatrix} 3 & -5 \\ -2 & 1 \end{bmatrix}$. Find a symmetric matrix W and a skew-symmetric E such that $A = W + E$.

QUESTION 3. Given $A = \begin{bmatrix} 1 & 1 & 1 & 1 \\ -1 & 0 & 6 & -1 \\ -1 & -1 & 7 & 7 \\ -1 & -1 & -1 & 7 \end{bmatrix}$. Find the $(4, 1)$-entry of A^{-1}.

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Quiz 6: MTH 221, Spring 2016

Ayman Badawi

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

a. Find $dim(D)$ and find a basis for D.

b. Is $(-2, 2, 8) \in D$? explain

(ii) Let $M = \{(a + 2b + 3c, -a + b, 3a + 6b + 9c) \mid a, b, c \in R\}$.

a. Show that M is a subspace of R^3.

b. Find a basis for M and write M as a span of a basis.

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Quiz 7: MTH 221, Spring 2016

Ayman Badawi

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

(i) Find all eigenvalues of A.

(ii) For each eigenvalue α of A find E_α.

(iii) Find an invertible matrix Q such that $Q^{-1}AQ = A$.

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