Name———————————————, ID ———————————

Quiz one: MTH 221, Fall 2016

Ayman Badawi

QUESTION 1. Find the solution set to the following system

$$x_2 - x_3 + x_4 = 0$$
$$x_1 - x_2 + x_3 - x_4 = 4$$
$$-2x_1 + x_3 + x_4 = 8$$

QUESTION 2. Consider a system of this form

$$x_1 + 2x_2 + x_3 = 10$$
$$-x_1 + ax_2 - x_3 = 0$$
$$2x_1 + 4x_2 + bx_3 = 20$$

i)For what values of a, b will the system be consistent?

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

Faculty information

Ayman Badawi, Department of Mathematics & Statistics, American University of Sharjah, P.O. Box 26666, Sharjah, United Arab Emirates.
E-mail: abadawi@aus.edu, www.ayman-badawi.com

Name———————————————, ID ———————————

Quiz II: MTH 221, Fall 2016

Ayman Badawi

QUESTION 1. Let A be a 4×4 matrix such that 3rd column of A is identical to the 4th column of A. Consider the system of linear equations $AX = C$, where C =3rd column of A.

(i) One particular solution to the above system is

(ii) a second particular solution to the system is

(iii) a third particular solution to the system is

(iv) Does the system have infinitely many solutions? why?

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

i)Use the method of linear combination of columns to find the matrix AB.

ii) Let $BA = C$. Use dot product method to find $c_{2,1}$, and $c_{1,2}$.

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Quiz III: MTH 221, Fall 2016

Ayman Badawi

QUESTION 1. Let $Q_1 = (1, -1, 2, 3), Q_2 = (-1, 2, 6, 0), Q_3 = (-1, 1, -1, 0), Q_4 = (-1, 1, -2, -2)$.

(i) Are Q_1, Q_2, Q_3, Q_4 independent? SHOW THE WORK

(ii) Find all values of a, b, c, d such that $aQ_1 + bQ_2 + cQ_3 + dQ_4 = (0, 0, 0, 0)$

(iii) Can you find at least one value for a and at least one value for b and at least one value for c so that $Q_4 = aQ_1 + bQ_2 + cQ_3$.

QUESTION 2. Let $D = span\{(1, 1, 1), (-1, 0, 1), (0, 1, 2)\}$. Find $dim(D)$. Is $D = R^3$? explain why yes or why NO.

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Ayman Badawi, Department of Mathematics & Statistics, American University of Sharjah, P.O. Box 26666, Sharjah, United Arab Emirates.
E-mail: abadawi@aus.edu, www.ayman-badawi.com

Name———————————————, ID ———————————

Quiz IV: MTH 221, Fall 2016

Ayman Badawi

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

QUESTION 2. Let $A = \begin{bmatrix} 1 & 0 & 1 & 0 \\ -1 & 1 & -1 & 0 \\ -1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 1 \end{bmatrix}$. a) Find A^{-1} if possible.

Is span$\{Row1, Row2, Row3, Row4\} = R^4$? Why?

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Ayman Badawi, Department of Mathematics & Statistics, American University of Sharjah, P.O. Box 26666, Sharjah, United Arab Emirates.
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Quiz V: MTH 221, Fall 2016

Ayman Badawi

QUESTION 1. Given A is a 3×3 matrix such that $A \xrightarrow{3R_1} B \xrightarrow{-4R_2+R_3 \to R_3} C = \begin{bmatrix} 0 & 1 & -4 \\ 1 & -1 & 8 \\ 0 & 2 & -7 \end{bmatrix}$

(i) Find $|A|$

(ii) Find $Span\{R1, R_2, R_3\}$, where each R_i is a row of A.

(iii) Find A

(iv) Find $|2A^tA^{-1}|$.

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E-mail: abadawi@aus.edu, www.ayman-badawi.com

Name———————————————, ID ———————————

Quiz VI: MTH 221, Fall 2016

Ayman Badawi

QUESTION 1. Given A is a $3\times$ matrix and $A \xrightarrow{2R_3} B \xrightarrow{-4R_3+R_1\rightarrow R_1} C$.

(i) Find two elementary matrices F_1, F_2 such that $F_1F_2A = C$.

(ii) Find an elementary matrix W such that $WC = B$.

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

(i) Find the LU-factorization of A.

(ii) Find L^{-1}.

(iii) Use (1) and (2) to find the solution set to $AX = \begin{bmatrix} 1 \\ 0 \\ -1 \end{bmatrix}$

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E-mail: abadawi@aus.edu, www.ayman-badawi.com

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

Quiz 7: MTH 221, Fall 2016

Ayman Badawi

Submit solution to this QUIZ on Thursday Nov. 17, at 3pm, just leave it on the table

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

(i) Find $C_A(\alpha)$.

(ii) Find the eigenvalues of A.

(iii) For each eigenvalue a find the eigenspace E_a.

(iv) If A is diagnolizable, then find a diagonal matrix D and an invertible matrix Q such that $A = QDQ^{-1}$.

QUESTION 2. Use the least square method in order to find "best fitting plane" $z = ax + by + c$ that is close to the points $(1, 1, 0), (2, 1, 1), (-1, 1, 1), (-1, -1, 1)$.

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Ayman Badawi, Department of Mathematics & Statistics, American University of Sharjah, P.O. Box 26666, Sharjah, United Arab Emirates.
E-mail: abadawi@aus.edu, www.ayman-badawi.com

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

Quiz 8: MTH 221, Fall 2016

Ayman Badawi

Submit solution to this QUIZ on Thursday Nov. 25, at 3pm, just leave it on the table

QUESTION 1. Let $D = span\{x^3 - x - 1, -x^3 - 2x - 2, 6x + 6\}$.

1) Find $dim(D)$

2) Find a basis for D.

3) Does the polynomial $-2x^3 - 7x - 7$ belong to D? explain

QUESTION 2. Let $M = \{f(x) \in P_4 \mid \int_0^1 f(x)\, dx = 0\}$.

1)Show that M is a subspace of P_4

2) Find $dim(M)$

3) Find a basis for M.

Faculty information

Ayman Badawi, Department of Mathematics & Statistics, American University of Sharjah, P.O. Box 26666, Sharjah, United Arab Emirates.
E-mail: abadawi@aus.edu, www.ayman-badawi.com