

Sultan Qaboos University – College of Science

Department of Mathematics and Statistics

MATH3171, Fall Semester 2008, Quiz 1A

LINEAR ALGEBRA & MULTIVARIATE CALCULUS FOR ENGINEERS

Date: 22-09-03

Time allowed: 15 mins.

Name:

I.D.No.:

1. [6 pts] Write the following system of linear equations in matrix form $Ax = B$

$$-2x + 3y - z = 1$$

$$x + 2y - z = 4$$

$$-2x - y + z = -3$$

Solve this system of equations showing whether it has a unique solution, infinite number of solutions or no solution.

2. [4 pts] Give an example of two matrices A and B such that $(AB)^T \neq A^T B^T$.

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MATH3171, Fall Semester 2008, Quiz 1B

LINEAR ALGEBRA & MULTIVARIATE CALCULUS FOR ENGINEERS

Date: 22-09-08

Time allowed: 15 mins.

Name:

I.D.No.:

1. [6 pts]. Find the rank of the following matrix

$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 2 & -1 \\ 3 & 4 & 1 \\ 0 & 1 & 0 \end{bmatrix}$$

Check whether the following vectors are linearly independent:

$$[1 \ 0 \ 0], [0 \ 2 \ -1], [3 \ 4 \ 1], [0 \ 1 \ 0].$$

Then find the maximum number of linearly independent set of these vectors.

2. [4 pts] Give an example of two nonzero matrices A and B such that $AB = 0$.

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MATH3171, Fall Semester 2008, Quiz 1C

LINEAR ALGEBRA & MULTIVARIATE CALCULUS FOR ENGINEERS

Date: 22-09-03

Time allowed: 15 mins.

Name:

I.D.No.:

1. [5 pts]. Solve this system of equations showing whether it has a unique solution, infinite number of solutions or no solution.

$$x + y - z = 9$$

$$y + z = -1$$

$$-x + 2y - 6z = 18$$

2. [5 pts] Are the following set of vectors linearly independent or dependent?
(Show the details of your work.) $[1 \ 0 \ 0 \ 0]$, $[1 \ -1 \ 0 \ 0]$, $[1 \ -1 \ 0 \ -1]$.
Then find the rank of the following matrix

$$\begin{bmatrix} 1 & 0 & 0 & 0 \\ 1 & -1 & 0 & 0 \\ 1 & -1 & 0 & -1 \end{bmatrix}.$$

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MATH3171, Fall Semester 2008, Quiz 1D

LINEAR ALGEBRA & MULTIVARIATE CALCULUS FOR ENGINEERS

Date: 21-09-03

Time allowed: 15 mins.

Name:

I.D.No.:

1. [6 pts]. Solve the following system by the Gauss elimination or indicate the nonexistence of the solution.

$$x + 2y + 3z + 4w = 5$$

$$x + 3y + 5z + 7w = 11$$

$$x - z - 2w = -6.$$

2. [4 pts] Give an example of three non zero matrices A, B and C such that $AB = AC$ but $B \neq C$.

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MATH3171, Fall Semester 2008, Quiz 1E

LINEAR ALGEBRA & MULTIVARIATE CALCULUS FOR ENGINEERS

Date: 21-09-03

Time allowed: 15 mins.

Name:

I.D.No.:

1. [6 pts] Evaluate the rank of the matrix $A = \begin{bmatrix} 0 & 8 & -1 \\ 1 & 2 & 0 \\ 0 & 0 & 3 \\ 0 & 4 & 5 \end{bmatrix}$

Check whether the following vectors are linearly independent or not:

$$[0 \ 8 \ -1], [1 \ 2 \ 0], [0 \ 0 \ 3], [0 \ 4 \ 5].$$

2. [4 pts] Let $A = \begin{bmatrix} 1 & -1 \\ -1 & 1 \end{bmatrix}$. Compute A^2 and A^3 , then guess the general form of A^n .