Assignment 1

Due Date: 28 Feb 2015

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Determine whether the statement is true or false:

1. If and are matrices, then. False
2. Trace of matrix is the product of the elements on the main diagonal. False
3. A single linear equation with two or more unknowns must always have infinitely many solutions. True
4. The matrix is symmetric. True
5. If has infinitely many solutions then will have no solution or infinitely many solutions but not a unique solution. True
6. A matrix is upper and lower triangular simultaneously if and only if it is a diagonal matrix. True
7. If and are square matrices of same size, then True
8. The Number is called the Cofactor of . True
9. If A is a Square matrix with two proportional rows then . Flase

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For Each Question, Choose the Correct Answer from the Multiple-Choice List.

1. Determine whether the matrix below is in

a)row echelon form b) reduced row echelon form c) both

1. If is a matrix and is a matrix, then is

a) b)

c)

1. The quantity , is equal to

a) b) c)

= I

1. The inverse of is

a) b) c)

1. If A= ,then the minor of is:

a) b) c)

Minor of = = -1

1. If the determinant of ,then

a) b) c)

Solve the following questions:

1. Find , if and
2. Apply Elementary row operations to find the inverse of . And use the result to solve the system of equations

First step: find

, ,

,,

,, ,

.

Second part: solve the system

We have ;

.

 3) For what values of and is the following system inconsistent (no solution), with unique solution or with infinitely many solutions?

Augmented matrix

 , ,

There is two cases:

First case: a=2, then the matrix becomes

* If b≠1 then no solution because system is inconsistent.
* If b=1 then the matrix becomes:

This system has infinite solutions because there is one free variable . and .

Second case: a≠2, then

 , ,

,it can be concluded from this step that it has unique solution for all b.

For finding this unique solution, we perform the row operation

 ,

The unique solution is:

In short,

No solution when a=2,b≠1,

Infinitely many solutions: a=2,b=1.

Unique solution: a≠2, for every b,

1. If A= and . Evaluate the determinants of the following matrices by comparing them to :

B = ; C= ; and

 D=

* B is the matrix resulted when the second column of A is multiplied by 2. Using Theorem2.2.3(a), we have |B| = 3|A| = 336.
* C is the matrix resulted when the second and third rows of A are interchanged. Using Theorem2.2.3(b), we have |C| = – |A| = –12.
* D is the matrix resulted when the first row of A multiplied by 2 and added to the third row of A. Using Theorem2.2.3(c), we have |D| = |A| = 12
1. Solve the following system of equations using Cramer’s rule.

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Since (verify this), we use Cramer’s rule as follow:

We find that and

Thus