**Department of Mathematics**

**College of Sciences**

**King Saud University**

**Math 240**

**First Mid exam**

**First semester, 1436-1437H**

**Time: 90 min.**

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| **Name:** |
| **Student Serial No.** |

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| --- | --- | --- | --- | --- | --- |
| **Question number** | I | II | III | IV | total |
| **Answer** |  |  |  |  |  |

### . **Choose the correct answer and fill the table:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Question number** | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| **Answer** |  |  |  |  |  |  |  |  |

**1)** (AB)-1(AC-1)(D-1C-1)-1 D-1

a) B-1 b) C c) D-1 d) None of the previous.

**2)** If A = and B=then the first row of AB is

a) [63 67 57 ] b) [67 41 41] c) [5 20 40] d) None of the previous.

**3)** Number of solutions of the following homogeneous linear system

4x1-x2+x3 = 0

6x1-4 x2- x3 = 0

a) No solution. b) one solution. c) three solutions. d) infinitly many solutions.

**4)** **(AT )-1**=  then **A=**

a)  **b)**  c)  d) None of the previous.

**5)** If D = then det(D) is

a) -3. b) 3. c) 29. d) None of the previous.

**6)** **(A-1 )5** =  then **A5=**

a)  **b)**  c)  d) None of the previous.

**7)** The matrixis in

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

d) None of the previous.

**8)** The linear system with the augmented matrix is

a) always consistent. b) sometimes inconsistent. c) always inconsistent.

d) None of the previous.

**II. Determine whether the following statements are true false.**

(a) If A , B ,and C are invertible matrices such that AB =AC, then B =C .

(b) For any given square matrix A, if A=ATA, then A is symmetric.

(c) For any given square matrix A, tr (A)=tr( AT) .

(d) Every homogenous system of equations has no solution or infinitely many solutions.

(e) The reduced row-echelon form of any matrix A is a diagonal matrix.

**III .** If A is an  matrix, then prove that the following :

1. If A is invertible then Ax=0 has only the trivial solution.
2. (kA)-1=(1\k)A-1 for any non-zero real scalar k.
3. (a) Find A-1, where A=.

(b) Using (a) find the solution of the linear system

x1+2x2+3x3= 1

2x1+5x2+3x3= 4

x1 +8x3= -3

(Do Not Use Row Reduction to solve (b))

Good Luck