

-Al-Balqa' Applied University, Faculty of Engineering Technolog

Mid Exam, Linear Algebra

Student Name:

شادي المكوامّعة :Instructor name فيزة رالد كالمعان

Lecture Time:

Date.

## Part One: Choose the correct answer

(10 marks)

| X     | 2 | 13/ | 4/ | 5/ | 0    |
|-------|---|-----|----|----|------|
| A     | B | É   | Ó  | 3  | 1 40 |
| 1-1-1 | 1 |     |    |    |      |

1- One of the following matrices is in R.R.E form

B) 
$$\begin{bmatrix} 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 2 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

C) 
$$\begin{bmatrix} 1 & 0 & 0 & 2 & 0 \\ 0 & 1 & 0 & 0 & 1 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

2- The corresponding linear system for the augmented matrix  $\begin{bmatrix} 2 & 1 & 3 & -5 \\ 1 & 2 & 4 & 0 \\ -1 & 6 & 2 & 1 \end{bmatrix}$  is:

A) 
$$2X_1 + X_2 + 3X_3 + 5 = 0$$
  
 $X_1 + 2X_2 + 4X_3 = 0$   
 $-X_1 + 6X_2 + 2X_3 - 1 = 0$ 

$$\begin{array}{c}
(5) 2X_1 + X_2 + 3X_3 = 5 \\
X_1 + 2X_2 + 4X_3 = 0 \\
-X_1 + 6X_2 + 2X_3 = 1
\end{array}$$

C) 
$$2X_1 + X_2 + 3X_3 + 5 = 0$$
  
 $X_2 + 2X_1 + 4X_3 = 0$   
 $-X_1 + 6X_2 + 2X_3 - 1 = 0$ 

D) 
$$2X_1 + X_2 + 3X_3 + 5 = 0$$
  
 $X_1 + 2X_2 + 4X_3 = 0$   
 $X_1 - 6X_2 - 2X_3 - 1 = 0$ 

3- The solution of the linear system with the corresponding augmented matrix

$$\begin{bmatrix} 2 & 5 & 8 \\ 4 & 10 & 16 \end{bmatrix}$$
 is:

$$(C) X_1 = 4 - \frac{5t}{2} \text{ and } X_2 = t; \ t \in \mathbb{R}$$

B) 
$$X_1 = 4$$
 and  $X_2 = 0$ 

B) 
$$X_1 = 4$$
 and  $X_2 = 0$   
D)  $X_1 = 8 - 5t$  and  $X_2 = t$ ;  $t \in \mathbb{R}$ 

4- One of the following statements is false for any symmetric matrix A

- A)  $tr(2A) = tr(A) + tr(A^T)$ .
- B) AAT is symmetric.
- C) A is a square matrix.
- D)) The equation AX = B has only one solution.

5-Let A be a matrix with det(A) = 7, and B is the matrix result by multiplying the third row in A by the scalar  $\alpha = 3$  and the second column in A by the scalar  $\beta = -2$  then det(B) =

Part two: Fill the blank. (10 marks)

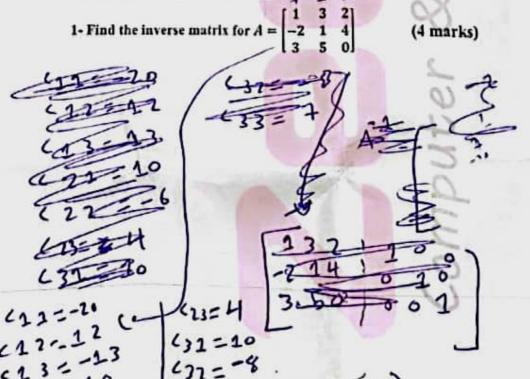
1- Let 
$$A = \begin{bmatrix} 2 & 7 \\ -3 & 5 \end{bmatrix}$$
 then  $A^{-1} = \underbrace{1}_{32} \underbrace{5}_{5} \underbrace{2}_{7}$ ....

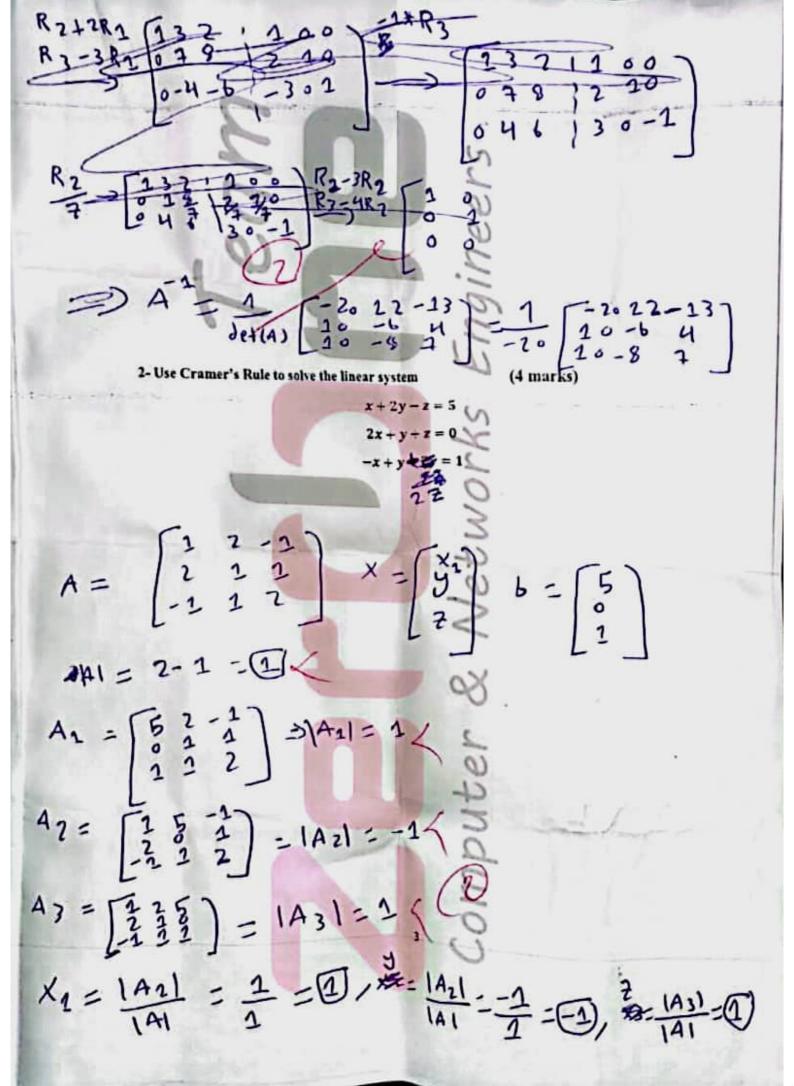
3- If 
$$A^{-1} = \begin{bmatrix} 2 & 5 & 3 \\ 1 & 3 & -2 \\ 4 & 0 & 1 \end{bmatrix}$$
 then the solution of the equation  $A \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 2 \\ 3 \\ 1 \end{bmatrix}$  is .....

4- If A is a square matrix satisfies 
$$A^2 - 3A = I$$
, then  $A^{-1} = A^{-1} = A^{-1}$ 

5- Let A and B be two symmetric matrix with the same size, then AB is symmetric matrix iff AB = ... E I







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