

Mid Exam Summer

Course Name: Linear Algebra

Submitted By:

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BS (SE-8) Section: A

Submitted To:

Sir Mansoor Qadir

Dated: 21th August 2020

Department of Computer Science,
IQRA National University, Peshawar Pakistan Linear Algebra
Mid Assignment

Note:

- If your student ID is e.g. 14589 then ID1 = 1, ID2 = 4, ID3 = 5 etc
- Submission time 21-08-2020 before 6:00 pm (4 Hrs)
- Copied papers will both be marked zero

Question No: 1

Solve the system of equations that corresponds to this augmented Matrix

Question No: 2

a) Find Inverse of a Matrix

$$\begin{array}{cccc} ID3 & -1 & 0 \\ [0 & 1 & ID3] \\ 1 & 1 & 0 \end{array}$$

Question # 2(a)
- A (a)
Find goverse of a Matrix
[TD3 -1 . 0]
0 1 702
0 1 703
1 1 0
1100
Journa gu
As my ID is 12280
50.103 = 2
pulling value in the matrix.
the mains.
$A = \begin{bmatrix} 2 & -1 & 0 \\ 0 & 1 & 2 \\ 1 & 1 & 0 \end{bmatrix}$: $taking$
0 1 2
1 1 0 : taking
V determi-
A - 12 -1 0
. 42
= 2 x 11 21+1 x 10 21+0x 10 11
$= 2 \times \begin{vmatrix} 1 & 2 + 1 \times \begin{vmatrix} 0 & 2 \\ 1 & 0 \end{vmatrix} + 0 \times \begin{vmatrix} 0 & 1 \\ 1 & 1 \end{vmatrix}$
$= 2 \times (1 \times 0 - 2 \times 1) + 1(0 \times 0 - 2 \times 1) + 0(0 \times 1 - 1 \times 1)$
$1 - 2 \cdot 1/2 \cdot 2 \cdot 2/2 - 1$
=2(0-2)+1(0-2)+0(0-1)

$$= 2(-2) + 1(-2) + 0(-1)$$

$$= -4 - 2 + 0$$

$$= -6$$
Now 7aking adj...

Adj (A) = Adj [2 - 1 0]

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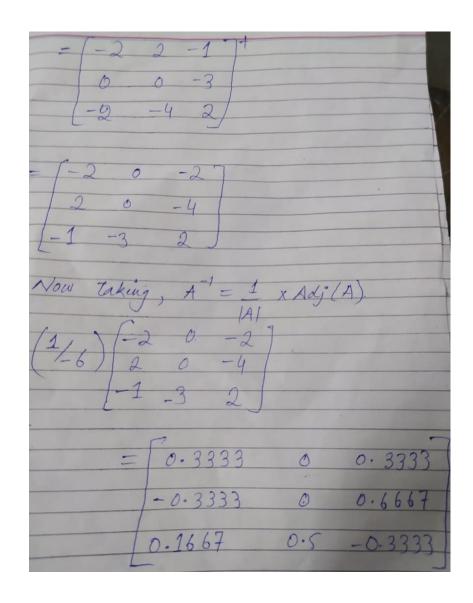
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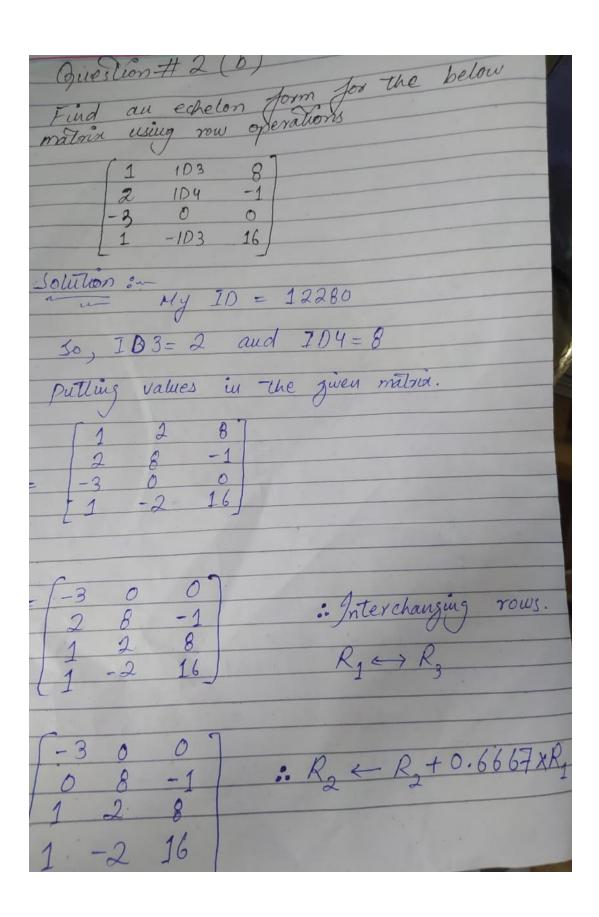
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1



b) Find an echelon form for the below matrix using row operations



```
= \begin{bmatrix} -3 & 0 & 0 \\ 0 & 8 & -1 \\ 1 & -2 & 16 \end{bmatrix} : R_{4} \leftarrow R_{3} + 0.33333 \times R_{4}
= \begin{bmatrix} -3 & 0 & 0 \\ 0 & 8 & -1 \\ 0 & 2 & 8 \\ 0 & -2 & 16 \end{bmatrix} : R_{4} \leftarrow R_{4} + 0.33333 \times R_{4}
= \begin{bmatrix} -3 & 0 & 0 \\ 0 & 8 & -1 \\ 0 & -2 & 16 \end{bmatrix} : R_{3} \leftarrow R_{3} - 0.25 \times R_{2}
= \begin{bmatrix} -3 & 0 & 0 \\ 0 & 8 & -1 \\ 0 & -2 & 16 \end{bmatrix} : R_{4} \leftarrow R_{4} + 0.25 \times R_{2}
= \begin{bmatrix} -3 & 0 & 0 \\ 0 & 8 & -1 \\ 0 & 0 & 3.25 \\ 0 & 0 & 15.75 \end{bmatrix} : R_{4} \leftarrow R_{4} + 0.25 \times R_{2}
= \begin{bmatrix} -3 & 0 & 0 \\ 0 & 8 & -1 \\ 0 & 0 & 15.75 \end{bmatrix} : R_{3} \leftarrow R_{4} \leftarrow R_{4} + 0.25 \times R_{2}
= \begin{bmatrix} -3 & 0 & 0 \\ 0 & 8 & -1 \\ 0 & 0 & 15.75 \end{bmatrix} : R_{3} \leftrightarrow R_{4}
```

Question No: 3

Find the Eigen values and Eigen vectors of the below Matrix

Question # 3:-
Find the Eigen values and Eigen vectors
The Egan
of the below matrix.
CIOR 12
103 -6 &
103 -6 2 -6 102 -4 2 -4 104
2 -4 ID4
Solution:~
My ID = 12280
50, ID2=2, ID3=2, ID4=8
putting values in the matrix.
$= \begin{bmatrix} 2 & -6 & 2 \\ -6 & 2 & -4 \\ 2 & -4 & 8 \end{bmatrix}$
= -6 2 -4
2 -4 8
: A-11/=0
(2-1) -6 2
-6 (2-1)-4 = 0
2 -4 (8-1)

$$= \frac{1}{(2-1)((2-1)(8-1)-(-4)(-4))-(-6)(-6)(8-1)}$$

$$= (-4) \times 2 + 2((-6)(-4)-(2-1)2) = 0$$

$$= (2-1)((16-101+1^2)-16)+6((-48+61)$$

$$= (-8) + 2(24-(4-21)) = 0$$

$$= (2-1)(-101+1^2)+6(-40+61)+2(20+21)=0$$

$$= (-201+121^2-13)+(-240+361)+(49+41)=0$$

$$= (-1^3+121^2+201-200)=0$$

$$= (-1^3+121^2-201+200)=0$$

$$= (-1^3-121^2-201+200)=0$$

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$$= (-1^3-121^2-201+200)=0$$

1st Iteration: Num $f(x_0) = f(3) = 3^3 - 12 \times 3^2 - 20 \times 3 + 200 = 59$ $f(x_0) = f(3) = 3(3^2) - 24(3) - 20 = -65$ $x_1 = x_0 - f(x_0)$ $f(x_0)$ $y_1 = 3 - 59/-65$ 1 = 3.9077 2 nd Ateration: $f(x_1) = f(3.9077) = (3.9077)^{\frac{2}{3}} \cdot 12(3.9077)^{\frac{1}{2}} - 20(3.9077) + 200$ = (.7239) $f(x_1) = f(3.9077) = 3(3.9077)^2 - 24(3.9077)$ -20=67.9744 $x_2 = x_1 - f(x_1)$ f(x1) 2= 3.9077 - -1.7239 -67.9744. x2 = -3.8823.

 $3^{3} = 3 + 4 = 3 + 8 = 23$ $f(x_1) = f(3.8823) = (3.8823)^2 - 20(3.8823)$ + 200 = -0.0002 $f(x_2) = f(3.8823) = 3(3.8823)^2 - 24(3.8823)$ -20 = -67.9585 $x_3 = x_2 - f(x_1)/f(x_1)$ $x_3 = 3.8823 - -0.0002$ -67.9585 $x_3 = 3.8823$

