



*SECTION: 11*

*Course Name: MAT125(Quiz01- Fall 2020)*

*Submitted to:*

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Section: 11

Quiz-01 (MATH125 - MEUSIR)

Gives no:

(1)

$$x_1 + 2x_2 - 3x_3 + 4x_4 = 2$$

$$2x_1 + 3x_2 - 2x_3 + x_4 = 1$$

$$5x_1 + 12x_2 - 7x_3 + 6x_4 = 3$$

Augmented Matrix:

$$\begin{bmatrix} 1 & 2 & -3 & 4 & 2 \\ 2 & 3 & -2 & 1 & 1 \\ 5 & 12 & -7 & 6 & 3 \end{bmatrix}$$

S-1: Add  $(-2 \times \text{row } 1)$  to row 2

$$\begin{bmatrix} 1 & 2 & -3 & 4 & 2 \\ 0 & 1 & 4 & -7 & -3 \\ 5 & 12 & -7 & 6 & 3 \end{bmatrix}$$

S-2: Add  $(-5 \times \text{row } 1)$  to row 3

$$\begin{bmatrix} 1 & 2 & -3 & 4 & 2 \\ 0 & 1 & 4 & -7 & -3 \\ 0 & 2 & 8 & 14 & 7 \end{bmatrix}$$

S-3: Add  $(-2 \times \text{row } 2)$  to row 3

$$\begin{bmatrix} 1 & 2 & -3 & 4 & 2 \\ 0 & 1 & 4 & -7 & -3 \\ 0 & 0 & 0 & 0 & -1 \end{bmatrix}$$

S-4: Divide row 3 by  $-1$ 

$$\begin{bmatrix} 1 & 2 & -3 & 4 & 2 \\ 0 & 1 & 4 & -7 & -3 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix}$$

S-5: Add  $(3 \times \text{row } 3)$  to row 2

$$\begin{bmatrix} 1 & 2 & -3 & 4 & 2 \\ 0 & 1 & 4 & -7 & -3 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix}$$

S-6:

Add  $(-2 \times \text{row } 3)$  to row 1:

$$\begin{bmatrix} 1 & 2 & -3 & 4 & 0 \\ 0 & 1 & 4 & -7 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix}$$

S-7:

Add  $(-2 \times \text{row } 2)$  to row 1

$$\begin{bmatrix} 1 & 0 & -11 & 18 & 0 \\ 0 & 1 & 4 & -7 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix}$$

② Here,

$$A = \begin{bmatrix} 5 & -7 & 1 \\ -7 & 8 & 2 \\ 1 & 2 & -4 \end{bmatrix}$$

Now,

$$A^2 + 2A + \text{tr}(A)I$$

$$A^2 = \begin{pmatrix} 5 & -7 & 1 \\ -7 & 8 & 2 \\ 1 & 2 & 4 \end{pmatrix}$$

$$= \begin{pmatrix} 5 & -7 & 1 \\ -7 & 8 & 2 \\ 1 & 2 & 4 \end{pmatrix}$$

$$= \begin{pmatrix} 75 & -89 & -5 \\ -89 & 117 & 17 \\ -5 & 17 & 21 \end{pmatrix}$$

$$2A = 2 \begin{pmatrix} 5 & -7 & 1 \\ -7 & 8 & 2 \\ 1 & 2 & 4 \end{pmatrix}$$

$$= \begin{pmatrix} 10 & -14 & 2 \\ -14 & 16 & 4 \\ 2 & 4 & 8 \end{pmatrix}$$

$$A^T = \begin{pmatrix} 5 & -7 & 1 \\ -7 & 8 & 2 \\ 1 & 2 & 4 \end{pmatrix}$$

$$= \begin{pmatrix} 5 & -7 & 1 \\ -7 & 8 & 2 \\ 1 & 2 & 4 \end{pmatrix}$$

$$\text{tr}(A)I = 17 \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

$$= \begin{pmatrix} 17 & 0 & 0 \\ 0 & 17 & 0 \\ 0 & 0 & 17 \end{pmatrix}$$

$$= 75 + 90 = 165$$

$$= 17$$

$$\therefore A^T + 2A + \text{tr}(A)A^T$$

$$= \begin{pmatrix} 75 & -89 & -5 \\ -89 & 117 & 17 \\ -5 & 17 & 21 \end{pmatrix} + \begin{pmatrix} 10 & -14 & 2 \\ -14 & 16 & 4 \\ 2 & 4 & 8 \end{pmatrix}$$

$$+ 17$$

$$= \text{undefined}$$

(Answer)