

# Bangladesh University of Business and Technology

Program BSc in CSE

Semester : Second Semester

Course Code : MAT 121

Course title : Linear Algebra and Differential  
Equations

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Intake: 37

Ans to the Q no: 3

0

Wine,

$$A = \begin{bmatrix} -9 & -3 & 4 \end{bmatrix}$$

$$B = \begin{bmatrix} 8 \\ -1 \\ -96 \end{bmatrix}$$

$$AB = \begin{bmatrix} -9 & -3 & 4 \end{bmatrix} \times \begin{bmatrix} 8 \\ -1 \\ -96 \end{bmatrix}$$

$$= \begin{bmatrix} -9 \times 8 & -3 \times (-1) & 4 \times (-96) \end{bmatrix}$$

$$= \begin{bmatrix} -72 & 3 & -384 \end{bmatrix}$$

Ans

$$BA = \begin{bmatrix} 8 \\ -1 \\ -96 \end{bmatrix} \begin{bmatrix} -9 & -3 & 4 \end{bmatrix}$$

$$= \begin{bmatrix} 8 \times (-9) & -1 \times (-3) & -96 \times 4 \end{bmatrix}$$

$$= \begin{bmatrix} -72 & 3 & -384 \end{bmatrix}$$

Ans

Q. 2. Find the adjoint of the matrix A

Given

$$A = \begin{bmatrix} 1 & 3 & 2 \\ 2 & 0 & 3 \\ 1 & -1 & 1 \end{bmatrix}$$

$$A^T = \begin{bmatrix} 1 & 2 & 1 \\ 3 & 0 & -1 \\ 2 & 3 & 1 \end{bmatrix}$$

Now,

$$A_{11} = (0-3) = -3$$

$$A_{12} = -(3+2) = -5$$

$$A_{13} = (0-0) = 0$$

$$A_{21} = (2-3) = -1$$

$$A_{22} = (1-2) = -1$$

$$A_{23} = (3-4) = -1$$

$$A_{31} = (-2-0) = -2$$

$$A_{32} = -(-1-3) = 4$$

$$A_{33} = (0-6) = -6$$

Now

$$\text{Adj}(A) = \begin{bmatrix} 3 & -5 & 9 \\ 1 & -1 & 1 \\ -2 & 4 & -6 \end{bmatrix}$$

$$|A| = 1(5 - 2) + 1(12 - 2) = 5$$

Now

$$A^{-1} = \frac{1}{|A|} \text{Adj}(A) = \frac{1}{5} \begin{bmatrix} 3 & -5 & 9 \\ 1 & -1 & 1 \\ -2 & 4 & -6 \end{bmatrix}$$

$$= \frac{1}{5} \begin{bmatrix} 3 & -5 & 9 \\ 1 & -1 & 1 \\ -2 & 4 & -6 \end{bmatrix}$$

$$= \frac{1}{5} \begin{bmatrix} 3 & -5 & 9 \\ 1 & -1 & 1 \\ -2 & 4 & -6 \end{bmatrix}$$

$$= \frac{1}{5} \begin{bmatrix} 3 & -5 & 9 \\ 1 & -1 & 1 \\ -2 & 4 & -6 \end{bmatrix}$$

$$= \frac{1}{5} \begin{bmatrix} 3 & -5 & 9 \\ 1 & -1 & 1 \\ -2 & 4 & -6 \end{bmatrix}$$

∴ we know,

$$A^{-1} = \frac{1}{|A|} \text{Adj}(A)$$

$$A^{-1} = \frac{1}{5} \text{Adj}(A)$$

$$= \frac{1}{5} \begin{bmatrix} 3 & -5 & 9 \\ 1 & -1 & 1 \\ -2 & 4 & -6 \end{bmatrix}$$

Ans



\* solution

Ans to the Q no 1  

$$\begin{bmatrix} 29 & 4n & 23 & 2t \\ 29 & -2n & 23 & -2t \\ 29 & 8n & 4t & 5t \\ 29 & 7n & 23 & 4t \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

$$29 + 4n + 23 + 2t = 12$$

$$29 - 2n + 23 - 2t = -4$$

$$29 + 8n + 4t + 5t = 22$$

$$29 + 7n + 23 + 4t = 20$$

$$r_2 = r_2 - r_1 \quad 29 + 4n + 23 + 2t = 12$$

$$r_3 = 2r_3 - r_2 \quad 0 - 6n + 0 - 4t = -16$$

$$r_4 = r_4 - r_2 \quad 0 + 9n + 0 + 6t = 24$$

$$29 + 4n + 23 + 2t = 12$$

$$r_3 = 2r_3 + 3r_2 \quad 0 - 6n + 0 - 4t = -16$$

$$r_4 = 2r_4 + 5r_2 \quad 0 + 0 + 0 + 0 = 0$$

$$0 + 0 + 0 + 0 = 0$$