

Assignment 1

Shubham Shrivastava

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Question 1:

If A,B are symmetric matrices of same order, then $AB-BA$ is a

- (A) Skew symmetric matrix
- (B) Symmetric matrix
- (C) Zero matrix
- (D) Identity matrix

Solution:

Given, A and B are symmetric matrices, therefore, we have:

$$A' = A \quad \text{and} \quad B' = B \quad (1)$$

consider

$$\begin{aligned} \Rightarrow (AB - BA)' &= (AB)' - (BA)' & [(A - B)' = A' - B'] \\ \Rightarrow (AB - BA)' &= B'A' - A'B' & [(AB)' = B'A'] \\ \Rightarrow (AB - BA)' &= BA - AB \\ \Rightarrow (AB - BA)' &= -(AB - BA) \end{aligned}$$

Thus, $(AB - BA)$ is a skew symmetric matrix.