(3) $A, B \Rightarrow$ symmetric matrices of same order.

$X = AB + BA$

$Y = AB - BA$

then $(XY)^T = ?$

a) XY b) YX

c) $-YX$ d) none of these

~~$X^T \neq AB$~~

$$(XY)^T = Y^T \cdot X^T$$

$$= (AB - BA)^T (AB + BA)^T$$

$$= \{(AB)^T - (BA)^T\}\{(AB)^T + (BA)^T\}$$

$$= \{B^T A^T - A^T B^T\}\{B^T A^T + A^T B^T\}$$

{ A, B are symmetric matrices.
So $A^T = A$, $B^T = B$ }

$$= \{BA - AB\}\{BA + AB\}$$

$$= -(AB - BA)(AB + BA)$$

$$= -YX$$ Ans.

c) is correct.