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

, then which one of the following statements is not correct?

(a) $A^2 + I = A(A^2-I)$

(b) $A^4 - I = A^2+I$

(c) $A^3 + I = A(A^3-I)$

(d) $A^3 - I = A(A-I)$

Solution:

Given

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

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

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

$$A^4 = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} = I$$

$A^2+I = A^3-A$

$-I+I = A^3-A$

$A^3 \neq A$

So option a is the wrong statement.

Hence option a is the answer.