If $A = \begin{bmatrix} 2 & 3 \\ -1 & 2 \end{bmatrix}$ & $f(x) = x^2 - 4x + 7$, then the $f(A)$ is :

Solution :

$$f(x) = x^2 - 4x + 7$$

$$f(A) = A^2 - 4A + 7I$$

$$A^2 = \begin{bmatrix} 2 & 3 \\ -1 & 2 \end{bmatrix} \begin{bmatrix} 2 & 3 \\ -1 & 2 \end{bmatrix} = \begin{bmatrix} 1 & 12 \\ -4 & 1 \end{bmatrix}$$

$$f(A) = \begin{bmatrix} 1 & 12 \\ -4 & 1 \end{bmatrix} - 4\begin{bmatrix} 2 & 3 \\ -1 & 2 \end{bmatrix} + 7\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

$$= \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$$f(A) = O$$

A A

B $7I$

C O

D $A - I$

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