MATRICES

 Example 1:$Define f\left(x\right)=x^{2}+2x-1 find f\left(A\right)if A=\left(\begin{matrix}1&2\\2&1\end{matrix}\right) $

$$ $$

$$Solution $$

$$f\left(A\right)=A^{2}+2A-I when I is the identity matrix$$

$$ A^{2}=\left(\begin{matrix}1&2\\2&1\end{matrix}\right)\left(\begin{matrix}1&2\\2&1\end{matrix}\right)=\left(\begin{matrix}5&4\\4&5\end{matrix}\right) $$

$$ 2A=\left(\begin{matrix}2&4\\4&2\end{matrix}\right) I=\left(\begin{matrix}1&0\\0&1\end{matrix}\right) $$

$$ f\left(A\right)=\left(\begin{matrix}5&4\\4&5\end{matrix}\right)+\left(\begin{matrix}2&4\\4&2\end{matrix}\right)-\left(\begin{matrix}1&0\\0&1\end{matrix}\right)= \left(\begin{matrix}6&8\\8&6\end{matrix}\right)$$

$$Example 2:Define f\left(x\right)=3x+5, find f\left(A\right) if A=\left(\begin{matrix}1&0&1\\0&0&1\\1&0&0\end{matrix}\right)$$

$$Solution:$$

$$f\left(A\right)=3A+5I. $$

$$f\left(A\right)=3\left(\begin{matrix}1&0&1\\0&0&1\\1&0&0\end{matrix}\right)+5\left(\begin{matrix}1&0&0\\0&1&0\\0&0&1\end{matrix}\right) $$

$$ f\left(A\right)=\left(\begin{matrix}3&0&3\\0&0&3\\3&0&0\end{matrix}\right)+\left(\begin{matrix}5&0&0\\0&5&0\\0&0&5\end{matrix}\right)=\left(\begin{matrix}8&0&3\\0&5&3\\3&0&5\end{matrix}\right)$$