

Given the following matrices, please solve the questions below and if you can't solve the problem, explain why:-

$$1) A + F = \begin{bmatrix} 3 & 1 & 5 \\ 6 & 2 & 0 \end{bmatrix} + \begin{bmatrix} 2 & 1 & 3 \\ 5 & 7 & -2 \end{bmatrix} = \begin{bmatrix} 5 & 2 & 8 \\ 11 & 9 & -2 \end{bmatrix}$$

$$2) E - D = \begin{bmatrix} 3 & -2 \\ 1 & 4 \end{bmatrix} - \begin{bmatrix} 5 & 2 \\ 3 & 1 \end{bmatrix} = \begin{bmatrix} -2 & -4 \\ -2 & 3 \end{bmatrix}$$

$$3) C + B = \begin{bmatrix} 2 & 4 \\ 3 & 6 \\ -1 & 2 \end{bmatrix} + \begin{bmatrix} 6 \\ 4 \\ -1 \end{bmatrix} \text{ - Not possible.}$$

Because both matrices C and B are not of the same size i.e. different dimensions.

$$4) C(D) = \begin{bmatrix} 2 & 4 \\ 3 & -6 \\ -1 & 2 \end{bmatrix} \begin{bmatrix} 5 & 2 \\ 3 & 1 \end{bmatrix} = \begin{bmatrix} 2(5) + 4(3) & 2(2) + 4(1) \\ 3(5) + (-6)(3) & 3(2) + (-6)(1) \\ -1(5) + 2(3) & -1(2) + 2(1) \end{bmatrix}$$

$$= \begin{bmatrix} 10 + 12 & 4 + 4 \\ 15 - 18 & 6 - 6 \\ -5 + 6 & -2 + 2 \end{bmatrix} = \begin{bmatrix} 22 & 8 \\ 3 & 0 \\ 1 & 0 \end{bmatrix}$$

$$5) A(F) = \begin{bmatrix} 3 & 1 & 5 \\ 6 & 2 & 0 \end{bmatrix} \begin{bmatrix} 2 & 1 & 3 \\ 5 & 7 & -2 \end{bmatrix} \text{ - Not possible.}$$

Because the number of columns of matrix A is not equal to number of rows of matrix F.

$$6) C^T = \begin{bmatrix} 2 & 4 \\ 3 & 6 \\ -1 & 2 \end{bmatrix}^T = \begin{bmatrix} 2 & 3 & -1 \\ 4 & 6 & 2 \end{bmatrix}$$

$$7) F^T(E) = \begin{bmatrix} 2 & 1 & 3 \\ 5 & 7 & -2 \end{bmatrix}^T \begin{bmatrix} 3 & -2 \\ 1 & 4 \end{bmatrix} = \begin{bmatrix} 2 & 5 \\ 1 & 7 \\ 3 & -2 \end{bmatrix} \begin{bmatrix} 3 & -2 \\ 1 & 4 \end{bmatrix}$$

$$= \begin{bmatrix} 2(3) + 5(1) & 2(-2) + 5(4) \\ 1(3) + 7(1) & 1(-2) + 7(4) \\ 3(3) + (-2)(1) & 3(-2) + (-2)(4) \end{bmatrix} = \begin{bmatrix} 6 + 5 & -4 + 20 \\ 3 + 7 & -2 + 28 \\ 9 - 2 & -6 - 8 \end{bmatrix} = \begin{bmatrix} 11 & 16 \\ 10 & 26 \\ 7 & -14 \end{bmatrix}$$