

## CS 228, Matrix Exercises

Name:

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Consider the following matrices:

$$A = \begin{bmatrix} 1 & 2 & -3 \\ 3 & 4 & -1 \end{bmatrix}, B = \begin{bmatrix} 2 & 1 \\ 1 & 2 \\ 2 & -1 \end{bmatrix}, C = \begin{bmatrix} 2 \\ 1 \end{bmatrix}, D = \begin{bmatrix} -5 \\ -2 \end{bmatrix},$$

$$E = \begin{bmatrix} 3 & 2 \\ 7 & 5 \end{bmatrix}, F = \begin{bmatrix} 5 & -2 \\ -7 & 3 \end{bmatrix}$$

Perform each of the following operations, or indicate that the result is not defined.

- $E + F$

- $A + E$

- $AB$

- $BA$

- $BA^T$

$$A = \begin{bmatrix} 1 & 2 & -3 \\ 3 & 4 & -1 \end{bmatrix}, B = \begin{bmatrix} 2 & 1 \\ 1 & 2 \\ 2 & -1 \end{bmatrix}, C = \begin{bmatrix} 2 \\ 1 \end{bmatrix}, D = \begin{bmatrix} -5 \\ -2 \end{bmatrix},$$

$$E = \begin{bmatrix} 3 & 2 \\ 7 & 5 \end{bmatrix}, F = \begin{bmatrix} 5 & -2 \\ -7 & 3 \end{bmatrix}$$

- $C^T D$

- $CD^T$

- $EF$

- $FE$

- $(FE)C$

- Solve the following equation for the unknown  $2 \times 1$  matrix  $X$ . (Hint: try pre-multiplying both sides by  $E$ .)

$$FX = C$$