Solutions for practice problems in 5. 2 Operations with matrices

Given $A = \begin{bmatrix} 3 & 2 \\ -1 & 5 \end{bmatrix}$ $B = \begin{bmatrix} -2 & 0 \\ 3 & 4 \end{bmatrix}$ $C = \begin{bmatrix} 1 & 0 \\ -2 & 4 \\ -1 & 3 \end{bmatrix}$

$D = \begin{bmatrix} 0 & -2 & 1 \\ 3 & 0 & 4 \end{bmatrix}$

Compute each of the following. Some are not possible. So state.

a. 2A-3B $= 2\begin{bmatrix} 3 & 2 \\ -1 & 5 \end{bmatrix} - 3\begin{bmatrix} -2 & 0 \\ 3 & 4 \end{bmatrix} = \begin{bmatrix} 6 & 4 \\ -2 & 10 \end{bmatrix} - \begin{bmatrix} -6 & 0 \\ 9 & 12 \end{bmatrix} =$

$= \begin{bmatrix} 6-(-6) & 4-0 \\ -2-9 & 10-12 \end{bmatrix} = \begin{bmatrix} 12 & 4 \\ -11 & -2 \end{bmatrix}$

b. C + D Not possible, C is 3x2 and D is 2x3, and we can only add matrices of same size

c. AC Not possible A is 2x2, and C is 3x2

should be the same, and they're not.

d. C^2 Not possible

3x2 · 3x2

not the same ∴

e. $BD=\begin{bmatrix}-2 & 0\\ 3 & 4\end{bmatrix}\begin{bmatrix}0 & -2 & 1\\ 3 & 0 & 4\end{bmatrix}=\begin{bmatrix}0 & 4 & -2\\ 12 & -6 & 19\end{bmatrix}$

$2\times2 \cdot 2\times3$: answer will be 2×3

f. $2D=2\begin{bmatrix}0 & -2 & 1\\ 3 & 0 & 4\end{bmatrix}=\begin{bmatrix}0 & -4 & 2\\ 6 & 0 & 8\end{bmatrix}$

g. $B^2+2A=\begin{bmatrix}-2 & 0\\ 3 & 4\end{bmatrix}^2+2\begin{bmatrix}3 & 2\\ -1 & 5\end{bmatrix}=\begin{bmatrix}-2 & 0\\ 3 & 4\end{bmatrix}\begin{bmatrix}-2 & 0\\ 3 & 4\end{bmatrix}+2\begin{bmatrix}3 & 2\\ -1 & 5\end{bmatrix}$

$=\begin{bmatrix}4 & 0\\ 6 & 16\end{bmatrix}+\begin{bmatrix}6 & 4\\ -2 & 10\end{bmatrix}=\begin{bmatrix}10 & 4\\ 4 & 26\end{bmatrix}$