Homework 5 MATH 304 Section 3

Assigned: Monday, September 15.
Potentially Collected: Monday, September 22.

$$A = \begin{bmatrix} 7 & 0 & -1 \\ -1 & 5 & 2 \end{bmatrix} \qquad B = \begin{bmatrix} -1 & 4 & 1 \\ 5 & -3 & 0 \end{bmatrix}$$

$$C = \begin{bmatrix} 1 & 4 \\ -4 & 0 \end{bmatrix} \qquad D = \begin{bmatrix} 1 & 0 \\ -2 & 1 \end{bmatrix} \qquad E = \begin{bmatrix} 7 \\ -3 \end{bmatrix}$$

	Size
A	2×3
B	2×3
C	2×2
D	2×2
E	2×1

1. Calculate the matrices $-2A$ and $\frac{1}{2}E$.
2. Which pair of matrices can be summed? Add them.
3. Which matrices can be multiplied? Multiply them.
(*Remember non-commutativity of matrix multiplication!*)

(1) $-2A = \begin{bmatrix} -14 & 0 & 2 \\ 2 & -10 & -4 \end{bmatrix}$, $\frac{1}{2}E = \begin{bmatrix} 7/2 \\ -3/2 \end{bmatrix}$

(2) $A+B = B+A = \begin{bmatrix} 6 & 4 & 0 \\ 4 & 2 & 2 \end{bmatrix}$, $C+D = D+C = \begin{bmatrix} 2 & 4 \\ -6 & 1 \end{bmatrix}$

(3) $(2\times3)(3\times?)$ we have nothing with 3 rows or with 1 row, $(2\times2)(2\times3)$, $(2\times1)(1\times?)$

$(2\times2)(2\times2)$
$(2\times2)(2\times1)$

Possible combos

CA	DA
CB	DB
CC	DC
CD	DD
CE	DE

$$CA = \begin{bmatrix} 1 & 4 \\ -4 & 0 \end{bmatrix} A = \begin{bmatrix} 1[7\ 0\ -1] + 4[-1\ 5\ 2] \\ -4[7\ 0\ -1] + 0[-1\ 5\ 2] \end{bmatrix} = \begin{bmatrix} 3 & 20 & 7 \\ -28 & 0 & -4 \end{bmatrix}$$

$$CB = \begin{bmatrix} 1 & 4 \\ -4 & 0 \end{bmatrix} B = \begin{bmatrix} 1[-1\ 4\ 1] + 4[5\ -3\ 0] \\ -4[-1\ 4\ 1] + 0[5\ -3\ 0] \end{bmatrix} = \begin{bmatrix} 19 & -8 & 1 \\ 4 & 16 & -4 \end{bmatrix}$$

$$CC = \begin{bmatrix} 1 & 4 \\ -4 & 0 \end{bmatrix} C = \begin{bmatrix} 1[1\ 4] + 4[-4\ 0] \\ -4[1\ 4] + 0[-4\ 0] \end{bmatrix} = \begin{bmatrix} -15 & 4 \\ -4 & -16 \end{bmatrix}$$

$$CE = \begin{bmatrix} 1 & 4 \\ -4 & 0 \end{bmatrix} E = \begin{bmatrix} 1[7] + 4[-3] \\ -4[7] + 0[-3] \end{bmatrix} = \begin{bmatrix} 5 \\ -28 \end{bmatrix}$$