Problem 0 General Information

(a) Nathan Tanaboriboon

(b) 6681224

(c) Section 2

(d) Only me

(e) None

Optional : Nickname : Pin

Source? (trust me) : For this problem, I only use your note, with nothing else.

Problem 1 (written in pen, since it would be easier to read, although I still prefer pencil, old school)

I think learning different rules (not sure about their names) of matrix multiplication, bracket-distribution (A·(B+C), A(B·C)), matrix addition and how are they different from similar rules of algebraic multiplication, addition, subtraction is interesting, to see the difference between the two world, world of matrix, and the algebraic world. It helps me dives deeper into the world of matrix, its mechanic, how can one manipulate it, for easier calculation, gives me more insight into what matrix is, as the heart of Linear Algebra.

Problem 2

$A=\begin{bmatrix}3 & 8\\ 2 & 5\end{bmatrix}$ $B=\begin{bmatrix}\frac{9}{2} & 4\\ 1 & -1\end{bmatrix}$ $C=\begin{bmatrix}-1 & 1\\ 0 & -3\end{bmatrix}$ $X=A^{-2}+8\cdot B^{-1}-C^4$

$A^{-1}=\frac{1}{15-16}\begin{bmatrix}-5 & -8\\ -2 & -3\end{bmatrix}=\begin{bmatrix}-5 & 8\\ 2 & -3\end{bmatrix}$ $B^{-1}=\frac{1}{\frac{9}{2}-4}\begin{bmatrix}-1 & -4\\ -1 & -\frac{9}{2}\end{bmatrix}=-2\begin{bmatrix}-1 & -4\\ -1 & -\frac{9}{2}\end{bmatrix}$

$=\begin{bmatrix}2 & 8\\ 2 & 9\end{bmatrix}$

$C^2=\begin{bmatrix}-1 & 1\\ 0 & -3\end{bmatrix}\begin{bmatrix}-1 & 1\\ 0 & -3\end{bmatrix}=\begin{bmatrix}1 & -1-3\\ 0 & 9\end{bmatrix}=\begin{bmatrix}1 & -4\\ 0 & 9\end{bmatrix}$

$C^4=\begin{bmatrix}1 & -4\\ 0 & 9\end{bmatrix}\begin{bmatrix}1 & -4\\ 0 & 9\end{bmatrix}=\begin{bmatrix}1 & -4-36\\ 0 & 81\end{bmatrix}=\begin{bmatrix}1 & -40\\ 0 & 81\end{bmatrix}$

$A^{-2}=\begin{bmatrix}-5 & 8\\ 2 & -3\end{bmatrix}\begin{bmatrix}-5 & 8\\ 2 & -3\end{bmatrix}=\begin{bmatrix}25+16 & -40-24\\ -10-6 & 16+9\end{bmatrix}=\begin{bmatrix}41 & -64\\ -16 & 25\end{bmatrix}$

$8B^{-1}=8\begin{bmatrix}2 & 8\\ 2 & 9\end{bmatrix}=\begin{bmatrix}16 & 64\\ 16 & 56\end{bmatrix}$

$X=A^{-2}+8B^{-1}-C^4$

$=\begin{bmatrix}41 & -64\\ -16 & 25\end{bmatrix}+\begin{bmatrix}16 & 64\\ 16 & 56\end{bmatrix}+\begin{bmatrix}-1 & 40\\ 0 & -81\end{bmatrix}$

$=\begin{bmatrix}56 & 40\\ 0 & 0\end{bmatrix}$

Problem 3

$A\cdot B=B\cdot A$ when A and B are matrices, can be multiplied, and commute

commute $MN=NM$

$MN=\begin{bmatrix}1 & 0 & x\\ 0 & 1 & 0\\ -1 & 0 & 4\end{bmatrix}\begin{bmatrix}1 & 8 & 0\\ -1 & 1 & 0\\ 0 & 2 & 1\end{bmatrix}=\begin{bmatrix}1 & 8+8x & x\\ -1 & 1 & 0\\ -1 & -8+8y & 4\end{bmatrix}$

$NM=\begin{bmatrix}1 & 8 & 0\\ -1 & 1 & 0\\ 0 & 2 & 1\end{bmatrix}\begin{bmatrix}1 & 0 & x\\ 0 & 1 & 0\\ -1 & 0 & 4\end{bmatrix}=\begin{bmatrix}1 & 8 & x\\ -1 & 1 & -x\\ -1 & 2 & 4\end{bmatrix}$

$8+8x=8$ $8y=8+2=10$

$-8+2y=2$ $y=5$

$x=x$

$0=-x$

$4=4$

$x=0$

$y=5$

substitute back

$\begin{bmatrix}1 & 8 & 0\\ -1 & 1 & 0\\ -1 & 2 & 5\end{bmatrix}=MN$ $NM=\begin{bmatrix}1 & 8 & 0\\ -1 & 1 & 0\\ -1 & 2 & 5\end{bmatrix}$ ✓

$\therefore x=0,\ y=5$ $(0,5)$