King Fahd University of Petroleum and Minerals
Prep-Year Math Program
Math 002 - Term 151
Recitation (9.7)

Question 1:

Let $A=\begin{bmatrix}-1 & 2 & 2\\ 1 & 0 & -2\end{bmatrix}$, $B=\begin{bmatrix}3 & -1 & 2\\ 1 & 0 & 5\\ 3 & -3 & -5\end{bmatrix}$, and $C=\begin{bmatrix}3 & -6 & -3\\ 7 & -14 & -11\\ -1 & 1 & 1\end{bmatrix}$. Perform each possible operation. If an operation is not possible, so state:

a. $-2A$
b. $A+B$
c. CA
d. B^2-2C

Answer: **(a):** $-2A=\begin{bmatrix}2 & -4 & -4\\ -2 & 0 & 4\end{bmatrix}$

(b): $A+B$ is **not** possible because the dimension of A 2×3 $\neq$ dimension of B 3×3.

(c): $C_{3\times 3}A_{2\times 3}$ is **not** possible (It is not conformable for multiplication) because the number of column of C is not equal to the number of row of A.

(d): $B^2-2C=\begin{bmatrix}8 & 3 & -3\\ 4 & 12 & -1\\ -7 & 10 & 14\end{bmatrix}$

Question 2: If $A=\begin{bmatrix}-1 & 2 & -3\\ 6 & -1 & 2\end{bmatrix}$, $B=\begin{bmatrix}0 & -1 & 4\\ -2 & 6 & -3\end{bmatrix}$, then find the matrix X for which $4X+B=X-2A$.

Answer: $X=\begin{bmatrix}\frac{2}{3} & -1 & \frac{2}{3}\\ -\frac{10}{3} & -\frac{4}{3} & -\frac{1}{3}\end{bmatrix}$

Question 3: If A, B and C are $n\times n$ matrices and I_n is the identity matrix of order n, then which of the following statements is TRUE?

A) $(A+I_n)(A-I_n)=A^2-I_n^2$ (True) **because** $(A+I_n)(A-I_n)=A^2-A+A-I_n^2=A^2-I_n^2$

B) $(A-B)^2=A^2-2AB+B^2$ (False)

C) $A^2C=ACA$ (False)

D) $(A+I_n)^2=A^2+I_n$ (False)

E) $(A+B)(A^2-AB+B^2)=A^3+B^3$ (False)

Question 4: If $A=\begin{bmatrix}1 & -2 & 0\\ 3 & 0 & -1\\ 1 & 1 & 4\end{bmatrix}$, then the element in the third row and second column of the matrix A^3+3A is:

A) 2 B) -2 C) -1 D) 7 E) 5