

202010819 조정현 3주차 과제

[연습문제 2.1 part 3]

#2) (1) $\begin{bmatrix} 4 & -2 & 5 \\ -3 & 6 & 2 \end{bmatrix}$ (2) $\begin{bmatrix} -7 & -4 & 0 \\ 29 & 7 & -26 \end{bmatrix}$

$$(1) A+B = \begin{bmatrix} 1+3 & -2+0 & 3+2 \\ 4-7 & 5+1 & -6+8 \end{bmatrix}$$

$$= \begin{bmatrix} 4 & -2 & 5 \\ -3 & 6 & 2 \end{bmatrix}$$

$$(2) 2A-3B = \begin{bmatrix} 2 & -4 & 6 \\ 8 & 10 & -12 \end{bmatrix} - \begin{bmatrix} 9 & 0 & 6 \\ -21 & 3 & 24 \end{bmatrix}$$

$$= \begin{bmatrix} -7 & -4 & 0 \\ 29 & 7 & -26 \end{bmatrix}$$

#3) $x=2$, $x=3$

$$x^2 = 5x - 6$$

$$x^2 - 5x + 6 = 0$$

$$(x-2)(x-3) = 0$$

$$\therefore x=2 \text{ 혹은 } x=3$$

#7) 정의되는 행렬: (2), 4x2인 행렬

중간의 숫자가 일치해야 행렬의 곱이 정의될 수 있다.

따라서 (2) 만 정의될 수 있다.

(2)의 AC 계산 결과 4x2인 행렬이고 AC와 D 모두 4x2인 행렬이므로 계산 결과
는 4x2인 행렬이다.

#10)

$$(1) AB = \begin{bmatrix} 1 \times 5 + 2 \times 0 & 6 \times 1 + 2 \times (-2) \\ 3 \times 5 + 4 \times 0 & 3 \times 6 + 4 \times (-2) \end{bmatrix}$$

$$= \begin{bmatrix} 5 & 2 \\ 15 & 10 \end{bmatrix}$$

$$(2) BA = \begin{bmatrix} 5 & 6 \\ 0 & -2 \end{bmatrix} \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$$

$$= \begin{bmatrix} 5 \times 1 + 6 \times 3 & 5 \times 2 + 6 \times 4 \\ 0 \times 1 + (-2) \times 3 & 0 \times 2 + (-2) \times 4 \end{bmatrix}$$

$$= \begin{bmatrix} 23 & 24 \\ -6 & -8 \end{bmatrix}$$

이므로 직접 계산하면 결과
 $AB \neq BA$ 이다.

#11) (1) $\begin{bmatrix} -1 & -2 \\ -5 & -2 \end{bmatrix}$ (2) $\begin{bmatrix} 1 & 2 & 0 \\ 3 & 4 & -2 \end{bmatrix}$

$$(1) AB = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \begin{bmatrix} -3 & 2 \\ 1 & -2 \end{bmatrix}$$

$$= \begin{bmatrix} 1 \times (-3) + 2 \times 1 & 1 \times 2 + 2 \times (-2) \\ 3 \times (-3) + 4 \times 1 & 3 \times 2 + 4 \times (-2) \end{bmatrix} = \begin{bmatrix} -1 & -2 \\ -5 & -2 \end{bmatrix}$$

$$(2) AC = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \begin{bmatrix} 1 & 0 & -2 \\ 0 & 1 & 1 \end{bmatrix}$$

$$= \begin{bmatrix} 1 \times 1 + 2 \times 0 & 1 \times 0 + 2 \times 1 & 1 \times (-2) + 2 \times 1 \\ 3 \times 1 + 4 \times 0 & 3 \times 0 + 4 \times 1 & 3 \times (-2) + 4 \times 1 \end{bmatrix} = \begin{bmatrix} 1 & 2 & 0 \\ 3 & 4 & -2 \end{bmatrix}$$

#12) (1) $\begin{bmatrix} 5 & 14 \\ 9 & 32 \end{bmatrix}$

$$A(B+C) = AB + AC$$

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

$$= \begin{bmatrix} 1 \times 2 + 2 \times 1 & 1 \times 3 + 2 \times 2 \\ 3 \times 2 + 4 \times 1 & 3 \times 3 + 4 \times 2 \end{bmatrix} + \begin{bmatrix} 1 \times (-3) + 2 \times 2 & 1 \times 1 + 2 \times 3 \\ 3 \times (-3) + 4 \times 2 & 3 \times 1 + 4 \times 3 \end{bmatrix}$$

$$= \begin{bmatrix} 4 & 7 \\ 10 & 17 \end{bmatrix} + \begin{bmatrix} 1 & 7 \\ -1 & 5 \end{bmatrix}$$

$$= \begin{bmatrix} 5 & 14 \\ 9 & 32 \end{bmatrix}$$

#15) (3) $\begin{bmatrix} 5 & 7 & -15 \\ -12 & 0 & 20 \\ 17 & 7 & -35 \end{bmatrix}$

$$AB = \begin{bmatrix} 1 \times 2 + 2 \times 0 + 3 \times 1 & 1 \times (-5) + 2 \times 3 + 3 \times 2 & 1 \times 1 + 2 \times (-4) + 3 \times (-8) \\ (-4) \times 2 + (-8) \times 0 + (-4) \times 1 & -4 \times (-5) + 3 \times 2 & -4 \times (1-2-4) \\ 5 \times 2 + 6 \times 0 + 7 \times 1 & -25 + 18 + 14 & 5 - 12 - 28 \end{bmatrix}$$

$$= \begin{bmatrix} 5 & 7 & -15 \\ -12 & 0 & 20 \\ 17 & 7 & -35 \end{bmatrix}$$

#16) (2) $\begin{bmatrix} -\frac{1}{5} & -\frac{1}{5} & -\frac{2}{5} \\ \frac{6}{5} & \frac{6}{5} & -\frac{1}{5} \\ -\frac{1}{5} & -\frac{1}{5} & -\frac{6}{5} \end{bmatrix}$

$$B-A = 5X = \begin{bmatrix} -1 & -1 & -3 \\ 6 & 6 & -1 \\ -1 & -1 & -2 \end{bmatrix}$$

$$X = \begin{bmatrix} -\frac{1}{5} & -\frac{1}{5} & -\frac{2}{5} \\ \frac{6}{5} & \frac{6}{5} & -\frac{1}{5} \\ -\frac{1}{5} & -\frac{1}{5} & -\frac{6}{5} \end{bmatrix}$$