

CHAPTER 10: MATRIX MULTIPLICATION PRACTICE

1. $A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 1 & -1 & 0 \\ 0 & 2 & 1 & -1 \\ 2 & -1 & -1 & 2 \end{bmatrix}$, find

(a) AB

(b) BA

2. For $A = \begin{bmatrix} 2 & 5 \\ \pi & \sqrt{2} \end{bmatrix}$ $\begin{bmatrix} 1 & -1 \\ 3 & 2 \end{bmatrix}$, find

(a) AB **by first writing out the calculation consistently in detail** and then completing the calculation. (See the process started for you...)

$$AB = \begin{bmatrix} 2 & 5 \\ \pi & \sqrt{2} \end{bmatrix} \begin{bmatrix} 1 & -1 \\ 3 & 2 \end{bmatrix} = \begin{bmatrix} 2 \cdot 1 + 5 \cdot 3 & & & \\ & & & \\ & & & \\ & & & \end{bmatrix} = \begin{bmatrix} 17 & & & \\ & & & \\ & & & \\ & & & \end{bmatrix}$$

(b) BA (no extra restrictions)

$$A = \begin{bmatrix} 2 & 5 \\ \pi & \sqrt{2} \end{bmatrix}, B = \begin{bmatrix} 1 & -1 \\ 3 & 2 \end{bmatrix}$$

(c) $(AB)^T$ (Use part (a)....)

(d) $B^T A^T$

(e) A^2

3. Find each product below.

$$(a) \begin{bmatrix} 1 \\ -2 \\ 3 \end{bmatrix} [4 \ 7]$$

$$(b) \begin{bmatrix} \pi & 0 \\ 0 & \sqrt{2} \end{bmatrix} \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix}$$

$$(c) I_2 \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix}$$

4. Suppose A and B are both 2×2 matrices. Let $C = \begin{bmatrix} A & I \\ 0 & B \end{bmatrix}$ be matrix defined in terms of blocks where I is the identity matrix and 0 is the zero matrix.

(a) What are the dimensions of I ? Of 0 ? Of C ?

(b) Find C^2 .

5. Observations/Rules