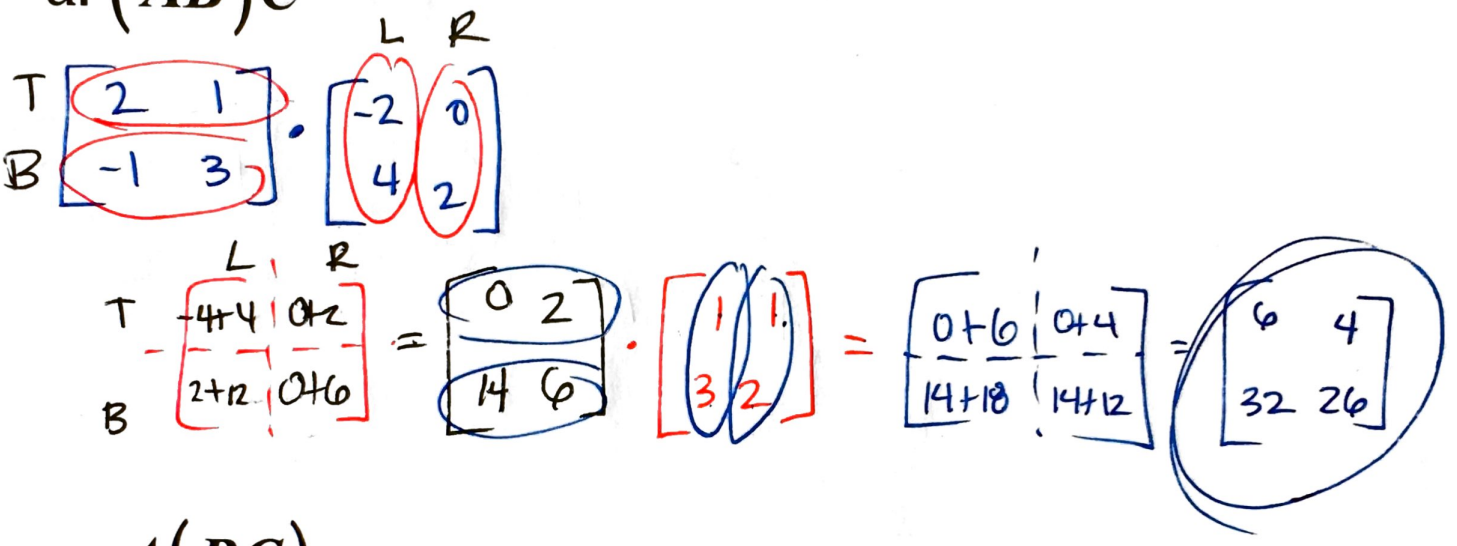
9-4 NOTES

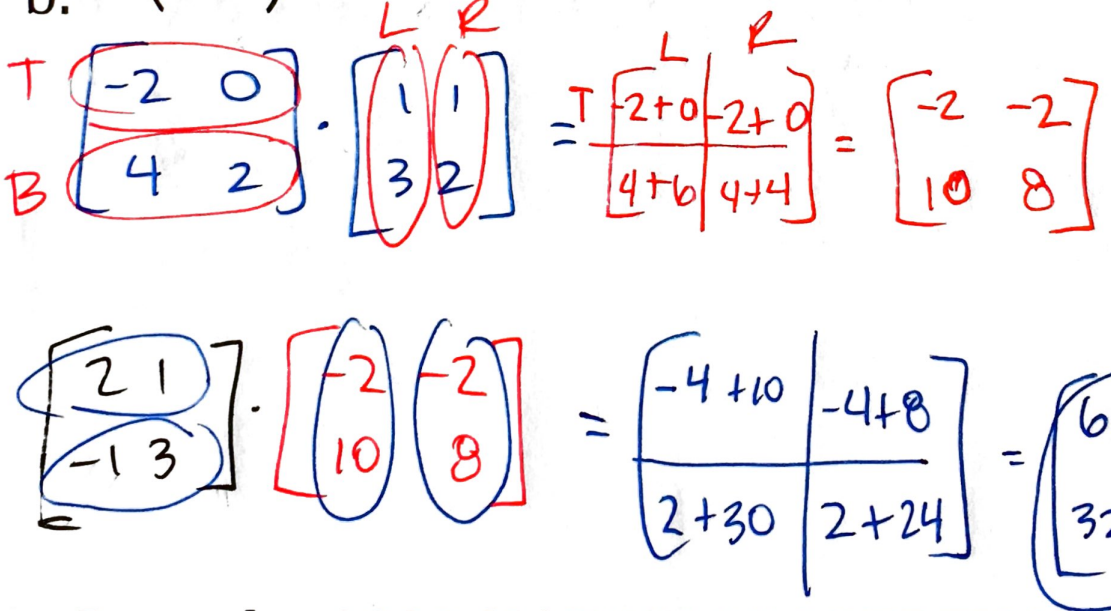
Sec 1 H | **Multiplying Matrices Day 2** | **Unit 9**

Ex. 1: If $A = \begin{bmatrix} 2 & 1 \\ -1 & 3 \end{bmatrix}$, $B = \begin{bmatrix} -2 & 0 \\ 4 & 2 \end{bmatrix}$, and $C = \begin{bmatrix} 1 & 1 \\ 3 & 2 \end{bmatrix}$, simplify each expression.

a. $(AB)C$



b. $A(BC)$



c. Does the ASSOCIATIVE PROPERTY hold true for matrices?

Yes!

Ex. 2: If $A = \begin{bmatrix} 2 & 1 \\ -1 & 3 \end{bmatrix}$, $B = \begin{bmatrix} -2 & 0 \\ 4 & 2 \end{bmatrix}$, and $C = \begin{bmatrix} 1 & 1 \\ 3 & 2 \end{bmatrix}$, simplify each expression.

a. $A(B+C)$

$\begin{bmatrix} 2 & 1 \\ -1 & 3 \end{bmatrix} \cdot \begin{bmatrix} -1 & 1 \\ 7 & 4 \end{bmatrix} = \begin{bmatrix} -2+7 & 2+4 \\ 1+21 & -1+12 \end{bmatrix} = \begin{bmatrix} 5 & 6 \\ 22 & 11 \end{bmatrix}$

b. $AB + AC$

$\begin{bmatrix} 2 & 1 \\ -1 & 3 \end{bmatrix} \cdot \begin{bmatrix} 1 & 1 \\ 3 & 2 \end{bmatrix} = \begin{bmatrix} 5 & 4 \\ 8 & 5 \end{bmatrix}$

$\begin{bmatrix} 0 & 2 \\ 14 & 6 \end{bmatrix} + \begin{bmatrix} 5 & 4 \\ 8 & 5 \end{bmatrix} = \begin{bmatrix} 5 & 6 \\ 22 & 11 \end{bmatrix}$

c. Does the DISTRIBUTIVE PROPERTY hold true for matrices? yes!

$[2] \cdot [1] = [2]$

Identity Matrix:

$\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

1's on the Diagonal
0's everywhere else

Ex. 3: If $A = \begin{bmatrix} 2 & 1 \\ -1 & 3 \end{bmatrix}$, simplify each expression.

$A \cdot B \neq B \cdot A$

a. $AI = A$

b. IA $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} \cdot \begin{bmatrix} 2 & 1 \\ -1 & 3 \end{bmatrix} = \begin{bmatrix} 2 & 1 \\ -1 & 3 \end{bmatrix}$

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Ex. 4: Simplify $\begin{bmatrix} -1 & 5 \\ 3 & 2 \end{bmatrix}^2$ $\neq$ $\begin{bmatrix} 1 & 25 \\ 9 & 4 \end{bmatrix}$

$\begin{bmatrix} -1 & 5 \\ 3 & 2 \end{bmatrix} \cdot \begin{bmatrix} -1 & 5 \\ 3 & 2 \end{bmatrix}$

$\begin{bmatrix} \quad \end{bmatrix} \cdot \quad =$

Ex. 5: Solve the each variable.

$$\begin{bmatrix} 2 & y & 4 \\ 5 & 3 & 8 \\ -1 & -2 & 5 \end{bmatrix} \begin{bmatrix} x \\ 2 \\ 1 \end{bmatrix} = \begin{bmatrix} -4 \\ y \\ 4 \end{bmatrix}$$

3x3 3x1

$2x + 2y + 4 = -4$

$5x + 6 + 8 = y$

$-x + -4 + 5 = 4$

$-x + 1 = 4$

$-1 \quad -1$

$-x = 3$

$-1 \quad -1$

$x = -3$

$5(-3) + 6 + 8 = y$

$-15 + 6 + 8$

$-9 + 8$

$-1 = y$