



10-2 Reteach to Build Understanding

Matrix Multiplication

The product of two matrices is a new matrix. The new matrix is the sums of the products of the corresponding row and column elements.

$$\begin{bmatrix} a & b \\ c & d \end{bmatrix} \begin{bmatrix} e & f \\ g & h \end{bmatrix} = \begin{bmatrix} ae + bg & af + bh \\ ce + dg & cf + dh \end{bmatrix}$$

1. Multiply the two matrices.

$$\begin{aligned} \begin{bmatrix} 4 & 1 \\ 2 & 6 \end{bmatrix} \begin{bmatrix} 2 & 3 \\ 1 & 4 \end{bmatrix} &= \begin{bmatrix} 4(2) + 1(1) & 4(3) + 1(4) \\ 2(2) + 6(1) & 2(3) + 6(4) \end{bmatrix} \\ &= \begin{bmatrix} 8 + 1 & 12 + 4 \\ 4 + 6 & 6 + 24 \end{bmatrix} \\ &= \begin{bmatrix} \underline{\quad} & \underline{\quad} \\ \underline{\quad} & \underline{\quad} \end{bmatrix} \end{aligned}$$

2. Juan multiplied the following matrices. Find and fix his error.

$$\begin{bmatrix} 4 & 1 \\ 2 & 1 \end{bmatrix} \begin{bmatrix} 1 & 3 \\ 2 & 4 \end{bmatrix} = \begin{bmatrix} 6 & 16 \\ 3 & 10 \end{bmatrix}$$

3. Multiply the two matrices and find the solution.

$$\begin{aligned} \text{a. } \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix} \begin{bmatrix} 0 & 3 \\ 4 & 4 \end{bmatrix} &= \begin{bmatrix} 1(0) + 1(4) & \underline{\hspace{2cm}} \\ \underline{\hspace{2cm}} & 1(3) + 1(4) \end{bmatrix} \\ &= \begin{bmatrix} \underline{\hspace{2cm}} & 3 + 4 \\ 0 + 4 & \underline{\hspace{2cm}} \end{bmatrix} \\ &= \begin{bmatrix} 4 & 7 \\ \underline{\quad} & \underline{\quad} \end{bmatrix} \end{aligned}$$

$$\begin{aligned} \text{b. } \begin{bmatrix} 4 & 3 \\ 9 & 7 \end{bmatrix} \begin{bmatrix} 6 & 3 \\ 9 & 4 \end{bmatrix} &= \begin{bmatrix} 4(6) + 3(9) & \underline{\hspace{2cm}} \\ 9(6) + 7(9) & \underline{\hspace{2cm}} \end{bmatrix} \\ &= \begin{bmatrix} \underline{\hspace{2cm}} & 24 \\ 117 & \underline{\quad} \end{bmatrix} \end{aligned}$$