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MTH317: Linear Algebra
Professor Sussan
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Homework#10

✓ 3.24 Predict the result of each product with a permutation matrix and then check by multiplying it out.

(a) $\begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}\begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$

Prediction: $\begin{bmatrix} 3 & 4 \\ 1 & 2 \end{bmatrix}$

Matrix Multiplication: $\underbrace{\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}}_{P_{1,2}} \cdot \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} = \begin{matrix} (0\cdot1)+(1\cdot3)=3 \\ (0\cdot2)+(1\cdot4)=4 \\ (1\cdot1)+(0\cdot3)=1 \\ (1\cdot2)+(0\cdot4)=2 \end{matrix} = \begin{bmatrix} 3 & 4 \\ 1 & 2 \end{bmatrix}$

Explanation: With the permutation matrix ($P_{1,2}$) it simply swaps the first and second rows. My prediction of $\begin{bmatrix} 3 & 4 \\ 1 & 2 \end{bmatrix}$ is correct.