

Name: _____

DATA 470 — Fall 2025

Quiz #3

Sep. 4, 2025

What is the result of the following operations? (Note: if any of the operations are impossible/undefined, simply write “*u cant do dat*” instead of giving a mathematical answer.)

1. $\begin{bmatrix} 9 & 9 & 9 \\ 3 & 3 & -1 \end{bmatrix} \cdot \begin{bmatrix} 1 & 2 & 4 \\ 3 & 0 & 4 \end{bmatrix}$

u cant do dat

2. $\begin{bmatrix} 2 & 1 & 0 & 1 & 0 \\ 3 & 0 & 0 & 0 & 1 \end{bmatrix} \cdot \begin{bmatrix} 1 & 2 \\ 3 & 0 \\ 1 & 2 \\ 3 & 0 \\ 1 & 2 \end{bmatrix}$

$$\begin{bmatrix} 8 & 4 \\ 4 & 8 \end{bmatrix}$$

3. $\begin{bmatrix} 1 & 2 \\ 3 & 0 \\ 1 & 2 \\ 3 & 0 \\ 1 & 2 \end{bmatrix} \cdot \begin{bmatrix} 2 & 1 & 0 & 1 & 0 \\ 3 & 0 & 0 & 0 & 1 \end{bmatrix}$

$$\begin{bmatrix} 8 & 1 & 0 & 1 & 2 \\ 6 & 3 & 0 & 3 & 0 \\ 8 & 1 & 0 & 1 & 2 \\ 6 & 3 & 0 & 3 & 0 \\ 8 & 1 & 0 & 1 & 2 \end{bmatrix}$$

4. $\begin{bmatrix} 3 & 1 \\ 3 & 2 \\ 3 & 3 \end{bmatrix} \cdot \begin{bmatrix} 2 & 0 & 0 \\ 1 & 2 & 1 \\ 5 & 2 & 1 \end{bmatrix}$

u cant do dat

$$5. \begin{bmatrix} 2 & 1 \\ 1 & 2 \end{bmatrix} \cdot \begin{bmatrix} 3 & 3 \\ 4 & 4 \end{bmatrix}$$

$$\begin{bmatrix} 10 & 10 \\ 11 & 11 \end{bmatrix}$$

$$6. \begin{bmatrix} 3 & 3 \\ 4 & 4 \end{bmatrix} \cdot \begin{bmatrix} 2 & 1 \\ 1 & 2 \end{bmatrix}$$

$$\begin{bmatrix} 9 & 9 \\ 12 & 12 \end{bmatrix}$$

Not the same as the previous result, as you might expect. (Matrix multiplication is not commutative like most operations you're familiar with.)

$$7. \begin{bmatrix} 2 & 1 & 2 \end{bmatrix} \cdot \begin{bmatrix} 3 & 3 & 2 \end{bmatrix}^T$$

$$13$$

$$8. \begin{bmatrix} 2 & 2 & 3 & \frac{1}{2} & 19 \\ \frac{3}{4} & 1 & 17 & \pi & e^3 \\ 9 & \frac{1}{9} & 9 & 99 & 999 \\ 2 & 2 & 3 & \frac{1}{2} & 19 \\ \frac{3}{4} & 1 & 17 & 3\pi & e^{2\pi} \\ 9 & \frac{1}{9} & 9 & 99 & 999 \end{bmatrix}^T \cdot \begin{bmatrix} 7 & 6 & 5 & 4 & 3 & 3 & 1 & 0 \\ 8 & 16 & 2 & 3 & .03 & -42 & 1 & 12 \\ 2 & \pi^2 & \pi^\pi & 1 & 1 & -2 & 7 & 3+4i \\ 2 & 2 & 3 & \frac{1}{2} & 19 & 27 & 2 & 2 \\ 7\frac{1}{8} & \frac{3}{4} & 1 & 17 & \pi & e^3 & 11 & -\frac{1}{2} \\ 6 & 9 & \frac{1}{9} & 9 & 99 & 999 & 9999 & \frac{1}{3} \end{bmatrix}^T$$

u cant do dat (thank God)

The left matrix is 6×5 , which means its transpose is 5×6 .

The right matrix is 6×8 , which means its transpose is 8×6 .

Since $6 \neq 8$, the operation is illegal. 😊