

Linear Algebra

TOTAL POINTS 5

1. Let two matrices be

$$A = \begin{bmatrix} 1 & -4 \\ -2 & 1 \end{bmatrix}, \quad B = \begin{bmatrix} 0 & 3 \\ 5 & 8 \end{bmatrix}$$

1 point

What is $A \cdot B$?

$\begin{bmatrix} 1 & -7 \\ -7 & -7 \end{bmatrix}$

$\begin{bmatrix} 1 & 7 \\ 7 & 9 \end{bmatrix}$

$\begin{bmatrix} 1 & -7 \\ -7 & 7 \end{bmatrix}$

$\begin{bmatrix} 1 & 1 \\ -3 & -7 \end{bmatrix}$

2. Let $x = \begin{bmatrix} 2 \\ 7 \\ 4 \\ 1 \end{bmatrix}$

1 point

What is $\frac{1}{2} * x$?

$[4 \ 14 \ 8 \ 2]$

$\begin{bmatrix} 4 \\ 14 \\ 8 \\ 2 \end{bmatrix}$

$\begin{bmatrix} 1 & \frac{1}{2} & 2 & \frac{1}{2} \end{bmatrix}$

$\begin{bmatrix} 1 \\ \frac{7}{2} \\ 2 \\ \frac{1}{2} \end{bmatrix}$

3. Let u be a 3-dimensional vector, where specifically

1 point

$$u = \begin{bmatrix} 5 \\ 1 \\ 9 \end{bmatrix}$$

What is u^T ?

$\begin{bmatrix} 5 \\ 1 \\ 9 \end{bmatrix}$

$[5 \ 1 \ 9]$

$[9 \ 1 \ 5]$

$\begin{bmatrix} 9 \\ 1 \\ 5 \end{bmatrix}$

4. Let u and v be 3-dimensional vectors, where specifically

1 point

$$u = \begin{bmatrix} -3 \\ 4 \\ 3 \end{bmatrix}$$

and

$$v = \begin{bmatrix} 3 \\ 1 \\ 5 \end{bmatrix}$$

What is $u^T v$?

(Hint: u^T is a

1x3 dimensional matrix, and v can also be seen as a 3x1

matrix. The answer you want can be obtained by taking

the matrix product of u^T and v .) Do not add brackets to your answer.

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5. Let A and B be 3x3 (square) matrices. Which of the following

1 point

must necessarily hold true? Check all that apply.

If $C = A * B$, then C is a 6x6 matrix.

$A * B * A = B * A * B$

$A + B = B + A$

If v is a 3 dimensional vector, then $A * B * v$ is a 3 dimensional vector.