Linear Algebra

Practice Quiz, 5 questions

5/5 points (100%)

Congratulations! You passed!

Next Item

1 / 1 points

1.
Let two matrices be

$$A = \begin{bmatrix} 4 & 3 \\ 6 & 9 \end{bmatrix}, \qquad B = \begin{bmatrix} -2 & 9 \\ -5 & 2 \end{bmatrix}$$

What is A - B?

- $\begin{bmatrix} 4 & 12 \\ 1 & 11 \end{bmatrix}$
- $\begin{bmatrix} 2 & -6 \\ 1 & 7 \end{bmatrix}$
- $\begin{bmatrix} 6 & -12 \\ 11 & 11 \end{bmatrix}$
- **(selected)** $\begin{bmatrix} 6 & -6 \\ 11 & 7 \end{bmatrix}$

Correct
To subtract B from A, carry out the subtraction element-wise.

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1 / 1 points

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

What is $3 * x$?

- $\begin{bmatrix} \frac{2}{3} & \frac{7}{3} & \frac{4}{3} & \frac{1}{3} \end{bmatrix}$
- **(selected)** $\begin{bmatrix} 6 \\ 21 \\ 12 \\ 3 \end{bmatrix}$

Correct
To multiply the vector x by 3, take each element of x and multiply that element by 3.

- $\begin{bmatrix} 6 & 21 & 12 & 3 \end{bmatrix}$
-

$\begin{bmatrix} \frac{2}{3} \\ \frac{1}{3} \\ \frac{4}{3} \\ \frac{1}{3} \end{bmatrix}$

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1 / 1 points

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

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

What is u^{T}?

- $[1 \quad 5 \quad 3]$
- $[3 \quad 5 \quad 1]$

Correct

- $\begin{bmatrix} 1 \\ 5 \\ 3 \end{bmatrix}$
- $\begin{bmatrix} 3 \\ 5 \\ 1 \end{bmatrix}$

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1 / 1 points

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

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

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

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

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Correct Response

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1 / 1 points

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

must necessarily hold true? Check all that apply.

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

Un-selected is correct

- [x] $A + B = B + A$

Correct
We add matrices element-wise. So, this must be true.

- [ ] $A * B * A = B * A * B$

Un-selected is correct

- [x] If v is a 3 dimensional vector, then $A * B * v$ is a 3 dimensional vector.

Correct
Since A and B are both 3x3 matrices, $A * B$ is 3x3 matrix. Thus, $(A * B) * v$ is a 3x3 matrix times a 3×1 matrix (since v is a 3 dimensional vector, and thus also a 3x1 matrix), and the result gives a 3x1 vector.