Linear Algebra

Practice Quiz, 5 questions

Congratulations! You passed!

Next Item

1 / 1 points

1.

Let two matrices be

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

What is A + B?

- $\begin{bmatrix} 1 & -1 \\ 7 & 9 \end{bmatrix}$
- $\begin{bmatrix} 1 & -7 \\ -7 & -7 \end{bmatrix}$
- $\begin{bmatrix} 1 & -1 \\ 3 & 9 \end{bmatrix}$

Correct

To add two matrices, add them element-wise.

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

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1 / 1 points

2.

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Let $x = \begin{bmatrix} 5 \\ 5 \\ 2 \\ 7 \end{bmatrix}$

What is $2 * x$?

- $\begin{bmatrix} \frac{5}{2} & \frac{5}{2} & 1 & \frac{7}{2} \end{bmatrix}$
- $\begin{bmatrix} 10 \\ 10 \\ 4 \\ 14 \end{bmatrix}$

Correct

To multiply the vector x by 2, take each element of x and multiply that element by 2.

- $\begin{bmatrix} 10 & 10 & 4 & 14 \end{bmatrix}$
- $\begin{bmatrix} \frac{5}{2} \\ \frac{5}{2} \\ 1 \\ \frac{7}{2} \end{bmatrix}$

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1 / 1 points

3.

Let u be a 3-dimensional vector, where specifically

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

What is u^{T}?

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

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Correct

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1 / 1 points

4.

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

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

and

$$v = \begin{bmatrix} 2 \\ 2 \\ 4 \end{bmatrix}$$

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.

4

Correct Response

1 / 1 points

5.

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Let A and B be 3x3 (square) matrices. Which of the following must necessarily hold true? Check all that apply.

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

Un-selected is correct

- [ ] 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.

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

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

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

Un-selected is correct