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Linear Algebra

Retake

Course Home

5/5 points earned (100%)

Excellent!

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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?

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

Correct

To add two matrices, add them element-wise.

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1 / 1 points

2.

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

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

- $\begin{bmatrix} 4 & 14 & 8 & 2 \end{bmatrix}$
- $\begin{bmatrix} 1 & \frac{7}{2} & 2 & \frac{1}{2} \end{bmatrix}$
- $\begin{bmatrix} 4 \\ 14 \\ 8 \\ 2 \end{bmatrix}$
- $\begin{bmatrix} 1 \\ \frac{7}{2} \\ 2 \\ \frac{1}{2} \end{bmatrix}$

Correct

To multiply the vector x by $\frac{1}{2}$, take each element of x and multiply that element by $\frac{1}{2}$.

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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}?

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

Correct

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

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1 / 1
points

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

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

and

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

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

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

-4

Correct Response

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

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

Correct

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

- [ ] If A is the 3x3 identity matrix, then $A * B = B * A$

Correct

Even though matrix multiplication is not commutative in general ($A * B \neq B * A$ for general matrices A, B), for the special case where $A = I$, we have $A * B = I * B = B$, and also $B * A = B * I = B$. So, $A * B = B * A$.

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

Un-selected is correct