# Linear Algebra

Practice Quiz, 5 questions

## 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?

- $\begin{bmatrix} 4 & 12 \\ 1 & 11 \end{bmatrix}$
- $\begin{bmatrix} 6 & -6 \\ 11 & 7 \end{bmatrix}$

**Correct**

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

- $\begin{bmatrix} 6 & -12 \\ 11 & 11 \end{bmatrix}$
- $\begin{bmatrix} 2 & -6 \\ 1 & 7 \end{bmatrix}$

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1 / 1 points

2.

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

What is $3 * x$?

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

**Correct**

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

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

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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 $u^{\mathrm{T}}$?

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

**Correct**

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

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4.

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

$$u = \begin{bmatrix} 3 \\ -5 \\ 4 \end{bmatrix}$$

and

$$v = \begin{bmatrix} 1 \\ 2 \\ 5 \end{bmatrix}$$

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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**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.

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- [x] 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, $A * B = B * A$.

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

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

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

**Un-selected is correct**

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

**Un-selected is correct**