Feedback — III. Linear Algebra

Help Center

You submitted this quiz on **Sat 24 Jan 2015 8:27 AM CET**. You got a score of **5.00** out of **5.00**.

Question 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?

Your Answer		Score	Explanation
$\begin{bmatrix} 1 & -1 \\ 7 & 9 \end{bmatrix}$			
$\begin{bmatrix} 1 & -7 \\ -7 & -7 \end{bmatrix}$			
$\begin{bmatrix} 1 & 7 \\ 7 & 9 \end{bmatrix}$			
$\begin{bmatrix} 1 & -1 \\ 3 & 9 \end{bmatrix}$	✔	1.00	To add two matrices, add them element-wise.
Total		1.00 / 1.00	

Question 2

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

What is $3 * x$?

Your Answer	Score	Explanation

$\begin{bmatrix} 6 \\ 21 \\ 12 \\ 3 \end{bmatrix}$	✔	1.00	To multiply the vector x by 3, take each element of x and multiply that element by 3.
$\begin{bmatrix} \frac{2}{3} \\ \frac{7}{3} \\ \frac{4}{3} \\ \frac{1}{3} \end{bmatrix}$			
$\begin{bmatrix} \frac{2}{3} & \frac{7}{3} & \frac{4}{3} & \frac{1}{3} \end{bmatrix}$			
$\begin{bmatrix} 6 & 21 & 12 & 3 \end{bmatrix}$			
Total		1.00 / 1.00	

Question 3

Let u be a 3-dimensional vector, where specifically

$$u = \begin{bmatrix} 8 \\ 1 \\ 4 \end{bmatrix}$$

What is u^{T}?

Your Answer		Score	Explanation
$\begin{bmatrix} 4 & 1 & 8 \end{bmatrix}$			
$\begin{bmatrix} 8 & 1 & 4 \end{bmatrix}$	✔	1.00	
$\begin{bmatrix} 8 \\ 1 \\ 4 \end{bmatrix}$			
$\begin{bmatrix} 4 \\ 1 \\ 8 \end{bmatrix}$			
Total		1.00 / 1.00	

Question 4

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

$$u = \begin{bmatrix} 4 \\ -4 \\ -3 \end{bmatrix} \text{ and } v = \begin{bmatrix} 4 \\ 2 \\ 4 \end{bmatrix}$$

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 the matrix product of u^T and v.)

You entered:

-4

Your Answer		Score	Explanation
-4	✔	1.00	
Total		1.00 / 1.00	

Question 5

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

Your Answer		Score	Explanation
☐ If $C = A * B$, then C is a 6x6 matrix.	✔	0.25	Since A and B are both 3x3 matrices, their product is 3x3. More generally, if A were an $m \times n$. matrix, and B a $n \times o$ matrix, then C would be $m \times o$. (In our example, $m = n = o = 3$.)
☑ If B is the 3x3 identity matrix, then $A * B = B * A$	✔	0.25	Even though matrix multiplication is not commutative in general ($A * B \neq B * A$ for general matrices A, B), for the special case where $B = I$, we have $A * B = A * I = A$, and also $B * A = I * A = A$. So, $A * B = B * A$.
☐ $A * B = B * A$	✔	0.25	We saw in the lecture that matrix multiplication is not commutative in general.
☑ If v is a 3	✔	0.25	Since A and B are both 3x3 matrices, $A * B$ is 3x3 matrix.

dimensional vector, then $A * B * v$ is a 3 dimensional vector.		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.
Total	1.00 / 1.00	