Feedback — III. Linear Algebra

You submitted this quiz on **Fri 3 May 2013 12:08 PM PDT -0700**. You got a score of **5.00** out of **5.00**.

Question 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?

Your Answer		Score	Explanation
○ $\begin{bmatrix} 4 & 12 \\ 1 & 11 \end{bmatrix}$			
● $\begin{bmatrix} 6 & -6 \\ 11 & 7 \end{bmatrix}$	✔	1.00	To subtract B from A, carry out the subtraction element-wise.
○ $\begin{bmatrix} 6 & -12 \\ 11 & 11 \end{bmatrix}$			
○ $\begin{bmatrix} 2 & -6 \\ 1 & 7 \end{bmatrix}$			
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
○ $\begin{bmatrix} \frac{2}{3} \\ \frac{7}{3} \\ \frac{4}{3} \\ \frac{1}{3} \end{bmatrix}$			
◉ $\begin{bmatrix} 6 \\ 21 \\ 12 \\ 3 \end{bmatrix}$	✔	1.00	To multiply the vector x by 3, take each element of x and multiply that element by 3.
○ $\begin{bmatrix} 6 & 21 & 12 & 3 \end{bmatrix}$			
○ $\begin{bmatrix} \frac{2}{3} & \frac{7}{3} & \frac{4}{3} & \frac{1}{3} \end{bmatrix}$			
Total		1.00 / 1.00	

Question 3

Let u be a 3-dimensional vector, where specifically

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

What is u^{T}?

Your Answer	Score	Explanation
○ $\begin{bmatrix} 5 \\ 1 \\ 9 \end{bmatrix}$		
● $\begin{bmatrix} 5 & 1 & 9 \end{bmatrix}$ ✔	1.00	
○ $\begin{bmatrix} 9 & 1 & 5 \end{bmatrix}$		
○ $\begin{bmatrix} 9 \\ 1 \\ 5 \end{bmatrix}$		
Total	1.00 / 1.00	

Question 4

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

$$u = \begin{bmatrix} 3 \\ -5 \\ 4 \end{bmatrix} \text{ and } v = \begin{bmatrix} 1 \\ 2 \\ 5 \end{bmatrix}$$

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.)

You entered:

13

Your Answer	Score	Explanation
13	✔ 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
☐ $A * B = B * A$	✔ 0.25	We saw in the lecture that matrix multiplication is not commutative in general.
☑ If v is a 3 dimensional vector, then $A * B * v$ is a 3 dimensional vector.	✔ 0.25	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.
☑ If $C = A * B$, then C is a 3x3 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 $C = A * B$, 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, $m = n = o = 3$.)
Total	1.00 / 1.00	