Feedback — III. Linear Algebra

You submitted this quiz on **Tue 18 Mar 2014 4:38 PM IST**. 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
⦿ $\begin{bmatrix} 6 & -6 \\ 11 & 7 \end{bmatrix}$	✔	1.00	To subtract B from A, carry out the subtraction element-wise.
◯ $\begin{bmatrix} 6 & -12 \\ 11 & 11 \end{bmatrix}$			
◯ $\begin{bmatrix} 2 & -6 \\ 1 & 7 \end{bmatrix}$			
◯ $\begin{bmatrix} 4 & 12 \\ 1 & 11 \end{bmatrix}$			
Total		1.00 / 1.00	

Question 2

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

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

Your Answer		Score	Explanation
○	$\begin{bmatrix} 1 & \frac{7}{2} & 2 & \frac{1}{2} \end{bmatrix}$		
○	$\begin{bmatrix} 4 \\ 14 \\ 8 \\ 2 \end{bmatrix}$		
◉	$\begin{bmatrix} 1 \\ \frac{7}{2} \\ 2 \\ \frac{1}{2} \end{bmatrix}$	✔ 1.00	To multiply the vector x by $\frac{1}{2}$, take each element of x and multiply that element by $\frac{1}{2}$.
○	$\begin{bmatrix} 4 & 14 & 8 & 2 \end{bmatrix}$		
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
◉ $\begin{bmatrix} 8 & 1 & 4 \end{bmatrix}$	✔ 1.00	
○ $\begin{bmatrix} 4 & 1 & 8 \end{bmatrix}$		
○ $\begin{bmatrix} 8 \\ 1 \\ 4 \end{bmatrix}$		

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

Total	1.00 / 1.00

Question 4

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

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

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.)

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
☐ $A * B = B * A$	✔ 0.25	We saw in the lecture that matrix multiplication is not commutative in general.
☑ 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,
$A * B = B * A$.

☑   ✔   0.25   This true by the associative property of matrix
$(A * B) * A = A * (B * A)$ multiplication. More generally,
                                                    $(A * B) * C = A * (B * C)$, and here we
                                                    have just set $C = A$.

☐ If $C = A * B$, then C is a   ✔   0.25   Since A and B are both 3x3 matrices, their
6x6 matrix.   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