

Feedback — III. Linear Algebra

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You submitted this quiz on **Wed 30 Oct 2013 12:21 PM PDT (UTC -0700)**. You got a score of **5.00** out of **5.00**.

Question 1

Let two matrices be

$$A = \begin{bmatrix} 1 & -4 \\ -2 & 1 \end{bmatrix}, \quad B = \begin{bmatrix} 0 & 3 \\ 5 & 8 \end{bmatrix}$$

What is $A - B$?

| Your Answer | Score | Explanation |
|--|-------------|-------------|
| <input type="radio"/> $\begin{bmatrix} 1 & 1 \\ -3 & -7 \end{bmatrix}$ | | |
| <input type="radio"/> $\begin{bmatrix} 1 & -7 \\ -7 & 7 \end{bmatrix}$ | | |
| <input checked="" type="radio"/> $\begin{bmatrix} 1 & -7 \\ -7 & -7 \end{bmatrix}$ | ✓ 1.00 | |
| <input type="radio"/> $\begin{bmatrix} 1 & 7 \\ 7 & 9 \end{bmatrix}$ | | |
| Total | 1.00 / 1.00 | |

Question 2

Let $x = \begin{bmatrix} 8 \\ 2 \\ 5 \\ 1 \end{bmatrix}$

What is $2 * x$?

Your Answer

Score

Explanation



$$\begin{bmatrix} 4 & 1 & \frac{5}{2} & \frac{1}{2} \end{bmatrix}$$



$$\begin{bmatrix} 16 & 4 & 10 & 2 \end{bmatrix}$$



$$\begin{bmatrix} 16 \\ 4 \\ 10 \\ 2 \end{bmatrix}$$



1.00

To multiply the vector x by 2, take each element of x and multiply that element by 2.



$$\begin{bmatrix} 4 \\ 1 \\ \frac{5}{2} \\ \frac{1}{2} \end{bmatrix}$$

Total

1.00 /

1.00

Question 3

Let u be a 3-dimensional vector, where specifically

$$u = \begin{bmatrix} 2 \\ 1 \\ 8 \end{bmatrix}$$

What is u^T ?

Your Answer

Score

Explanation



$$\begin{bmatrix} 8 \\ 1 \\ 2 \end{bmatrix}$$

☐ $\begin{bmatrix} 2 \\ 1 \\ 8 \end{bmatrix}$

☒ $\begin{bmatrix} 2 & 1 & 8 \end{bmatrix}$ ✓ 1.00

☐ $\begin{bmatrix} 8 & 1 & 2 \end{bmatrix}$

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 |
|---|--|--|
| <input checked="" type="checkbox"/> $(A * B) * A = A * (B * A)$ | <input checked="" type="checkbox"/> 0.25 | This true by the associative property of matrix multiplication. More generally, $(A * B) * C = A * (B * C)$, and here we have just set $C = A$. |
| <input type="checkbox"/> If $C = A * B$, then C is a 6x6 matrix. | <input checked="" type="checkbox"/> 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, $m = n = o = 3$.) |
| <input type="checkbox"/> $A * B * A = B * A * B$ | <input checked="" type="checkbox"/> 0.25 | This would not be true even if A and B were 1x1 matrices (i.e., scalars/real numbers). In general, $a^2b \neq ab^2$. |
| <input checked="" type="checkbox"/> $A + B = B + A$ | <input checked="" type="checkbox"/> 0.25 | We add matrices element-wise. So, this must be true. |
| Total | 1.00 / 1.00 | |