Try again once you are ready

Grade received 40% **To pass** 80% or higher

Try again

1. Let two matrices be 0 / 1 point

$$A = \begin{bmatrix} 4 & 3 \\ 6 & 9 \end{bmatrix}, \qquad B = \begin{bmatrix} -2 & 9 \\ -5 & 2 \end{bmatrix}$$

What is A - B?

- $\begin{bmatrix} 2 & -6 \\ 1 & 7 \end{bmatrix}$
- $\begin{bmatrix} 6 & -6 \\ 11 & 7 \end{bmatrix}$
- ◉ $\begin{bmatrix} 6 & -12 \\ 11 & 11 \end{bmatrix}$
- $\begin{bmatrix} 4 & 12 \\ 1 & 11 \end{bmatrix}$

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

2. 1 / 1 point

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

What is $3 * x$?

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

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

3. Let u be a 3-dimensional vector, where specifically 1 / 1 point

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

What is u^{T}?

- $\begin{bmatrix} 4 & 1 & 8 \end{bmatrix}$
- $\begin{bmatrix} 4 \\ 1 \\ 8 \end{bmatrix}$
- ◉ $\begin{bmatrix} 8 & 1 & 4 \end{bmatrix}$
- $\begin{bmatrix} 8 \\ 1 \\ 4 \end{bmatrix}$

Correct

4. Let u and v be 3-dimensional vectors, where specifically **0 / 1 point**

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

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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Incorrect

5. Let A and B be 3x3 (square) matrices. Which of the following **0 / 1 point**

must necessarily hold true? Check all that apply.

- ☐ If $C = A * B$, then C is a 3x3 matrix.
- ☑ If B 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 $B = I$, we have $A * B = A * I = A$, and also $B * A = I * A = A$. So, $A * B = B * A$.

- ☑ $A * B * A = B * A * B$

This should not be selected

This would not be true even if A and B were 1x1 matrices (i.e., scalars/real numbers). In general, $a^2 b \neq ab^2$.

- ☑ $A * B = B * A$

This should not be selected

We saw in the lecture that matrix multiplication is not commutative in general.