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1. Let two matrices be

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

What is $A - B$?

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

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2.

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

What is $2 * x$?

- ☐ $\begin{bmatrix} 4 & 1 & \frac{5}{2} & \frac{1}{2} \end{bmatrix}$
- ☐ $\begin{bmatrix} 16 & 4 & 10 & 2 \end{bmatrix}$
- ☒ $\begin{bmatrix} 16 \\ 4 \\ 10 \\ 2 \end{bmatrix}$
- ☐ $\begin{bmatrix} 4 \\ 1 \\ \frac{5}{2} \\ \frac{1}{2} \end{bmatrix}$

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

$$u = \begin{bmatrix} 3 \\ 5 \\ 1 \end{bmatrix}$$

What is u^T ?

- ☐ $\begin{bmatrix} 3 \\ 5 \\ 1 \end{bmatrix}$
- ☐ $\begin{bmatrix} 1 & 5 & 3 \end{bmatrix}$
- ☒ $\begin{bmatrix} 3 & 5 & 1 \end{bmatrix}$
- ☐ $\begin{bmatrix} 1 \\ 5 \\ 3 \end{bmatrix}$

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

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

and

$$v = \begin{bmatrix} 3 \\ 1 \\ 5 \end{bmatrix}$$

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

- ☒ If A is the 3x3 Identity matrix, then $A * B = B * A$
- ☒ $A + B = B + A$
- ☐ $A * B = B * A$
- ☐ $A * B * A = B * A * B$

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