# Linear Algebra

**TOTAL POINTS 5**

1. Let two matrices be 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?

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

2. 1 point

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

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

- ◉ $\begin{bmatrix} 1 \\ \frac{7}{2} \\ 2 \\ \frac{1}{2} \end{bmatrix}$
- ○ $[4 \quad 14 \quad 8 \quad 2]$
- ○ $\begin{bmatrix} 1 & \frac{7}{2} & 2 & \frac{1}{2} \end{bmatrix}$
- ○ $\begin{bmatrix} 4 \\ 14 \\ 8 \\ 2 \end{bmatrix}$

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

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

What is $u^{\mathrm{T}}$?

- (●) [3 5 1]
- ( ) [1 5 3]
- ( ) $\begin{bmatrix} 1 \\ 5 \\ 3 \end{bmatrix}$
- ( ) $\begin{bmatrix} 3 \\ 5 \\ 1 \end{bmatrix}$

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

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

and

$$v = \begin{bmatrix} 4 \\ 2 \\ 4 \end{bmatrix}$$

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 $v$.) 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. 1 point

- [x] If A is the 3x3 identity matrix, then $A * B = B * A$
- [x] $A + B = B + A$
- [ ] $A * B * A = B * A * B$
- [ ] $A * B = B * A$

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- [x] I, **Ayushi Saxena**, understand that submitting work that isn't my own may result in permanent

ayushisaxenamtr@gmail.com