

Linear Algebra

TOTAL POINTS 5

1. Let two matrices be

1 point

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

What is $A - B$?

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

2. Let $x =$

$$\begin{bmatrix} 5 \\ 5 \\ 2 \\ 7 \end{bmatrix}$$

1 point

What is $2 * x$?

- ☐ $\begin{bmatrix} 2 \\ 2 \\ 1 \\ 14 \end{bmatrix}$
- ☒ $\begin{bmatrix} 10 \\ 10 \\ 4 \\ 14 \end{bmatrix}$
- ☐ $\begin{bmatrix} 10 & 10 & 4 & 14 \end{bmatrix}$
- ☐ $\begin{bmatrix} \frac{5}{2} & \frac{5}{2} & 1 & \frac{7}{2} \end{bmatrix}$

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

1 point

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

What is u^T ?

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

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.

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

1 point

☐ $A * B = B * A$

☐ $A * B * A = B * A * B$

☒ If B is the 3x3 identity matrix, then $A * B = B * A$

☒ If $C = A * B$, then C is a 3x3 matrix.
