Math 2550-01 - Test 1 - Fall 2024

Name:____

<u>**Directions**</u>:

Show steps for full credit.
Also so I can give you partial credit if needed.

Score			
1		2	
3		4	
5		6	
Total			

1. [6 points] List 3 elements from the following set.

$$S = \{\ a\langle -1, 1, 2\rangle + b\langle 2, 2, 0\rangle \ |\ \ a, b \in \mathbb{R}\}$$

2. [9 points - 3 each] Let $\vec{a} = \langle 1, -1 \rangle$, $\vec{b} = \langle 2, 3 \rangle$,
$\vec{c} = \langle 2, 0, -1, 3, -1 \rangle$, and $\vec{d} = \langle 1, 2, -1, 2, 0 \rangle$.

(a) Compute $2\vec{a} - 3\vec{b}$

(b) Compute the norm/length of $\vec{d}$

(c) Compute $\vec{a} \cdot \vec{b}$ and $\vec{c} \cdot \vec{d}$

3. [12 points - 3 each] Let

$$A = \begin{pmatrix} 1 & 2 \\ 3 & 1 \end{pmatrix} \quad B = \begin{pmatrix} -1 & 1 \\ 3 & -4 \end{pmatrix} \quad C = \begin{pmatrix} 1 & -1 & 0 \\ 2 & -2 & 1 \end{pmatrix}$$

$$D = \begin{pmatrix} 3 \\ 1 \\ 0 \end{pmatrix} \quad E = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$$

Compute the following if possible. If not possible, explain why.
Show intermediate work so I can give you partial credit if needed.

(a) $-A + 2B$

(b) BE

(c) CD

(d) C^T

More space for problem 3...

4. [8 points] Solve the following system.

$$\begin{array}{rcrcrcl} 2x & + & y & + & 3z & = & 0 \\ x & + & 2y & & & = & 0 \\ & & y & + & z & = & 0 \end{array}$$

You must use the Gaussian elimination / row reduction method we used in class to get credit.

5. [6 points] Solve the following system.

$$\begin{array}{rcrcrcrcl} x & & & + & z & - & w & = & 1 \\ & & y & - & z & + & w & = & 0 \\ & & & & & & w & = & 2 \end{array}$$

6. [6 points] Let A and B be 2×2 matrices.

Prove that $(A+B)^T = A^T + B^T$