

Name: \_\_\_\_\_

Points: /25

1. Let  $u = (-1, 2, 2, 0)$  and  $v = (2, 0, -1, 1)$ . Is it true that

$$2u + v \in \text{span}\{(1, 0, 2, 1), (-1, 0, 1, 0), (0, 1, 0, 0)\}?$$

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2. Let the matrices  $A$ ,  $B$  and  $C$  be given as

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

Compute (if possible):

- $-A + 2B + C^T$ .
- $AB + C^T$ .
- $AC + \begin{pmatrix} -1 & 1 \\ 2 & 0 \end{pmatrix}$ .

Points: /5

3. Compute

$$\det \begin{pmatrix} 1 & 0 & 2 & 3 \\ -2 & 1 & 0 & 2 \\ 0 & -1 & -1 & -1 \\ 0 & 1 & 2 & 0 \end{pmatrix}.$$

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4. Let

$$C = \begin{pmatrix} -2 & 1 & 1 \\ 0 & 1 & 1 \\ 1 & 1 & 0 \end{pmatrix}.$$

Is  $C$  regular? If yes, compute  $C^{-1}$ .

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5. Decide about the definiteness of the matrix

$$\begin{pmatrix} -2 & 1 & 1 \\ 1 & -3 & 2 \\ 1 & 2 & -6 \end{pmatrix}.$$

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