

Math 427J. Spring 2026
Extra practice problems for Quiz 9.

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Find the adjugate of the following matrices.

1. $\begin{bmatrix} 1 & 4 & 3 \\ 2 & -1 & -5 \\ -1 & -2 & -2 \end{bmatrix}.$

2. $\begin{bmatrix} 1 & -a & b \\ 0 & 1 & -a \\ 0 & 0 & 1 \end{bmatrix}.$

3. $\begin{bmatrix} 1 & 0 & a & b \\ 0 & -2 & 0 & 3 \\ 0 & 0 & -1 & 2 \\ 0 & 0 & 0 & 1 \end{bmatrix}$

4. Consider the matrix

$$A = \begin{bmatrix} 1 & 1 & -1 \\ 6 & 2 & 6 \\ -2 & -1 & 0 \end{bmatrix}.$$

It is known that following set, under the usual sum and scalar product, is a vector space.

$$V = \{\mathbf{x} \in \mathbb{R}^3 : (A - 2I_3)^2\mathbf{x} = \mathbf{0}\}.$$

The set V is, in fact, the set of solutions of the homogenous equation $(A - 2I_3)^2\mathbf{x} = \mathbf{0}$.

Find a basis for V . What is $\dim(V)$?