Linear Algebra
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Final Exam
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1. Find the determinant of the matrix A.

$$\begin{matrix} 1 & -1 & 0 & 3 \\ 2 & -1 & 1 & 8 \\ 3 & 0 & 1 & 0 \\ 0 & 2 & 2 & 0 \end{matrix}$$

2. Use Gram-Schmidt process to find an orthonormal basis from the set

$$\{(2,0,0), (1,1,1), (0,1,0)\}.$$

3. Find the matrix of transition from the standard basis $\{(1,0), (0,1)\}$ to the new basis $\{(2,1), (5,3)\}$ and then use it to find the new coordinates of the vector $(4,3)$.

4. Find the eigenvalues and eigenvectors of the matrix A.

$$\begin{matrix} -1 & -2 \\ 3 & 4 \end{matrix}$$

5. Compute A^4 by diagonalizing the matrix A.

$$\begin{matrix} 1 & -1 & 0 \\ 0 & 2 & 3 \\ 0 & 0 & -1 \end{matrix}$$