WORKSHEET 11/6/23
MATH 2331, FALL 2023

(1) Use Laplace expansion across the fourth row to calculate the determinant of the matrix
$$A = \begin{bmatrix} 1 & 0 & 1 & 2 \\ 9 & 1 & 3 & 0 \\ 9 & 2 & 2 & 0 \\ 5 & 0 & 0 & 3 \end{bmatrix}.$$

(2) Let $A = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 2 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & -1 \end{bmatrix}$. Calculate A^5, $\det(A)$, and $\text{rank}(A)$. Find a basis for $\ker(A)$.

(3) Can you find an eigenvector of the identity matrix? What is the eigenvalue?