Exercises

Let $A = [a_1, a_2, a_3] = \begin{bmatrix} 1 & -1 & 0 \\ 0 & 2 & 0 \\ 0 & 1 & 1 \end{bmatrix}$ be a given matrix.

(1) Find the inverse of A, if it exists.
(2) Find determinant of A.
(3) Write the characteristic polynomial and compute all eigenvalues.
(4) Find an orthogonal basis for each eigenspace.
(5) Diagonalize A in terms of $A = PDP^{-1}$.
(6) Find A^{10}.
(7) Find a point y in $span\{a_2, a_3\}$ having the closest distance to a_1. What is the distance?