

HOMEWORK #14 (Chapter 8 Matrices)

In Problem 1, find the eigenvalues and eigenvectors of the given matrix.

1. $\begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ (Exercises 8.8 Problem 22)

The eigenvalues of A^{-1} are the reciprocals of a nonsingular matrix A . Furthermore, the eigenvectors for A and A^{-1} are the same. In problem 2, verify these facts for the given matrix.

2. $A = \begin{bmatrix} 1 & 2 & -1 \\ 1 & 0 & 1 \\ 4 & -4 & 5 \end{bmatrix}$ (Exercises 8.8 Problem 24)

A matrix A is singular if and only if $\lambda = 0$ is an eigenvalue. In Problem 3, verify that the given matrix A is singular. Find the characteristic equation for A and verify that $\lambda = 0$ is an eigenvalue.

3. $\begin{bmatrix} 6 & 0 \\ 3 & 0 \end{bmatrix}$ (Exercises 8.8 Problem 25)

In Problem 4, use the procedure illustrated in Example 6 to identify the given conic section. Graph.

4. $5x^2 - 2xy + 5y^2 = 24$ (Exercises 8.12 Problem 31)

In Problem 5, Find the Jordan form of matrix A .

5. $A = \begin{bmatrix} 0 & 9 & -4 \\ -1 & -2 & 2 \\ -2 & 0 & 2 \end{bmatrix}$

In Problem 6, Find the A^{10} of matrix A .

6. $A = \begin{bmatrix} -2 & 4 \\ -1 & 3 \end{bmatrix}$

In Problem 7~9, use the method of section to compute A^m . Use this result to compute the

indicated power of the matrix A.

7. $A = \begin{bmatrix} -1 & 2 \\ 0 & -3 \end{bmatrix}$; m=6. (Exercises 8.9 Problem 6)

8. $A = \begin{bmatrix} 1 & 1 & 1 \\ 0 & 1 & 2 \\ 0 & 1 & 0 \end{bmatrix}$; m=10. (Exercises 8.9 Problem 7)

9. $A = \begin{bmatrix} 2 & 2 & 0 \\ 4 & 0 & 0 \\ 1 & 2 & 1 \end{bmatrix}$; m=10. (Exercises 8.9 Problem 9)