

UH - Math 4378/6309 - Dr. Heier - Spring 2011

HW 2

Due 2/2, at the beginning of class.

1. (1 point) Section 5.1, Problem 21

2. (1 point) For the following matrix A , find the eigenvalues and eigenspaces. Determine if A is diagonalizable or not. If yes, give a matrix Q such that $Q^{-1}AQ$ is diagonal.

$$A = \begin{pmatrix} 1 & 0 \\ 1 & 1 \end{pmatrix}.$$

3. (1 point) For the following matrix A , find the eigenvalues and eigenspaces. Determine if A is diagonalizable or not. If yes, give a matrix Q such that $Q^{-1}AQ$ is diagonal.

$$A = \begin{pmatrix} 1 & 2 \\ 2 & 1 \end{pmatrix}.$$

4. (1 point) For the following matrix A , find the eigenvalues and eigenspaces. Determine if A is diagonalizable or not. If yes, give a matrix Q such that $Q^{-1}AQ$ is diagonal.

$$A = \begin{pmatrix} 0 & 4 & 4 \\ 4 & 0 & 4 \\ 4 & 4 & 0 \end{pmatrix}.$$

5. (1 point) For the following matrix A , find the eigenvalues and eigenspaces. Determine if A is diagonalizable or not. If yes, give a matrix Q such that $Q^{-1}AQ$ is diagonal.

$$A = \begin{pmatrix} 1 & 2 & 3 & 4 \\ 2 & 1 & 4 & 3 \\ 3 & 4 & 1 & 2 \\ 4 & 3 & 2 & 1 \end{pmatrix}.$$

6. (1 point) For the following matrix A , find the eigenvalues and eigenspaces. Determine if A is diagonalizable or not. If yes, give a matrix Q such that $Q^{-1}AQ$ is diagonal.

$$A = \begin{pmatrix} 2 & 1 & 0 & 0 \\ 0 & 2 & 1 & 0 \\ 0 & 0 & 3 & 0 \\ 0 & 1 & -1 & 3 \end{pmatrix}.$$

7. (1 point) For the following matrix A , find the eigenvalues and eigenspaces. Determine if A is diagonalizable or not. If yes, give a matrix Q such that $Q^{-1}AQ$ is diagonal.

$$A = \begin{pmatrix} 4 & 1 & 0 & 0 \\ 1 & 4 & 0 & 0 \\ 0 & 0 & -1 & 1 \\ 0 & 0 & 0 & -1 \end{pmatrix}.$$

8. (1 point) For

$$A = \begin{pmatrix} 8 & 2 \\ 6 & 4 \end{pmatrix},$$

find an expression for A^n , where n is an arbitrary positive integer.

9. (1 point) Section 5.2, Problem 10

10. (1 point) Section 5.2, Problem 11