

Homework # 11

Section # 5.1

- 1. Find the eigenvalues of the following matrix:

$$A = \begin{bmatrix} 5 & 0 & 0 \\ 1 & 2 & 0 \\ -2 & 0 & 3 \end{bmatrix}.$$

- 2. Let λ be an eigenvalue of an invertible matrix A . Show that λ^{-1} is an eigenvalue of A^{-1} .

Section # 5.2

- Find characteristic polynomials and eigenvalues of the following matrices:

3.

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

4.

$$A = \begin{bmatrix} 4 & 0 & 1 \\ -1 & 0 & 4 \\ 0 & 2 & 3 \end{bmatrix}.$$

- 5. Show that if $A = QR$ with Q invertible, then A is similar to $A_1 = QR$.

Section # 5.3

- 6. Compute A^{10}

$$A = \begin{bmatrix} 5 & 7 \\ 2 & 3 \end{bmatrix}.$$

- Diagonalize, if possible, following matrices:

7.

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

8.

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

- 9. Construct a nonzero 2×2 matrix that is invertible but non-diagonalizable.