Worksheet 13

Sections 306 and 310
MATH 54

October 3, 2018

Exercise 1. Mark each statement True or False. Justify each answer.

(a) If A, B are row equivalent, then they have the same eigenvalues.

(b) If A has n eigenvectors, A is diagonalizable.

(c) If A has n distinct eigenvalues, it is diagonalizable.

Exercise 2. Find the characteristic polynomials and eigenvalues of the following matrices:
$$\begin{bmatrix} 7 & -2 \\ 2 & 3 \end{bmatrix} \qquad \begin{bmatrix} 5 & 3 \\ -4 & 4 \end{bmatrix}$$

Exercise 3. (a) As a group, discuss why it is useful to be able to diagonalize a matrix!

(b) If possible, diagonalize the following matrix:
$$\begin{bmatrix} 3 & -1 \\ 1 & 5 \end{bmatrix}$$

Exercise 4. The eigenvalues of A are 2 and 8. Use this information to diagonalize A:
$$A = \begin{bmatrix} 4 & 2 & 2 \\ 2 & 4 & 2 \\ 2 & 2 & 4 \end{bmatrix}$$

Exercise 5. Do A and A^T have the same characteristic polynomial?