

Linear Algebra
MATH 224W – Spring 2015

Week 15: Diagonalization

Homework #14

due Friday, Dec. 11

§7.1 #1, 2, 6 (just find the characteristic poly. and eigenvalues), 8(a)(c), 13, 18(b)

§7.2 #6, 10(a)(b), 11(a)(c), 16(b), 19

*Hint: Theorem 7.5 is very helpful for several of the parts of #6. Show **all** of your work for these problems, especially for #19.*

You may continue to use a computer to perform your row reduction as long as you clearly state what you have done.

Writing Assignment #14

Not To Be Turned In—But May Appear on the Final

§7.2 #24

*Try using the **definition** of diagonalizability.*

AP #1 Prove or disprove the following statement.

“For every positive integer n , if A and B are invertible $n \times n$ matrices with the same characteristic polynomial, then A and B are similar.”

AP #2 Let $c \in \mathbb{R}$, and let A be an *upper triangular* $n \times n$ matrix such that every entry on the main diagonal is c .

(1) Prove that A is diagonalizable if and only if the nullity of $(cI - A)$ is n .

(2) Prove that A is diagonalizable if and only if A is a diagonal matrix.

Hint: use part 1 to prove part 2. What does it mean if an $n \times n$ matrix has nullity equal to n ?