

# MATH 117: Daily Assignment 8

WRITE YOUR NAME HERE

August 16, 2022

See the [daily assignment webpage](#) for due dates, templates, and assignment description. Try to explain your reasoning and justify your computations for every problem. You should not appeal to any theorems that we have not proved yet.

1. Let  $F = \mathbb{Z}_5$ . Diagonalize the following matrices over  $F$ .

(a)  $A = \begin{pmatrix} 1 & 0 & 0 \\ 0 & 2 & 0 \\ 1 & 0 & 2 \end{pmatrix}$

(b)  $B = \begin{pmatrix} 2 & 4 \\ 3 & 3 \end{pmatrix}$ .

2. Determine the characteristic and minimal polynomials for the following matrices over  $F = \mathbb{Z}_5$ .

(a)  $C = \begin{pmatrix} 1 & 1 & 0 \\ 0 & 4 & 1 \\ 0 & 0 & 1 \end{pmatrix}$

(b)  $D = \begin{pmatrix} 1 & 1 & 0 \\ 0 & 4 & 1 \\ 0 & 1 & 1 \end{pmatrix}$

(c)  $E = \begin{pmatrix} 1 & 1 & 0 & 4 \\ 2 & 4 & 1 & 1 \\ 0 & 0 & 1 & 3 \\ 0 & 0 & 0 & 1 \end{pmatrix}$

Are any of the matrices diagonalizable? Explain.