

**WORKSHEET 11/10/22**  
**MATH 2331, FALL 2022**

- (1) Can you find an eigenvector of the identity matrix? What is the eigenvalue?
- (2) Can you find an eigenvector for projection onto the line parallel to  $\begin{bmatrix} 3 \\ 4 \end{bmatrix}$ ? Can you find another? What are the eigenvalues?
- (3) What can you say about an eigenvector with eigenvalue 0?
- (4) Can you find an eigenvector for rotation by an angle  $\theta$  in  $\mathbb{R}^2$ ? What is the eigenvalue?
- (5) Can you find an eigenvector for reflection across the line parallel to  $\begin{bmatrix} 3 \\ 4 \end{bmatrix}$ ? Can you find another? What are the eigenvalues?
- (6) What can you say about the eigenvalues of an orthogonal matrix?
- (7) Find the eigenvalues of  $A = \begin{bmatrix} 1 & 2 & 3 \\ 0 & 4 & 5 \\ 0 & 0 & 6 \end{bmatrix}$ .
- (8) Write down the characteristic equation of  $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$ . Can you solve it?