

WORKSHEET 11/16/22
MATH 2331, FALL 2022

- (1) Find the eigenvectors of the matrix $A = \begin{bmatrix} 1 & 2 & 3 \\ 0 & 3 & 2 \\ 0 & 1 & 2 \end{bmatrix}$.
- (2) Suppose that \vec{v}_1 and \vec{v}_2 are eigenvectors of A with eigenvalues λ_1 and λ_2 , respectively.
- (a) Is $5\vec{v}_1$ an eigenvector of A ?
 - (b) Is $\vec{v}_1 + \vec{v}_2$ an eigenvector of A ?
- (3) Let A be an $n \times n$ matrix.
- (a) Is the collection of eigenvectors of A a subspace of \mathbb{R}^n ?
 - (b) Is the collection of eigenvectors of A with eigenvalue λ a subspace of \mathbb{R}^n ?
- (4) Let $A = \begin{bmatrix} 1 & 1 & 1 \\ 0 & 0 & 1 \\ 0 & 0 & 1 \end{bmatrix}$.
- (a) Find the eigenvalues of A .
 - (b) For each eigenvalue λ , find a basis for the eigenspace E_λ .
 - (c) Is A diagonalizable?
- (5) For each eigenvalue λ you found in the previous problem, write down its algebraic and geometric multiplicity. Do you notice anything?