MATH 121A Prep: Eigenvalues

1. Find all eigenvalues of the matrix $\begin{bmatrix} -2 & 0 & 0 \\ 1 & 2 & 5 \\ 4 & 2 & -1 \end{bmatrix}$.

2. Find all eigenvalues and corresponding eigenvectors of the matrix $\begin{bmatrix} 4 & 5 \\ 1 & 8 \end{bmatrix}$.

3. Recall that we defined the eigenspace of an $n \times n$ matrix A corresponding to an eigenvalue λ as the set of all eigenvectors corresponding to λ as well as the zero vector. We can also write this as $V = \{\vec{v} : A\vec{v} = \lambda\vec{v}\}$ Prove that this is a subspace of $\mathbb{R}^n$.