HW4B. Written Homework 4B. **Due Week 4 Wednesday 11:59PM**

Name:

Instructions: Upload a pdf of your submission to **Gradescope**. This worksheet is worth 20 points: up to 8 points will be awarded for accuracy of certain parts (to be determined after the due date) and up to 12 points will be awarded for completion of parts not graded by accuracy.

(1) Let $\mathbf{A_1} = \begin{pmatrix} -1 & 0 & 2 \\ 0 & -1 & 2 \\ 0 & 0 & 1 \end{pmatrix}$.

(a) Determine the **characteristic polynomial** of $\mathbf{A_1}$.

(b) Find all **real eigenvalues** of $\mathbf{A_1}$

(c) For each real eigenvalue λ of $\mathbf{A_1}$, determine a linearly independent spanning set for E_λ, i.e. find the eigenvectors corresponding to λ.

(2) Let $\mathbf{A_2} = \begin{pmatrix} -2 & -1 & 2 \\ 0 & -4 & 4 \\ -2 & 1 & 2 \end{pmatrix}$.

(a) Determine the **characteristic polynomial** of $\mathbf{A_2}$.

(b) Find all **real eigenvalues** of $\mathbf{A_2}$

(c) For each real eigenvalue λ of $\mathbf{A_2}$, determine a linearly independent spanning set for E_λ, i.e. find the eigenvectors corresponding to λ.