

Instructions: Please answer the following legibly, logically, and **show all work**. Please use a **separate sheet of paper** to write all work. No credit will be given for unjustified or unclear work. When you are finished, please scan your work (or take pictures) and submit via the Assignments or Quiz link on Canvas.

1. Is $\begin{bmatrix} 1 \\ 3 \end{bmatrix}$ an eigenvector of $\begin{bmatrix} 1 & -1 \\ 6 & -4 \end{bmatrix}$? If so, find the eigenvalue.

2. Is $\lambda = 2$ an eigenvalue of $\begin{bmatrix} 3 & 2 \\ 3 & 8 \end{bmatrix}$? Why or why not?

3. Let $A = \begin{bmatrix} 2 & 0 & -2 \\ 1 & 3 & 2 \\ 0 & 0 & 3 \end{bmatrix}$

- (a) Find the characteristic polynomial of A and give the eigenvalues of A .
- (b) Find a basis for the eigenspace corresponding to each of the eigenvalues that you found in (a).
- (c) Using (a) and (b) find a matrix P and matrix D such that $A = PDP^{-1}$.