

Math 1553 Worksheet: Chapter 5.1-5.2

1. True or false. Answer true if the statement is *always* true. Otherwise, answer false. If your answer is false, either give an example that shows it is false or (in the case of an incorrect formula) state the correct formula.
 - a) If v_1 and v_2 are linearly independent eigenvectors of an $n \times n$ matrix A , then they must correspond to different eigenvalues.
 - b) If A is a 3×3 matrix with characteristic polynomial $-\lambda(\lambda - 5)^2$, then the 5-eigenspace is 2-dimensional.

2. Let A be the matrix of the linear transformation $T : \mathbf{R}^2 \rightarrow \mathbf{R}^2$ that reflects vectors over the line $y = 2x$ in $\mathbf{R}^2$. Find the eigenvectors and eigenvalues of A without doing any matrix calculations. (Draw a picture!)

3. Find the eigenvalues and a basis for each eigenspace of $A = \begin{pmatrix} 2 & 3 & 1 \\ 3 & 2 & 4 \\ 0 & 0 & -1 \end{pmatrix}$.