Math 3260 Practice - Eigenvalues & Eigenvectors

Names:

(1) Let \( A = \begin{bmatrix} 5 & 3 \\ 3 & 5 \end{bmatrix} \). \( A \) has two eigenvalues \( \lambda_1 = 2 \) and \( \lambda_2 = 8 \).

(a) Find the eigenvectors of \( A \) corresponding to each eigenvalue.

(b) Compare \( \det(A) \) with the product \( \lambda_1 \lambda_2 \). Notice anything?

(c) Consider the matrix \( P = \begin{bmatrix} 1 & 1 \\ -1 & 1 \end{bmatrix} \). Compute the matrix \( B = P^{-1}AP \). Can you list the eigenvalues of \( B \) simply by looking at \( B \)?

(d) Find \( \text{rref}(A) \). Are the eigenvalues of \( \text{rref}(A) \) the same as the eigenvalues of \( A \)?