Problem Set 12: Due Friday, October 17

Problem 1: Find the eigenvalues of the matrix

$$\begin{pmatrix} 5 & -1 \\ -7 & 3 \end{pmatrix}$$

Problem 2: Find the eigenvalues of the matrix

$$\begin{pmatrix} 1 & 8 \\ 2 & 1 \end{pmatrix}$$

and then find (at least) one eigenvector for each eigenvalue.

Problem 3: Find the eigenvalues of the matrix

$$\begin{pmatrix} 2 & -1 \\ 1 & 4 \end{pmatrix}$$

and then find (at least) one eigenvector for each eigenvalue.

Problem 4 Find values for c and d such that the matrix

$$\begin{pmatrix} 3 & 1 \\ c & d \end{pmatrix}$$

has both 4 and 7 as eigenvalues. You should show the derivation for how you arrived at your choice.

Problem 5: Explain why a 2×2 matrix A is invertible if and only if 0 is not an eigenvalue of A.