1. Let $P = \begin{bmatrix} 5 & 7 \\ 2 & 3 \end{bmatrix}$. Find P^{-1}.

2. Let $A = \begin{bmatrix} 4 & 0 & 1 \\ -2 & 1 & 0 \\ -2 & 0 & 1 \end{bmatrix}$. Verify that $\mathbf{v}_1 = \begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix}$, $\mathbf{v}_2 = \begin{bmatrix} 1 \\ -2 \\ -2 \end{bmatrix}$ and $\mathbf{v}_3 = \begin{bmatrix} -1 \\ 1 \\ 1 \end{bmatrix}$ are all eigenvectors, and find their corresponding eigenvalues.

3. Find a basis of $\text{Nul}\, A$ for $A = \begin{bmatrix} 1 & 2 & -1 \\ 1 & 2 & -1 \\ -1 & -2 & 1 \end{bmatrix}$.

4. Let $A=\begin{bmatrix}16 & -35\\ 6 & -13\end{bmatrix}$.

   a. Find the characteristic polynomial and the eigenvalues.

   b. Find an eigenvector associated to each eigenvalue.

Hints to get started:

2. Compute $A\mathbf{v}$ and compare to $\mathbf{v}$.
3. Solve $A\mathbf{x}=\mathbf{0}$ for $\mathbf{x}$.
4. (a) Find the determinant of $A-\lambda I$

   (b) For each λ, find $A-\lambda I$ and row-reduce.