1. Verify that $\lambda_1 = -1$, $\mathbf{v_1} = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$ and $\lambda_2 = 2$, $\mathbf{v_2} = \begin{bmatrix} 5 \\ 2 \end{bmatrix}$ are eigenpairs for
$$\begin{bmatrix} 4 & -5 \\ 2 & -3 \end{bmatrix}$$

2. Find the eigenpairs for $\begin{bmatrix} 6 & -3 \\ -2 & 1 \end{bmatrix}$.

   (answer: $\lambda_1 = 0$, $\mathbf{v_1} = \begin{bmatrix} 1 \\ 2 \end{bmatrix}$ and $\lambda_2 = 7$, $\mathbf{v_2} = \begin{bmatrix} 3 \\ -1 \end{bmatrix}$)

3. Find the eigenpairs for $\begin{bmatrix} 1 & -3/2 \\ 1/2 & -1 \end{bmatrix}$.

   (answer: $\lambda_1 = -1/2$, $\mathbf{v_1} = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$ and $\lambda_2 = 1/2$, $\mathbf{v_2} = \begin{bmatrix} 3 \\ 1 \end{bmatrix}$)

4. Find the eigenpairs for $\begin{bmatrix} 2 & -2 & 3 \\ 0 & 3 & -2 \\ 0 & -1 & 2 \end{bmatrix}$.

   (answer: $\lambda_1 = 4$, $\mathbf{v_1} = \begin{bmatrix} 7 \\ -4 \\ 2 \end{bmatrix}$, $\lambda_2 = 2$, $\mathbf{v_2} = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}$ and $\lambda_3 = 1$, $\mathbf{v_3} = \begin{bmatrix} -1 \\ 1 \\ 1 \end{bmatrix}$)

5. Find the eigenpairs for $\begin{bmatrix} 0 & -3 & 5 \\ -4 & 4 & -10 \\ 0 & 0 & 4 \end{bmatrix}$.

   (answer: $\lambda_1 = -2$, $\mathbf{v_1} = \begin{bmatrix} 3 \\ 2 \\ 0 \end{bmatrix}$, $\lambda_2 = 4$, $\mathbf{v_2} = \begin{bmatrix} 5 \\ -10 \\ -2 \end{bmatrix}$ and $\lambda_3 = 6$, $\mathbf{v_3} = \begin{bmatrix} 1 \\ -2 \\ 0 \end{bmatrix}$)

6. Find the eigenpairs for $\begin{bmatrix} 3 & -4 \\ 1 & 3 \end{bmatrix}$.

   (answer: $\lambda_1 = 3 + 2i$, $\mathbf{v_1} = \begin{bmatrix} 2 \\ -i \end{bmatrix}$ and $\lambda_2 = 3 - 2i$, $\mathbf{v_2} = \begin{bmatrix} 2 \\ i \end{bmatrix}$)

7. Find the eigenpairs for $\begin{bmatrix} -1 & 3 & -4 \\ -2 & 3 & -4 \\ 1 & 1 & 3 \end{bmatrix}$.

   (answer: $\lambda_1 = 1$, $\mathbf{v_1} = \begin{bmatrix} 2 \\ 0 \\ -1 \end{bmatrix}$, $\lambda_2 = 2 + 3i$, $\mathbf{v_2} = \begin{bmatrix} -1 + 5i \\ -2 + 4i \\ 3 \end{bmatrix}$ and $\lambda_3 = 2 - 3i$, $\mathbf{v_3} = \begin{bmatrix} -1 - 5i \\ -2 - 4i \\ 3 \end{bmatrix}$)