

4 a.

The resulting tridiagonal matrix T is:

$$\begin{bmatrix} 7. & 3.74165739 & -0. & 0. & \\ 3.74165739 & 10.64285714 & 9.13085149 & 0. & \\ -0. & 9.13085149 & 10.59421525 & -4.77158058 & \\ 0. & 0. & -4.77158058 & 5.76292761 & \end{bmatrix}$$

4 b.

Eigenvalues:

$$[20.99929052 \ 8.87583819 \ 5.20425141 \ -1.07938012]$$

Eigenvectors:

$$\begin{bmatrix} 0.17920453 & -0.68815524 & 0.65013905 & 0.26767018 \\ 0.67048797 & -0.34499895 & -0.31202383 & -0.5779816 \\ 0.68704896 & 0.34875836 & -0.08056455 & 0.63232957 \\ -0.21516352 & -0.53458928 & -0.68809135 & 0.44096401 \end{bmatrix}$$