You can find here the solutions to the problems whose solution is not on the back of the book.

Problem 6.4.4

Solution: The eigenvectors are $\lambda_1 = 10$ and $\lambda_2 = -5$. Hence

$$\Lambda = \begin{bmatrix} 10 & 0 \\ 0 & -5 \end{bmatrix}.$$  

The eigenvectors are $x_1 = (1, 2)$ and $x_2 = (2, -1)$. Hence, normalizing these vectors gives us

$$Q = \frac{1}{\sqrt{5}} \begin{bmatrix} 1 \\ 2 \\ -1 \end{bmatrix}.$$  

Problem 6.4.7

Solution:

- Probably the easiest example was $(\frac{1}{3}, \frac{2}{3})$, with eigenvalues $\lambda_1 = -1$ and $\lambda_3 = 3$.
- The pivots have the same signs as the eigenvalues.
- The trace is $\lambda_1 + \lambda_2 = 2$, so $A$ cannot have two negative eigenvalues.

Problem 6.4.26

Solution: The eigenvectors are $(1, 0)$ and $(1, 1)$, and hence we have that the angle is $\pi/4$ even with $A^T$ very close to $A$.

Problem 8.3.11

Solution: Setting the last row to be $.2, .3, .5$ makes $A = A^T$. Rows also add to 1, so $(1, \ldots, 1)$ is also an eigenvector of $A$. 