1. Finding eigenvectors and eigenvalues
   (a) Using the characteristic polynomial method, find the eigenvectors and eigenvalues of
   $$A = \begin{bmatrix} 1 & 2 \\ -1 & 4 \end{bmatrix}$$
   (b) Use Axler's method to find the eigenvectors and eigenvalues of A again.
2. Some quick useful facts and special cases of eigenvectors and eigenvalues
   (a) A triangular matrix has eigenvalues along its main diagonal:
   (b) square of a triangular matrix and the eigenvalues
   (c) Symmetric matrices have eigenvectors that are orthogonal
   (d) eigenvelues of rotations through 90 and 180 degrees
3. Walk through Proof 4.2: For real $n \times n$ matrix A, prove that all the polynomials $p_i(t)$ are simple and have real roots iff there exists a basis for $\mathbb{R}^n$ consisting of eigenvectors of A.
4. If λ is an eigenvalue A with $\vec{v}$ the corresponding eigenvector, prove that $\lambda - s$ is an eigenvalue of $A - sI$ for any scalar s, with corresponding eigenvector $\vec{v}$.