The Cvetvovic bound of a graph \( G \) is the minimum of the number of non-negative and non-positive eigenvalues of the adjacency matrix of the graph.

**Notation:** Let \( \rho_0 \) be the number of 0 eigenvalues, \( \rho_+ \) be the number of positive eigenvalues, and \( \rho_- \) be the number of negative eigenvalues. Then Cvetkovic’s Theorem says 
\[
\alpha \leq \rho_0 + \min\{\rho_+, \rho_-\}.
\]

1. Find the eigenvalues of \( k_2 \).

2. Check Cvetkovic’s Theorem for \( k_2 \).

3. Find the eigenvalues of \( p_3 \).

4. Check Cvetkovic’s Theorem for \( p_3 \).
5. Find the eigenvalues of $k_3$.

6. Check Cvetkovic’s Theorem for $k_3$.

7. The spectrum (set of eigenvalues) of the Petersen graph is: $3^1, 1^5, -2^4$. Check Cvetkovic’s Theorem for the Petersen graph.

8. Let $U, W$ be 2-dimensional subspaces of $\mathbb{R}^3$. Argue that there is a non-zero vector in $U \cap W$. 