1. Show that every 2-connected graph contains a cycle.

2. Determine $\kappa(G)$ and $\lambda(G)$ for $G = P^m$, C^n, K^n, $K_{m,n}$ and the n-dimensional cube.

3. Is there a function $f : \mathbb{N} \to \mathbb{N}$ such that, for all $k \in \mathbb{N}$, every graph of minimum degree at least $f(k)$ is k-connected?

4. Prove that for every graph non-complete, connected graph G, if $F \subseteq E(G)$ is a separating set of edges of minimum order (i.e. $|F| = \lambda(G)$), then $G - F$ has exactly two components.

5. Prove Theorem 1.5.1.

   The following are equivalent for a graph T.

   (a) T is a tree.

   (b) Any two vertices of T are linked by a unique path.

   (c) T is minimally connected. (That is, T is connected but $T - e$ is disconnected for every $e \in E$.)

   (d) T is maximally acyclic. (That is, T is acyclic but for every nonadjacent pair of vertices $x, y \in V$, $T + xy$ contains a cycle.)

6. Let F and F' be forests on the same vertex set such that $\| F \| < \| F' \|$. Show that F' has an edge e such that $F + e$ is still a forest.