

- This homework set has *three* questions, each one with increasing difficulty. You must work in pairs to determine the solutions.
- Every member of the team must be able to explain how you arrived at the answer.
- You may be asked to present your answer on the blackboard.

1. Show that perfection is closed neither under edge deletion nor under edge contraction.
2. Use König's Theorem to show that the complement of any bipartite graph is perfect.

Theorem (König 1931)

The maximum cardinality of a maximal matching in G is equal to the minimum cardinality of a vertex cover of its edges.

3. Determine the class of all graphs G for which $P_G(k) = k(k-1)^{n-1}$. (Let P_G denote the chromatic polynomial of G .)