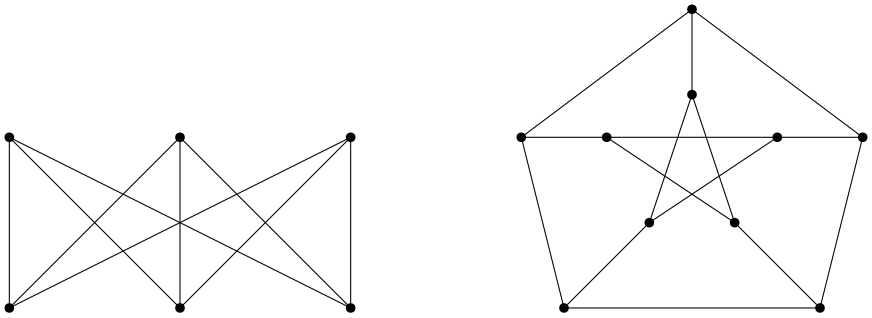

Problem 1. *Find the chromatic number of P_n, C_n and K_n for all value of n.*

Problem 2. *Find the chromatic number of the graphs in pictures.*



Problem 3. *We say that a graph G on n vertices is k-degenerate if each **induced** subgraph H of G contains a vertex of degree at most k. Show that a graph is k-degenerate iff each subgraph contains a vertex of degree at most k.*

Problem 4. *Show that there is no graph G, such that G has 6 vertices and 13 edges and $\chi(G) \leq 3$.*

Problem 5. *Let G be a graph without two disjoint odd cycles. Prove that $\chi(G) \leq 5$.*

Problem 6. *Show that a graph G on n vertices is k-degenerate if and only if admits a linear ordering $v_1 < v_2 < ... < v_n$ on the vertices such that each v_i forms at most k edges with vertices coming before it in the ordering.*

Problem 7. *Let G be a planar, triangle-free graph. Use Euler theorem to prove that G contains a vertex of degree at most three. Then use this to prove that $\chi(G) \leq 4$.*