▶ **Problem 13.1-13**

Suppose a graph G_1 with V_1 vertices and E_1 edges is homeomorphic to a graph G_2 with V_2 vertices and E_2 edges. Prove that $E_2 - V_2 = E_1 - V_1$.

Proof. Let G_1 be obtained from G (with V vertices and E edges) by adding k vertices to edges. Thus $V_1 = V + k$ and $E_1 = E + k$ (since there is one additional edge for each vertex added to an edge). Similarly, if G_2 is obtained from G by adding ℓ vertices, then $V_2 = V + \ell$ and $E_2 = E + \ell$. The result now follows easily. □