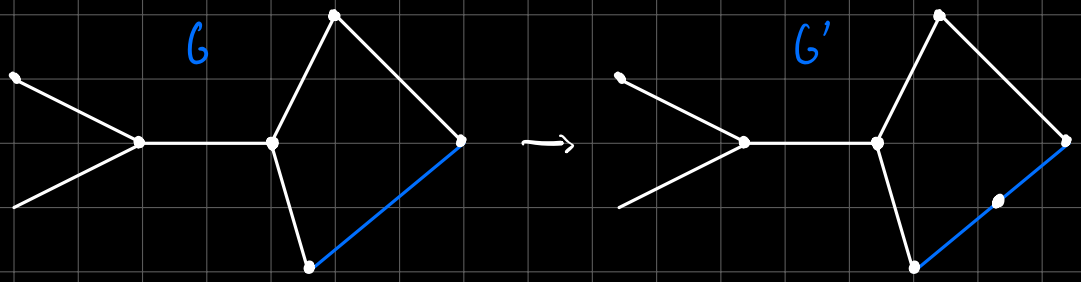
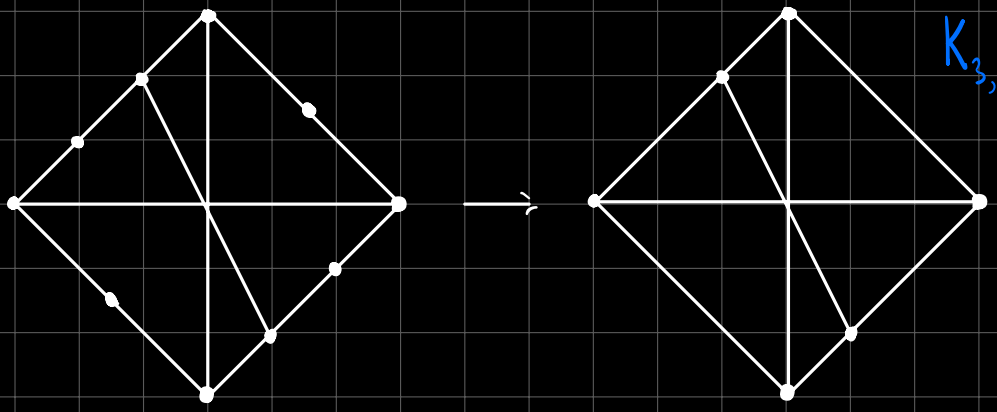
Subdivision: add vertices in between



If G is planar, then G' is also planar

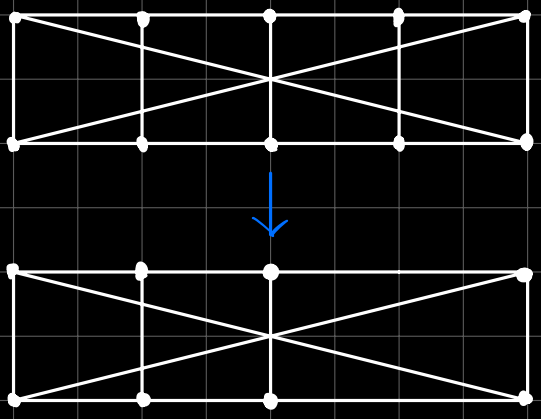


$K_{3,3}$ (bipartite 3-regular graph)

Kuratowski's Theorem

G is nonplanar *if and only if* it has a subgraph that is isomorphic to a subdivision of K5 or K_{3,3}

Ex.



is isomorphic to $K_{3,3}$
⇒ nonplanar

Check the longest cycle — removing vertices/edges from that will probably yield K5 or K_{3,3} if the graph is nonplanar