

Graph Theory 2, MATH 5450, Spring 2023

Homework 7, 10.2. Duality

Due Saturday, March 4, at 11:59 pm

Write in complete sentences!!! *Explain* what you are doing and convince me that you understand what you are doing and why. Justify all steps by quoting relevant results from the textbook, class notes, or hypotheses. Do not copy the work of others; **do your own work!!!**

10.2.6. Let G be a plane graph. Prove that $G^{**} \cong G$ if and only if G is connected. HINT: You may assume Euler's Formula (Theorem 10.19); this is where connectivity plays a role. To show $G^{**} \cong G$, first show the result for G connected and then consider the case where G is not connected.

10.2.10. Prove that the dual of an even plane graph is bipartite. HINT: You may assume Exercise 10.2.6: For plane graph G , $G^{**} \cong G$ if and only if G is connected.