

Math776: Graph Theory (I)
Fall, 2013
Homework 5, due Friday, Nov. 15

Select any 5 problems to solve. The total score of this homework is 10 points. You get a bonus point if you solve all 6 problems correctly. You also get another bonus point if your solution is selected as a standard solution (in this case you will be asked to send me the latex code of this solution.)

1. [page 84, #18] Let $k \geq 2$. Show that every k -connected graph of order at least $2k$ contains a cycle of length at least $2k$.
2. [page 84, #19] Let $k \geq 2$. Show that in a k -connected graph any k vertices lie on a common cycle.
3. [page 84, #24] Derive Tutte's 1-factor theorem from Mader's theorem.
4. [page 84, #26] For every $k \in \mathbb{N}$ find an $l = l(k)$, as large as possible, such that not every l -connected graph is k -linked.
5. [page 111, #4] show that every planar graph is a union of three forests.
6. [page 111, #13] Find a 2-connected planar graph whose drawings are all topologically isomorphic but whose planar embeddings are not all equivalent.