Graph Theory

Comments on typical mistakes for HW # 11.

4.2.12 A proof, which truly depends on Menger's Theorem should contain that *p.i.d.* is equivalent to *p.e.d.* in 3-regular graphs. Some solutions were only the disguised version of the case-analysis proof, how we did it in class.

5.1.1 It is **not enough** to just state that the chromatic number is 4. There is no other way around it, but saying two things:

$\chi(G) \leq 4$, since here is a proper 4-coloring, I draw it.

$\chi(G) \geq 4$, we cannot color with 3-colors, because... (and some argument)

Similarly, it is **not enough** to just state that G is color-critical. After establishing that $\chi(G) = 4$, you must show that deleting *any* edge the remaining graph is 3-colorable by actually drawing the 3-coloring. (Of course symmetries of the graph will reduce the number of cases you have to consider.)

4.2.11 and **4.2.13** I think there were hardly any perfect solutions. These statements are not hard, though. It is more likely that it is very hard to be precise about them. You have to be careful with sentences like: "Then the graph looks like this..." and you refer the reader to a picture. A picture could be very helpful in thinking about the problem, but after you feel like you solved the question, try to precisely write down, what you mean by "this" in the sentence above, i.e. what the crucial features of your "picture". If you are unable to do that, most probably you don't have a proof yet. If you can write it down, your picture is still very important for me to understand your formal description.