Graph Theory

Comments on typical mistakes for HW # 6.

3.1.1 A lot of people exhibited the extremums, but did not explain. Some of you did explain something, but somehow avoided the point.

If I exhibit a vertex cover of size 3, then I **proved** that $\alpha'(G) \leq 3$, since one vertex of my cover can cover at most one edge of *any* matching.

If I exhibit a matching of size 3, then I **proved** that $\alpha'(G) \geq 3$.

So exhibiting both of them **proves** that my matching is of maximum size.

3.1.24 One popular, but not correct, approach was to proceed by induction on k and obtain the first perfect matching (permutation matrix) by basically taking an arbitrary edge, then another which is not incident of the first one, and then a third which is not incident of the first two, and so on...

It seems that this approach tries to imitate the way perfect matchings are constructed in $K_{n,n}$. BUT!! For arbitrary k-regular graphs, the point is in the "and so on...". If you select your first edges arbitrarily, most likely you *cannot* finish with a perfect matching.