

These problems are for classroom presentations and some fraction of them may be final exam questions.

- 21 Given a planar (simple) graph  $G$  show that the complement  $G^c$  has the property that every vertex disjoint pair of odd cycles is joined by an edge. (thus we could apply our result about fractional  $f$ -factors yielding  $f$ -factors for such graphs)
22. Let  $G$  be a simple connected planar graph with all faces of even size. Show that  $G$  is bipartite.
23. Let  $G$  be a cubic simple connected planar map with 3 faces of size 4,  $s$  faces of size 6 and  $t$  faces of size 10. Determine  $t$ .
24. Classify which choices of  $m$  and  $n$  have the property that  $K_{m,n} - e$  is planar (for any edge  $e$  of  $K_{m,n}$ ). Assume  $m \geq n \geq 1$ .
25. Show that the Petersen Graph is not planar using the Jordan Curve argument (we used the Jordan Curve argument to show that  $K_{3,3}$  and  $K_5$  are not planar).