Problem 1. Prove that the graph $G = n$-cube is non-planar for all $n \geq 4$.

Problem 2. Prove that every planar graph having girth at least 6 has a vertex of degree at most 2.

Problem 3. Suppose that graph G satisfies $p = 2n$ and $\deg(v) \geq n$ for every vertex v. Prove that G has a perfect matching. (Prove that if M is a matching that is not perfect then there exists an augmenting path of length 1 or 3)

Problem 4. How many perfect matchings does the graph L_n have? (See Figure 7.3 on page 181 of the book)

Problem 5. Prove that any graph G of maximum degree at most d can be $(d+1)$-coloured.