

## MA010 Graph Theory—Homework Set #2

Each problem is worth 4 points. The solutions should be submitted using the university information system by **December 12**. Please submit your solutions as pdf files produced by a suitable text editor, e.g., L<sup>A</sup>T<sub>E</sub>X; solutions that are not submitted as pdf files may be assigned zero points. Your solutions should contain references to all sources, including those available on the web, that you have used.

1. Show that every  $n$ -vertex chordal graph  $G$  has at most  $n(\omega(G) - 1) - \binom{\omega(G)}{2}$  edges.
2. Show that every connected chordal graph with  $n \geq 2$  vertices has at most  $n - 1$  cliques (recall that a clique is an *inclusionwise maximal* complete subgraph).
3. Show that every 3-regular graph that contains a Hamilton cycle has chromatic index equal to three.
4. Show that a graph  $G$  is 2-edge-connected if and only if  $G$  is connected and every edge is contained in a cycle.