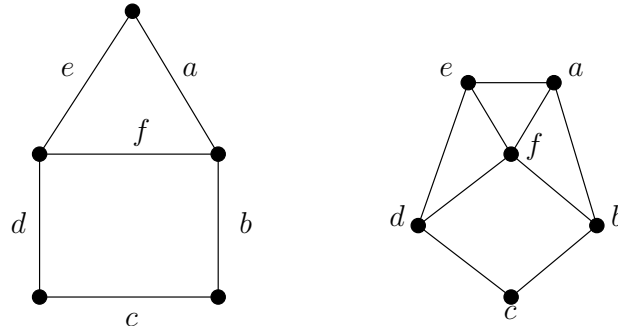


Problem sheet 1

1.



2. Re-reading the definition of the complement, it means that you put in  $G^c$  exactly the edges that are missing from  $G$ .

(a)



(b) In  $K_n$  you have all possible edges, so there are no missing edges. So in  $K_n^c$  you only have  $n$  vertices with no edges between them.

3. (a) No, because the number of vertices of odd degree must be even.  
 (b) Yes (try to make a picture of it).  
 (c) No: Start with the vertices of degree 4: All 3 of them are linked to all other vertices, which means that every vertex has degree at least 3.  
 (d) No: One vertex has degree 4, which is impossible since there are only 3 other vertices.
4. (a) See next question for an example.  
 (b) Let  $v_1, v_2, v_3, v_4$  be the vertices of this graph. The first column gives the number of edges between  $v_1$  and  $v_1, \dots, v_4$ , the second column the number of edges between  $v_2$  and  $v_1, \dots, v_4$ , etc. A possible drawing for this graph is

