MATC44 - Practice Problem Set 3

These problems are not for credit and should not be handed in. While working through these problems, be sure to provide ample justification (e.g., a proof, logical argument or counter-example)!

Q1. Up to graph isomorphism, draw all connected graphs on 5 vertices having exactly 5 edges. Give a reason why your list is complete (i.e., not missing any graphs).

Q2. Draw all graphs (up to isomorphism) on 5 vertices that contain C_5 as a subgraph.

Q3. For each of the sequences below, either construct a graph having that degree sequence, or explain why no such graph exists.

(a) $0, 1, 2, 2, 4, 5$.
(b) $0, 1, 2, 3, 3, 3$.
(c) $1, 1, 1, 2, 4, 5$.
(d) $1, 1, 2, 2, 3$.

Q4. Draw two nonisomorphic graphs on 10 vertices in which every vertex has degree equal to 3 (explain why they are nonisomorphic).