CS2022/MA2201
HW#8

DUE: Tuesday, October 16

1. (5 points) Do Exercise 6.5.2 (the second Exercise on pg. 413) of our text.

2. (3 points) Do Exercise 6.5.12 of our text.

3. (12 points) A graph is a cubic graph if it is simple and every vertex has degree 3.
   a) Draw a cubic graph with 7 vertices, or else prove that there is none.
   b) Draw a cubic graph with 6 vertices that is not isomorphic to $K_{3,3}$ or else prove that there is none, where $K_{3,3}$ is:

   ![Cubic Graph](image)

   c) Draw a cubic graph with 8 edges, or else prove that there is none.

4. (1 point) Do Exercise 7.3.34 of our text, and justify your response.

5. (1 point) Do Exercise 7.3.36 of our text, and justify your response.

6. (7 points) Prove or give a counterexample to the following:
   **Conjecture:** For any simple graph $G = (V, E)$ with $|V| \geq 2$, at least two distinct vertices of $G$ must have the same degree, that is,
   $$(\exists u, v \in V) (u \neq v \land \deg(u) = \deg(v)).$$