

Homework Assignment #8
Due Date, Wednesday 11/15

(1) (a) Find up to isomorphism all possible 3-regular loopless graphs on 6 vertices. (No proofs necessary, just tell me what the graphs are.)

(b) Find up to isomorphism all possible 3-regular simple graphs on 8 vertices. (No proofs necessary, just tell me what the graphs are.)

(2) Give me an example of two non-isomorphic, self-complementary graphs on 8 vertices.

(3) A graph G has n vertices, $2n - 2$ edges, and vertices of degree 3 and 4 only. Prove that G has exactly four vertices of degree 3.

(4) Let G be a graph. Prove the following statements are true.

a. If the edge set of G partitions into edge sets of cycles, then every vertex of G has even degree.

b. If every vertex of G has even degree, then the edge set of G partitions into edge sets of cycles.
(Use the second principle of induction on the number of edges in G with base case 0.)

Note that the proofs of these two statements together prove the statement that, the edge set of G partitions into edge sets of cycles if and only if every vertex of G has even degree.