MATH 239 — Tutorial 1

Bartosz Antczak *TA: Alan Arroyo* *January 11, 2017*

We'll cover

- Isomorphism
- Degree of vertices in graphs

1.1 Isomorphism

Given two graphs G and H, we say that they are isomorphic if we have a function f which is defined by

$$f : V(G) \to V(H)$$

such that f is a bijection as well as $u, v \in E(G) \iff f(u)f(v) \in E(H)$

1.1.1 Proving that Two Graphs are Not Isomorphic

For two graphs G and H, find some structure in G that isn't in H. Vertices, edges, degree sequence

1.2 Working with degrees

Let G be a graph. $S \subset V(G)$. Also let

- E1 = edges in G ushc that both ends are in S
- E2 = edges in G such that exactl one end is in S

Show that $sum_{v \in S} \deg(v) = 2|E_1| + |E_2|$
Proof: Let T = sum of deg(v) in S. Let e be an edge of G. If e is in E1, then it contributes 2 to T. If e is in E2 then it contributes 1 to T; otherwise it does not contribute to T. QED (wha..?)