

HW3

Graph Theory (Fall 2019)
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Due: Tuesday, October 15, 2019, in class

1. Problems 2.31, 2.32(a), the 2nd graph in 9.1, 9.2, 9.3(a), 9.5, 9.16, 9.19, 9.20, 10.1 (only G1), 10.3, 10.4, 10.11, 10.12, 10.17 (only G1).
2. Let G be a bipartite graph with 10^7 left vertices and 20 right vertices. Two vertices u, v are called twins if the set of neighbors of u equals the set of neighbors of v (triplets, quadruplets etc are defined similarly).

Show that G has twins.

Bonus: Show that G has triplets. What about quadruplets, etc.?

3. Show that there exists a bipartite graph with 10^5 left vertices and 20 right vertices without any twins.
4. Show that any graph with n vertices and $\delta(G) \geq n/2 + 1$ has a triangle.