

GRAPH THEORY – EXERCISES

8TH OF SEPTEMBER, 2020

- (1) Is it possible that a degree sequence of a graph is $3, 3, 3, 3, 5, 6, 6, 6, 6, 6$? Prove or disprove!
- (2) Let G be a simple graph. Show that it must have two distinct vertices, x and y such that $d(x) = d(y)$. What if G is not simple?
- (3) Can the following numbers be the degrees of a simple graph on five vertices?
 $S = 3, 3, 4, 4, 6$
- (4) Let G be a graph (not necessarily simple). Assume that it has exactly two vertices, x and y with odd degree, every other vertex has even degree. Show that there is a path between x and y – note that G may be disconnected!
- (5) Let G be a connected graph. Prove the following: if G is not a tree, then one can remove an edge from it so that the resulting graph is connected.
- (6) Let G be a connected graph. Prove the following: one can remove a *vertex* from it so that the resulting graph is connected.