

Math 55 Quiz 14  
November 30, 2016

This quiz will be graded out of 15 points; the True/False question is worth 3 points, and the exercise is worth 12 points. Please read the instructions carefully, and explain your work.

**True or False.** Mark the following statements as either true or false, or leave a blank if you don't know. A correct answer is worth +1 point, a blank is worth 0 points, and an incorrect answer is worth -1 points, so be smart about guessing!

- a. T A binary tree is a bipartite graph.
- b. F Hall's marriage theorem gives a necessary and sufficient condition for a graph to be bipartite.
- c. T A simple graph is allowed to have isolated vertices.



**Exercise.** Recall that the *degree sequence* of a graph is the sequence consisting of the degrees of the vertices of the graph, listed in nonincreasing order.

Prove or disprove the following statements:

- a) The sequence 5, 4, 3, 2, 2, 1 is the degree sequence of a simple graph.

This sequence is not a degree sequence because its sum, 17, is odd. This violates the handshake theorem, which says that the sum should be even.

- b) The sequence 4, 3, 3, 2, 2 is the degree sequence of a simple graph.

This sequence is a degree sequence, as is demonstrated by the following simple graph:

