

Graph Theory - MATH 247

Exam 2 - Part 2

November 13, 2019

Name:

Honor Code Pledge:

Signature:

Directions: Please complete three out of four problems – each is worth 10 points. There is a time limit of 1 hour.

1. Consider a normal deck of 52 playing cards. Deal the cards out into 13 piles, where each pile has 4 cards. Show that regardless of the deal that it is always possible to select exactly one card from each pile such that amongst the 13 cards chosen each rank (Ace, King, Queen, \dots , 3,2) is represented once. (Hint: Hall's Theorem)
2. Show that the 4-regular graph given below is NOT 1-factorable.
3. Give a graceful labelling of the complete bipartite graph $K_{1,3}$. Use this graceful labelling to give a cyclic decomposition of K_7 that we know exists according to the theorem of Alex Rosa (i.e. Theorem 8.6).
4. Give the proof of Veblen's Theorem: Every Eulerian graph has a cycle decomposition.