

Due Wednesday, May 07, 2014

Students in section X13 (three credit hours) need to solve any three of the following four problems. Students in section X14 (four credit hours) must solve all four problems.

1. Use Kuratowski's Theorem to prove that the Petersen graph is not planar.
2. # 6.2.7 in the book
3. For any positive  $k$ , let  $G$  be a simple graph such that  $d(x) + d(y) \leq 2k + 1$  for every pair of adjacent vertices  $x$  and  $y$ . Prove that  $\chi(G) \leq k + 1$ .
4. Let  $G$  be a simple graph such that  $n(G) \geq 3$ , and  $d(x) + d(y) \geq n(G)$  for every pair of distinct nonadjacent vertices  $x$  and  $y$ . Prove that  $G$  has a Hamiltonian cycle. (Hint: follow the argument in the proof of Dirac's Theorem)

Problems below review basic concepts and their ideas could be used in the tests.

OTHER INTERESTING PROBLEMS:

WARMUP PROBLEMS:

Section 6.2: # 3, 4 (replace "convex embedding" with "embedding" in these problems)