

Last name _____

First name _____

LARSON—MATH 656—CLASSROOM WORKSHEET 02
Matching Theory.

Concepts & Notation

- Sec. 3.1: matching, saturate, maximum vs. maximal matching, M -alternating path, M -augmenting path, Berge's Theorem, Symmetric Difference Lemma, Hall's Condition, Hall's Theorem, Marriage Theorem, k -regular bipartite graph theorem, vertex cover, König-Egervary Theorem.

Review

1. What are graphs, and what can they be used for?
2. What is the history of graph theory, what are its origins?
3. What is a *matching*?
4. What does it mean for a matching to *saturate* a vertex?
5. What is the difference between a *maximal* and *maximum* matching?
6. If M is a matching, what is an M -alternating path?
7. If M is a matching, what is an M -augmenting path?

Notes

1. What is *Berge's Theorem*?
2. Prove it!
3. What is the *Symmetric Difference Lemma*
4. Prove it!
5. What is *Hall's Condition*?
6. What is *Hall's Theorem*?
7. Prove it!
8. What is the Marriage Theorem?
9. Prove it!
10. What can we say about k -regular bipartite graphs?
11. Prove it!