

Last name \_\_\_\_\_

First name \_\_\_\_\_

**LARSON—MATH 656—CLASSROOM WORKSHEET 05**  
**Matching Theory.**

**Organizational Notes**

1. Don't forget to send your Notes / Classroom worksheet after each class (make the email subject useful: like "Math 656 c05 notes").
2. Homework #1 (h01) is due Wednesday.
3. Read ahead! Next up we'll talk about Dominating sets (end of Sec. 3.1).

**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, independent set, edge cover, Gallai Identities.

**Review**

1. What is a vertex cover?
2. What is the notation for the vertex covering number—and the matching number?
3. What is the König-Egervary Theorem?

## Notes

1. What is a *min-max relation*? What is an example?
2. What is the significance of a min-max relation?
3. What is an *independent set*? What is the *independence number*?
4. What is an equivalent statement of the König-Egerváry Theorem in terms of the independence number  $\alpha$ ?
5. (**Non-text**). What is a König-Egerváry Graph?
6. What is known about König-Egerváry graphs?
7. What is the relationship between independent sets and vertex covers?
8. What is an *edge cover*?
9. What are the Gallai Identities?
10. Prove them!