

Last name _____

First name _____

LARSON—MATH 656—CLASSROOM WORKSHEET 06
Dominating Sets.

Organizational Notes

1. Don't forget to send your Notes / Classroom worksheet after each class (make the email subject useful: like "Math 656 c06 notes").
2. The VCU Discrete Math Seminar is today (Wednesday).
3. Homework #1 (h01) is due today (Wednesday).
4. Read ahead! Next up we'll talk about bipartite matching algorithms (Sec. 3.2).

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, dominating sets, domination number γ , independent dominating sets, claws, claw-free graphs.

Review

1. What is the König-Egervary Theorem?
2. What is a *min-max relation*? What is an example?
3. What is the significance of a min-max relation?
4. What is an *independent set*? What is the *independence number*?
5. What is an equivalent statement of the König-Egervary Theorem in terms of the independence number α ?
6. (**Non-text**). What is a König-Egervary Graph?
7. What is known about König-Egervary graphs?
8. What is the relationship between independent sets and vertex covers?

Notes

1. What is an *edge cover*?
2. What are the Gallai Identities?
3. Prove them!
4. What is a *dominating set*? What is the *domination number* γ ?
5. What is the *closed neighborhood* $N[v]$ of a vertex v ?
6. What is an *independent dominating set*?
7. **Claim:** A set of vertices is an independent dominating set if and only if it is a maximal dominating set.
8. Prove it!
9. What is a *claw* in a graph? What is a *claw-free* graph?
10. **Theorem** If a graph is claw-free then it has an independent set of size γ .
11. Prove it!