**Last name** _____

**First name** _____

**LARSON—OPER 731—CLASSROOM WORKSHEET 14**
**Complementary Slackness!**

**Concepts**

- (Sec. 2.4) *basis*, *basic* variable, *nonbasic* variable, *basic solution*, *basic feasible solution*, *canonical form*.
- (Sec. 2.8) *hyperplane*, *halfspace*, *line*, *line segment*, *convex*, *polyhedron*, *tight* inequality, *extreme point*.
- (Sec. 3.1) *dual LP*, *Weak duality theorem*.
- (Sec. 4.1) *complementary slackness*

1. What is an example of a minimum cost perfect matching problem?

2. Model the problem as an IP.

3. Find its dual and try to interpret its *meaning*.

4. Given a dual feasible $y$, what is the *reduced cost* of an edge?

5. Given a minimum cost perfect matching IP and dual feasible $y$, explain why an optimal solution of the IP with reduced cost edges is an optimal solution of the original IP.

6. What is *complementary slackness*? What is the *Complementary Slackness Theorem*?