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Lauren Keough* (s-1keough1@math.unl.edu), University of Nebraska-Lincoln, Dept. of Math,
203 Avery Hall, PO Box 880130, Lincoln, NE 68588-0130. *Extremal Questions for Matchings*.

In recent years there has been increased interest in extremal problems for “counting” parameters of graphs. For example, the Kahn-Zhao theorem gives an upper bound on the number of independent sets in a d -regular graph. In the same spirit, the Upper Matching Conjecture claims an upper bound on the number of k -matchings in a d -regular graph. We are interested in finding which graphs on n vertices with e edges have the minimum number of matchings.

We first solve this question for bipartite graphs. We show that the lex bipartite graph has the fewest matchings of all sizes among bipartite graphs with fixed part sizes and a given number of edges. To prove this result we use both previously known and previously unknown facts about rook placements in Young diagrams. Then we consider both matchings and matchings of fixed sizes in graphs with a given number vertices and edges. We prove that the graph with the fewest matchings is either the lex or the colex graph. Similarly, for fixed k , the graph with the fewest k -matchings is either the lex or the colex graph. (Received August 09, 2014)