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I. V. Hicks and **S. Margulies***, 6100 Main St. MS 134, Houston, TX 77098. *Vizing's Conjecture and Techniques from Computer Algebra.*

Given a graph G , a dominating set is a subset of vertices such that every vertex in the graph is in, or adjacent to a vertex, in the dominating set. The size of a minimum cardinality dominating set is denoted by $\gamma(G)$. Given two graphs, G and H , and the cartesian product graph $G \square H$, V. Vizing conjectured in 1968 that $\gamma(G)\gamma(H) \leq \gamma(G \square H)$. We represent the problem of finding a dominating set of size k in an arbitrary graph G as a system of polynomial equations, and show that Vizing's conjecture is equivalent to a conjecture about the equality of two particular ideals. We discuss techniques from computer algebra that can aid in the proof of Vizing's conjecture, or in the search for a counter-example. Additionally, we conjecture a very specific graph-theoretic interpretation of the unique, reduced Gröbner basis of these ideals. (Received February 23, 2010)