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Nathaniel Dean* (nd17@txstate.edu), Department of Mathematics, 601 University Drive, San Marcos, TX 78666. *Finite Solutions to Infinite Graph Problems.*

A graph is a combinatorial structure consisting of a set of objects called vertices and a set of edges defined as unordered pairs of vertices. We consider certain unsolved problems where length is associated with the edges of an infinite graph (i.e., chromatic number of the plane and integer distances). Then we investigate the number theoretic and geometric structure of related finite graphs (i.e., unit and rational distance graphs). Finally, we discuss how attempts to solve these problems and generalize them lead to ongoing research in mathematical programming, algebraic geometry, data visualization, statistical clustering, and other areas. (Received July 29, 2014)