1125-52-1569 **Rebecca F. Durst** (rfd1@williams.edu), **Max Hlavacek*** (mhlavacek@g.hmc.edu) and **Chi Huynh** (nhuynh30@gatech.edu). *Classification of All Crescent Configurations on Four and Five Points.*

Erdős once wrote, "my most striking contribution is, no doubt, my problem on the number of distinct distances." Consequent to his work on the problem, he conjectured that, for sufficiently large N, it is impossible to place N points in general position on the plane with $N-1$ distinct distances so there is a distance occurring exactly i times for every $1 \leq i \leq N-1$. These have been termed *crescent configurations* due to the increase in distance multiplicities. Although significant work has been done by C. Pomerance, I. Palásti and others, nothing is yet known about the existence of these configurations on n points for $n > 8$. We take a new approach to studying these using techniques from distance geometry and graph theory that have allowed us to provide a method for classifying all configurations on n points up to isomorphism. Furthermore, we have proven that there exist only three possible realizations on four points and have decreased the number of configurations on five points from 12,600 to 27 final realizations. We then return to Erdős' question on existence with a new effective method for turning previously intractable problems into a more solvable form. This is joint work with Steven J. Miller and Eyvindur A. Palsson. (Received September 18, 2016)