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Michael J. Mossinghoff* (mjm@member.ams.org), Department of Mathematics, Davidson College, Davidson, NC 28035-6996. *Isodiametric problems for polygons.*

What is the maximal area of a convex polygon having unit diameter and a fixed number of sides n ? What is the maximal perimeter of such a polygon? It is known that the regular polygon is not optimal in either problem when n is even and $n \geq 6$. In fact, the area problem is unsolved when $n = 2m$ and $m \geq 5$, and the perimeter problem is open when $n = 2^m$ and $m \geq 4$. We describe how an experimental approach, combining numeric and symbolic computations, led to the construction of two families of polygons, one achieving areas that are in a precise sense very nearly optimal in the open cases of the first problem, and the other exhibiting perimeters that are very nearly optimal in the open cases of the second. (Received July 31, 2006)