

1039-52-117

**Michael J. Mossinghoff\*** ([mimossinghoff@davidson.edu](mailto:mimossinghoff@davidson.edu)), Department of Mathematics, Davidson College, Davidson, NC 28035-6996. *Convex polygons with fixed diameter and maximal perimeter*. Preliminary report.

A result of Karl Reinhardt from 1922 establishes that the maximal perimeter of a convex polygon with  $n$  sides and unit diameter is  $2n \sin(\pi/2n)$ , provided that  $n$  is not a power of 2. For a given positive integer  $n$ , how many different qualifying  $n$ -gons achieve this bound? This is unknown in general. We describe some recent progress on this problem, obtained using number theory, combinatorics, and some computation, and we provide some partial answers, including a new general lower bound. (Received March 09, 2008)