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Michael J. Mossinghoff* (mimossinghoff@davidson.edu), Department of Mathematics,
Davidson College, Davidson, NC 28035-6996. *Enumerating isodiametric and isoperimetric
polygons.*

For a positive integer n that is not a power of 2, precisely the same family of convex polygons with n sides is optimal in three different geometric problems. These polygons have maximal perimeter relative to their diameter, maximal width relative to their diameter, and maximal width relative to their perimeter. We study the number of different convex n -gons $E(n)$ which are extremal in these three isodiametric and isoperimetric problems. We show that $E(n) > \frac{p}{4n} \cdot 2^{n/p}$ if p is the smallest odd prime divisor of n , prove that $E(n) = 1$ if and only if $n = p$ or $n = 2p$ for some odd prime p , and compute the exact value of $E(n)$ in several cases. (Received June 11, 2010)