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Wenxiong Chen^{*} (wchen@yu.edu), Department of Mathematics, Yeshiva University, 500 W. 185 St., New York, NY 10033, and Ralph Howard, Erwin Lutwak, Deane Yang and Gaoyong Zhang. A generalized affine isoperimetric inequality and the L_p Minkowski problem.

We gave a purely analytic proof for an inequality that has as a direct consequence the two important affine isoperimetric inequalities of plane convex geometry: The Blaschke-Santalo inequality and the affine isoperimetric inequality of affine differential geometry. We removed the traditional convexity assumption so that the inequality can be applied to solve the L_p Minkowski problem for not necessarily positive data. Then using this inequality, we established various existences of positive solutions for the L_p Minkowski problem on the plane for $0 \ge p \ge -2$. Geometrically, this corresponds to positive support functions with not necessarily positive "curvature". In the case 0 > p > -2, we obtained necessary and sufficient conditions for the solvability of the problem. (Received January 30, 2006)