RESEARCH GROUP IN MATHEMATICAL INEQUALITIES AND APPLICATIONS

PROBLEM CORNER

Problem 6, (2009)

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Let two circumcircles with the same center O and radii R, r with $R > r$. The polygon $A_1A_2...A_n$ is inscribed, (O, r). A_1A_2 intersects (O, R) at B_1, and denote B_i as the intersection of A_iA_{i+1} with (O, R). Assuming that $n + 1 \equiv 1$, we have the polygon $B_1B_2...B_n$. Let S_A be the area of polygon $A_1A_2...A_n$ and S_B is the area of $B_1B_2...B_n$.
Prove or disprove that

$$\frac{S_B}{S_A} \geq \frac{R^2}{r^2}$$

Remark:The author has proven the above inequality for the case $n = 3$ and $n = 4$.