ROMANIAN MATHEMATICAL MAGAZINE

If in $\Delta ABC, s = 11r$ then:

$$r^2 \leq \frac{\sqrt{3}}{44}\max(a^2, b^2, c^2)$$

Proposed by Radu Diaconu-Romania

Solution by Tapas Das-India

$$\frac{a^2+b^2+c^2}{3}\cdot\frac{\sqrt{3}}{44} \overset{Ionescu-Weitzenbock}{\geq} \frac{4\sqrt{3}F}{3}\cdot\frac{\sqrt{3}}{44} = \frac{r.s}{11} \overset{s=11r}{\geq} r\cdot\frac{11r}{11} = r^2$$

$$Hence\ we\ can\ say\ \ r^2 \leq \frac{a^2+b^2+c^2}{3}\cdot\frac{\sqrt{3}}{44} \leq \frac{\sqrt{3}}{44}\max(a^2, b^2, c^2)$$