

# ROMANIAN MATHEMATICAL MAGAZINE

In  $\triangle ABC$  the following relationship holds:

$$r_a r_b r_c \geq 27r^3$$

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*Solution by Daniel Sitaru – Romania*

$$\begin{aligned} r_a r_b r_c &= \frac{F}{s-a} \cdot \frac{F}{s-b} \cdot \frac{F}{s-c} = \frac{F^3}{(s-a)(s-b)(s-c)} = \\ &= \frac{F^3 s}{s(s-a)(s-b)(s-c)} = \frac{F^3 s}{F^2} = Fs = rs \cdot s = rs^2 \stackrel{\text{MITRINOVIC}}{\geq} \\ &\geq r \cdot (3\sqrt{3}r)^2 = r \cdot 27r^2 = 27r^3 \end{aligned}$$

Equality holds for  $a = b = c$ .