

PP45140

MIHÁLY BENCZE - ROMANIA

In all triangles ABC holds:

$$2r \sum_{cyc} \frac{r_a}{h_a} = R \sum_{cyc} \frac{h_a h_b}{r_a r_b}$$

Solution by Daniel Sitaru and Claudia Nănuți.

$$2r \sum_{cyc} \frac{\frac{F}{s-a}}{\frac{2F}{a}} = R \sum_{cyc} \frac{\frac{2F}{a} \cdot \frac{2F}{b}}{\frac{F}{s-a} \cdot \frac{F}{s-b}}$$

$$r \sum_{cyc} \frac{a}{s-a} = 4R \sum_{cyc} \frac{(s-a)(s-b)}{ab}$$

$$\frac{r}{(s-a)(s-b)(s-c)} \sum_{cyc} a(s-b)(s-c) = \frac{4R}{abc} \sum_{cyc} c(s-a)(s-b)$$

$$\frac{r}{(s-a)(s-b)(s-c)} = \frac{4R}{abc}$$

$$\frac{rs}{s(s-a)(s-b)(s-c)} = \frac{4R}{4RF}$$

$$\frac{F}{F^2} = \frac{1}{F}$$

$$\frac{1}{F} = \frac{1}{F}$$

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