PP43140

MIHÁLY BENCZE - ROMANIA

In all triangles ABC holds:

$$\sum_{cyc} \frac{a(b^2 \sin C + c^2 \sin B)}{b+c} = 6sr$$

Solution by Daniel Sitaru, Claudia Nănuţi.

$$\sum_{cyc} \frac{a(b^2 \sin C + c^2 \sin B)}{b+c} =$$

$$= \sum_{cyc} \frac{a(b^2 \cdot \frac{c}{2R} + c^2 \cdot \frac{b}{2R})}{b+c} =$$

$$= \frac{1}{2R} \sum_{cyc} \frac{a(b^2 c + c^2 b)}{b+c} = \frac{1}{2R} \sum_{cyc} \frac{abc(b+c)}{b+c} =$$

$$= \frac{1}{2R} \sum_{cyc} abc = \frac{3}{2R} \cdot 4RF = 6F = 6rs$$

$\square$

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