PP46900

MIHÁLY BENCZE - ROMANIA

In all triangles ABC holds:

$$\sum_{cyc} \frac{a}{\sin^2 \frac{A}{2}} = \frac{4sR}{r}$$

Solution by Daniel Sitaru, Claudia Nănuţi.

$$\sum_{cyc} \frac{a}{\sin^2 \frac{A}{2}} = \sum_{cyc} \frac{a}{\frac{(s-b)(s-c)}{bc}} =$$

$$= abc \sum_{cyc} \frac{1}{(s-b)(s-c)} = \frac{abc}{(s-a)(s-b)(s-c)} \sum_{cyc} (s-a) =$$

$$= \frac{abcs}{s(s-a)(s-b)(s-c)} \left(3s - \sum_{cyc} a\right) =$$

$$= \frac{abcs}{F^2}(3s-2s) = \frac{abcs^2}{r^2 s^2} =$$

$$= \frac{abc}{r^2} = \frac{4Rrs}{r^2} = \frac{4Rs}{r}$$

□

Mathematics Department, National Economic College "Theodor Costescu", Drobeta Turnu - Severin, Romania

Email address: dansitaru63@yahoo.com