PP40325

DANIEL SITARU - ROMANIA

Prove that in any ΔABC the following relationship holds:

$$\sum \frac{(b^2 + c^2)w_a}{m_a} \leq 18R^2$$

Solution by Rovsen Pirguliyev - Azerbaijan.
It is known that:

(1) $$w_a \leq m_a, \quad w_b \leq m_b, \quad w_c \leq m_c$$

Using (1) and

(2) $$a^2 + b^2 + c^2 \leq 9R^2$$

$(9R^2 - \sum a^2 = OH^2 \geq 0$, Geometric ineq. Bottema, 1968)
We have:

$$\sum \frac{(b^2 + c^2)w_a}{m_a} \overset{(1)}{\leq} \sum (b^2 + c^2) = 2(a^2 + b^2 + c^2) \overset{(2)}{\leq} 18R^2$$

$\square$

MATHEMATICS DEPARTMENT, NATIONAL ECONOMIC COLLEGE "THEODOR COSTESCU", DROBETA TURNU - SEVERIN, ROMANIA
  Email address: dansitaru63@yahoo.com