

Proof of Correctedness for Special Pythagorean Triplets

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Theorem 0.1. *Let a, b, c, S be natural numbers such that $a^2 + b^2 = c^2$ and $a + b + c = S$.*

We have $a, b, c \leq \frac{S}{2}$.

Proof. Consider a right-angled triangle T with side lengths a, b, c . The perimeter of the triangle T is S . By the triangle inequality, $c \leq a + b$, hence $2c \leq a + b + c = S$, so $c \leq \frac{S}{2}$. Since $a, b \leq c$, we get the result. \square