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Short Communication

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Fermat's Theorem Arithmetic Demonstration

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Abstract
One of the factors of the number A+B-C is a fraction proper.

Theorem
In a prime base $n > 2$ and reciprocals prime (coprime) numbers *A, B, C*, not multiples of n (basic case), the equality

- $A^n + B^n - C^n = 0$ impossible.

Simplest Properties of Fermat's equality (1) In the Basic Case

- $A+B=c^n$, $C-B=a^n$, $C-A=b^n$. And $a^n + b^n = (a+b)r'$, $c^n - b^n = (c-b)p'$; $c^n - a^n = (c-a)q'$.
- $A = ap$, $B = bq$, $C = cr$; where the numbers *a, b, c, p, q, r* [like numbers in pairs $a+b$ and r'; $c-b$ and p'; $c-a$ and q'] are reciprocals prime.
- $U = A + B - C = ap - a^n = bq - b^n = c^n - cr = (c^n - a^n - b^n)/2 = abcu$ (where, how easy it is to see, numbers v ($=abc$) and u are reciprocals prime).
- a', b', c' – greatest common measures (G.C.M.) in pairs $(a, c-b)$, $(b, c-a)$, $(c, a+b)$. U' is number $a'+b'-c'$. p', q', r' are numbers $(c'^n-b'^n)/(c'-b')$, $(c'^n-a'^n)/(c'-a')$, $(a'^n+b'^n)/(a'+b')$. $c' > 1$.

Proof of the Theorem
If $U' = 0$, then $c'^2-a'^2-b'^2 = 2a'b'$ with the fraction proper $(2a'b')/(2a'b'c')$ (see 4)!
And after the recovery of all the factors of the number U, the fraction $1/c'$ remains.
And if $U' \neq 0$, then with the recovery of the number U the term c' multiplies by c'^{n-1}, and the term $a'+b'$ multiplies by r' (see 5), which is reciprocals prime (coprime) numbers with the denominator $a'b'c'$. Consequently, the fraction $(a'+b'-c')/(2a'b'c')$ of the number U remains, and the Fermat's equality (1) in integers is impossible.
The theorem is proven.