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

- \( A^n + B^n - C^n = 0 \)
- \( A = ap, B = bq, C = cr \)
- \( a', b', c' \) – greatest common measures (G.C.M.) in pairs \((a, c-b), (b, c-a), (a+b, c)\).
- \( U = A + B - C = ap - a^n = bq - b^n = cr - c^n = (a^n - a^n - b^n)/2 = abc u \) (where, how easy it is to see, numbers \( v (=abc) \) and \( u \) are reciprocals prime).

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 \( c' \) multiples by \( c'^{-1} \), and the term \( a' \cdot b' \) multiples by \( r' \) (see 5), which is reciprocals prime (coprime) numbers with the denominator \( a'b'c' \). Consequently, the fraction \( (a' \cdot b' \cdot c')(2a'b'c') \) of the number \( U \) remains, and the Fermat’s equality (1) in integers is impossible.

The theorem is proven.