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October 25, 1994

D. Andrew Beal
P.O. Drawer 3107
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Dear Sir,

I am sending your letter of October 5, 1994 to an expert on Fermat's Last Theorem. His reply is enclosed, which should be of interest to you.

Sincerely,

Carl J. Taft, Executive Editor
Communications in Algebra

Date: October 21, 1994

Subject: Beal letter

I looked briefly into the equation $A^x + B^y = C^z$. There exists a well known relevant conjecture:

The abc conjecture: Suppose that a,b,c are realitively prime integers with $a+b = c$. Then there exist constants μ, ϵ such that the maximum of the absolute value of a, b, c is no more than $\mu N(abc)^{1+\epsilon}$, where $N(x)$ is the product of the prime divisors of x.

Applying this conjecture to $a = A^x, b = B^y, c = C^y$ shows that the equation has no solutions in relatively prime A, B, C when the exponents are large enough.

The reference S. Lang, BAMS 23 (1990) 37–75 treats the abc conjecture and its relatives.

I found only one reference in math reviews to an equation like this, MR 85g:10027 which reviews a paper claiming to prove that $A^m + B^n = C^m$ has no solutions in relatively prime integers with exponents at least three. Needless to say, the reviewer was unable to understand the author's proof.

I see no reason that the equation does not have relatively prime solutions for some small exponents. If I find some I will let you know.