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June 3, 2013

Beal Conjecture Prize Increased to $1 Million

Prize enhanced to inspire young mathematicians and spur general interest in mathematics

Providence—The American Mathematical Society (AMS) announced today that the prize for the solution to the Beal Conjecture, a number theory problem, has been increased to US$1 million. The prize and Conjecture are named for D. Andrew "Andy" Beal, a Dallas banker who has a strong interest in number theory and who provided the funds for the Beal Prize.

The Beal Conjecture states that the only solutions to the equation $A^x + B^y = C^z$, when A, B, C, are positive integers, and x, y, and z are positive integers greater than 2, are those in which A, B, and C have a common factor. By way of example, $3^3 + 6^3 = 3^5$, but the numbers that are the bases have a common factor of 3, so the equation does not disprove the theorem; it is not a counterexample.

The truth of the Beal Conjecture implies Fermat's Last Theorem, which states that there are no solutions to the equation $a^n + b^n = c^n$ where a, b, and c are positive integers and n is a positive integer greater than 2. More than three hundred years ago, Pierre de Fermat claimed he had a proof but did not leave a record of it. The theorem was finally proved in the 1990s by Andrew Wiles, together with Richard Taylor. Both the Beal Conjecture and Fermat's Last Theorem are typical of many statements in number theory: easy to say, but extremely difficult to prove.

Andy Beal first established the prize for a solution to the Beal Conjecture in 1997. To date, no correct solution to the problem has been found. The current funding is an increase from the previously funded amount of $100,000. Funds for the prize are held in trust by the AMS.

"I was inspired by the prize offered for proving Fermat," said Mr. Beal, a self-taught mathematician with an interest in numbers theory. "I'd like to inspire young people to pursue math and science. Increasing the prize is a good way to draw attention to mathematics generally and the Beal Conjecture specifically. I hope many more young people will find themselves drawn into the wonderful world of mathematics."

The prize for solving the Beal Conjecture is not the only million-dollar prize for the solution of a mathematics problem. In 2000, the Clay Mathematics Institute created seven $1-million-dollar prizes for problems now known as the Millennium Problems. One, the Poincaré Conjecture,

was solved by Russian mathematician Grigori Perelman in works he made public in 2003 (he turned down the monetary prize).

More information about the Beal Conjecture and prize is at ams.org/beal-prize, and in the *Notices of the AMS*, "A Generalization of Fermat's Last Theorem: The Beal Conjecture and Prize Problem," at www.ams.org/notices/199711/beal.pdf.

Summary of Prize rules: To earn the Beal Prize, a proposed solution must be published in a refereed mathematics publication which is respected and, in the opinion of the prize committee (selected by the AMS), maintains the highest editorial standards. In the case of a counterexample, it will be subject to independent verification. Following a two-year period the prize committee will decide whether a solution merits detailed evaluation. **Solutions should not be sent to the AMS, the prize committee, or to Mr. Beal, and they must be published in the manner stated above to be considered.** The full rules may be found at ams.org/beal-prize. Information about publishing a math research article may be found at ams.org/publication-guidelines.

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