

Number Theory

The Babylonians knew how to find many positive integer solutions to the equation

$$x^2 + y^2 = z^2.$$

(See if you can find some of them). The Greeks knew that there were infinitely many integer solutions, which they called Pythagorean triples. (Can you find the historical reference?) In fact, they knew that there are infinitely many *primitive* ones: solutions like $(3, 4, 5)$ that have no common factors — so $(6, 8, 10)$ doesn't count as a new and interesting triple.

In 1637 century the French mathematician Fermat conjectured that the equation

$$x^3 + y^3 = z^3$$

has no positive integer solutions. In fact, he conjectured the same for the equation

$$x^d + y^d = z^d$$

for any positive exponent $d > 2$. Fermat's conjecture was finally proved in 1995 by the Andrew Wiles of Princeton University with help from Richard Taylor.