

Letter from the Chief Editor

Mathematicians Solve 'Trillion' Triangle Problem

Mathematicians from North America, Europe, Australia, and South America have resolved the first one trillion cases of an ancient mathematics problem. The advance was made possible by a clever technique for multiplying large numbers. The numbers involved are so enormous that if their digits were written out by hand they would stretch to the moon and back. The biggest challenge was that these numbers could not even fit into the main memory of the available computers, so the researchers had to make extensive use of the computers' hard drives. According to Brian Conrey, Director of the American Institute of Mathematics, "Old problems like this may seem obscure, but they generate a lot of interesting and useful research as people develop new ways to attack them." The problem, which was first posed more than a thousand years ago, concerns the areas of right-angled triangles. The surprisingly difficult problem is to determine which whole numbers can be the area of a right-angled triangle whose sides are whole numbers or fractions. The area of such a triangle is called a "congruent number." For example, the 3-4-5 right triangle which students see in geometry has area $\frac{1}{2} \times 3 \times 4 = 6$, so 6 is a congruent number. The smallest congruent number is 5, which is the area of the right triangle with sides $\frac{3}{2}$, $\frac{20}{3}$, and $\frac{41}{6}$. The first few congruent numbers are 5, 6, 7, 13, 14, 15, 20, and 21. Many congruent numbers were known prior to the new calculation. For example, every number in the sequence 5, 13, 21, 29, 37, ..., is a congruent number. But other similar looking sequences, like 3, 11, 19, 27, 35, ..., are more mysterious and each number has to be checked individually. The calculation found 3,148,379,694 of these more mysterious congruent numbers up to a trillion. Results such as these are sometimes viewed with skepticism because of the complexity of carrying out such a large calculation and the potential for bugs in either the computer or the programming. Dear IIT aspirants, if such tedious problem can be solved by these mathematicians, you are no less than them. Come on, take the lesson and achieve your target. With our Best Wishes



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