ABC@home is a mathematical project searching for abc-triples. An abc-triple consists of 3 numbers satisfying certain conditions. These triples might be helpful in proving the ABC-conjecture, one of the holy grails of mathematics, because of its interesting consequences.

ABC@home project URL; http://abcathome.com/

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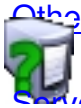

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An ABC-triple consists of 3 numbers a, b and c, satisfying the following conditions: a and b are
This means that the quality of the triple. The quality q is defined as:

The ABC conjecture

Since rad(abc) < c, the quality will always be greater than 1. Also there are infinately many triples. This can be proven by looking at the triples 1, 9^n-1, 9^n. Note that 9^n-1 can be divided by 8, because if 9^{n-1}-1 is divisible by 8, so is 9^n-1 = 9^{n-1}-1*9+8. Since 9

1

-1 is divisible by 8, so is 9

2

-1 and so is 9

3

-1, and so on. And since b is divisible by 8, rad(b) <= b/4. Also, the radical of c is 3 and the radical of a = 1. So rad(abc) <= 1*b/4*3 < b < c. So, this will always be an abc-triple.

So there are infinately many abc triples with *q* > 1. But the abc-conjecture says that there are only finitely many triples with q > 2. Or q > 1,1. Or even q > 1,0001. So

"for any e > 1, there are only finitely many abc-triples with q(abc) > e"

Consequences of the ABC conjecture

For the first consequense we do not even have to assume the abc-conjecture is true, but we'll assume the weak version is true, which says there are no triples with quality greater than 2. If this is true, one cannot find any solutions for the following equality: $p^n + q^n = r^n$ and n => 6. You may know this as Fermat's Last Theorem (FLT), only for n => 6 instead of n => 3. Suppose there is a solution, we can say a = p^n, b=q^n, and c=r^n. And rad(abc) <= pqr < r^3. Since c=r^6, c > $rad(abc)^2$, so *q* would be greater than 2. So this means we can't find solution to FLT for n => 6. Now we already know FLT is true, but we have a very complicated proof. So if we can prove this weak version of

the ABC-conjecture, we have a much simpler proof of FLT, since the case for n = 3, 4 or 5 is very simple and has been known for ages.

This is a very interesting video about FLT, explaining it very clearly. The Fermat's Last Theorem video comes in five, ten minute video's. Here are all the links; [part1 , part2 , part3 , part4 , part5
].

Another consequence is that the set of 3 consecutive powerful numbers is finite. A powerful number is a number which can be written as $n = a^2b^3$. So if any prime p divides n, so does p^2. A proof will follow soon here.

For more information about the ABC-conjecture, and a more extensive list of consequences, see Abderrahmane Nitaj's ABC-conjecture website or the Wikipedia article about the ABC conjecture.