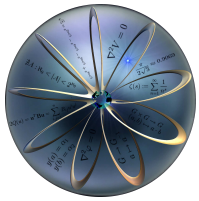

planetmath.org

Math for the people, by the people.

world records in mathematics

Canonical name	WorldRecordsInMathematics
Date of creation	2013-03-22 17:09:26
Last modified on	2013-03-22 17:09:26
Owner	PrimeFan (13766)
Last modified by	PrimeFan (13766)
Numerical id	9
Author	PrimeFan (13766)
Entry type	Feature
Classification	msc 01A07

In the sciences and in sports there are world records for achievements and discoveries. There are *world records in mathematics*, too.

1 Numbers

1.1 Largest numbers

Largest named number In a standard abridged dictionary of the English language, the largest named number is the centillion, 10^{600}. Given a googol 10^{100}, a googolplex $10^{10^{100}}$ is clearly much larger than a centillion; these words may be found in more recent unabridged dictionaries and certainly in mathematics dictionaries. According to the *Guinness Book of World Records 1991*, "the highest number ever used in a mathematical proof is a bounding value published in 1977 and known as Graham's number. It concerns bichromatic hypercubes and is inexpressible without the special 'arrow' notation, devised by Knuth in 1976, extended to 64 layers." (McFarlan, 1990)

Largest number factored The largest composite number factored (for which the factoring team did not know the answer beforehand) is RSA-200,
3532461934402770121272604978198464368671197400197625023649303468776121253679423200058547
times 7925869954478333033347085841480059687737975857364219960734330341455767872818152135
which was factored by a four-man team in 2005 using the general number field sieve. This record could be beat by the factorization of a Fermat number (beyond the known Fermat primes, and some partially factored Fermat numbers, the primality of most of these numbers remains an open question).

Largest known prime According to the Prime Pages, the largest known prime number is usually a Mersenne prime, currently $2^{32582657} - 1$, discovered by GIMPS last year. The largest known non-Mersenne prime, seventh overall, is currently $19249 \times 2^{13018586} + 1$, discovered by Konstantin Agafonov earlier this month using SoBSieve and other programs.

Largest known perfect number The largest known perfect number is of course the largest known Mersenne prime times the nearest power of two less than the Mersenne prime, in this case, $(2^{32582657} - 1)2^{32582656}$. No odd perfect numbers are known, and the current lower bound for an odd perfect number is significantly smaller.

Newest constant As of 1990, the newest mathematical constant was Feigenbaum's constant, approximately 4.6692016010299, according to *Guinness*.

2 Theorems, proofs, puzzles, etc.

Most-proved theorem According to the *Guinness*, Pythagoras' theorem has been proved the most often. A book of over a thousand proofs of the theorem includes an 1876 proof by then-Congressman James Garfield (PlanetMath has a `http://planetmath.org/ProofOfPythagoreasTheorem`proof with a square, a `http://planetmath.org/ProofOfPythagoreanTheorem`proof splitting a triangle into two smaller triangles, a `http://planetmath.org/ProofOfPythagoreanThe` with two triangles inside a square and Garfield's proof of Pythagorean theorem). Many people have authored proofs that there are infinitely many primes, however, most of these use either factorials or primorials and thus don't count as distinct proofs.

Largest prize Paul Wolfskehl's prize for a proof of Fermat's last theorem was 100000 Deutsche Marks; at the time it was offered, it would've been equivalent to about two million American dollars today, but because of inflation in Germany, it was only about sixty thousand dollars when Andrew Wiles received it. In 1993, Andrew Beal offered US$100000 for a proof of Beal's conjecture; this remains the largest prize offered by an individual. In 2001, the Clay Mathematics Institute offered US$7000000 for solutions of its seven Millennium Problems, or US$1000000 for a solution of one of the problems.

3 People

Longest-lived professional mathematician Austrian topologist Leopold Vietoris was born on June 4, 1891 and died two months short of his 111^{th} birthday on April 9, 2002.

Most prolific collaborator Paul Erdős collaborated with 509 other mathematicians on papers on a wide variety of mathematical topics, giving rise to the idea of the `http://planetmath.org/ErdHosNumber`Erdős number.

Highest documented Erdős number Michael Hones has Erdős number 8 (Styer, 2005)

References

[1] D. McFarlan, editor. *The Guinness Book of World Records 1991* New York: Guinness Publishing Limited (1990): 75 - 76

[2] R. Styer `http://www41.homepage.villanova.edu/robert.styer/ErdosNumber.htm`"Erdös numbers at Villanova http://www41.homepage.villanova.edu/robert.styer/ErdosNumber.htm Last updated July 22, 2005, accessed May 25, 2007