



2<sup>P</sup>-1  
May Be Prime!

# Great Internet Mersenne Prime Search

## GIMPS

Finding World Record Primes Since 1996



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### Welcome to GIMPS

## the Great Internet Mersenne Prime Search

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#### What is GIMPS?

GIMPS is a collaborative project of volunteers who search for [Mersenne prime numbers](#). Find out [how it works](#), [create an account](#), [download software](#), start searching! Ask questions on the [Mersenne Forum](#).

All exponents below **80 404 189** have been tested and verified.  
All exponents below **140 063 639** have been tested at least once.

Previous Day Stats	Today's Numbers
Newly Factored	109
First Prime Tests	251
Verified Prime Tests	554
	GFLOP/s
	GHz-Days
	CPUs & GPUs

2025-Sep-08

### All tests smaller than the 50th Mersenne Prime, M(77 232 917), have been verified

M(77 232 917) was discovered seven and half years ago. Now, thanks to the diligent efforts of many GIMPS volunteers, every smaller Mersenne number has been successfully double-checked. M(77 232 917) officially becomes the 50th Mersenne prime. This is a significant [milestone](#) for the GIMPS project. The next Mersenne milestone is not far away, please consider joining this important double-checking effort.

2025-Jun-23

### All tests smaller than the 49th Mersenne Prime, M(74 207 281), have been verified

M(74 207 281) was discovered nine and half years ago. Now, thanks to the largely unheralded and dedicated efforts of thousands of GIMPS volunteers, every smaller Mersenne number has been successfully double-checked. Thus, M(74 207 281) officially becomes the 49th Mersenne prime. This is a significant [milestone](#) for the GIMPS project. The next two Mersenne milestones are not far away, please consider joining this important double-checking effort.

## 2<sup>136279841</sup>-1 is the New Largest Known Prime Number

October 21, 2024 — The Great Internet Mersenne Prime Search (GIMPS) has discovered a new Mersenne prime number, 2<sup>136279841</sup>-1. At **41,024,320 digits**, it eclipses by more than 16 million digits the [previous largest known prime number](#) found by GIMPS nearly 6 years ago.

Luke Durant, GIMPS most prolific contributor using [free GIMPS software](#), proved the number prime on October 12. After notifying the GIMPS server, GIMPS began a rigorous process of independent confirmation of the prime number on several different hardware platforms using several different programs. This process concluded on October 19th.

This prime ends the 28 year reign of ordinary PCs finding the largest known prime. In 2017, Mihai Preda authored Mersenne prime search software that runs on GPUs. GPUs were primarily used for video cards or for mining cryptocurrency. Nowadays, video cards are also used to power the AI revolution. Durant's idea was to use these powerful GPUs that are now available in the cloud at a heavily discounted when they are being under-utilized. Luke organized these cloud GPUs creating a kind of "cloud supercomputer" spanning 17 countries. After nearly a year of testing, Luke struck paydirt. On October 11, an NVIDIA A100 GPU in Dublin, Ireland, reported that M136279841 is probably prime. On October 12, an NVIDIA H100 in San Antonio, Texas, USA, confirmed the prime with a Lucas-Lehmer test.

Luke, a 36 year-old researcher from San Jose, CA, and former NVIDIA employee, is one of thousands of GIMPS volunteers contributing spare CPU and GPU time in hopes of making a little history. Mihai Preda, and later George Woltman, wrote the GPU software. Aaron Blosser keeps the GIMPS server running smoothly. This discovery is also made possible by the combined efforts of every GIMPS volunteer testing Mersenne numbers that did not turn out to be prime. In recognition of all the above, official credit for this discovery goes to "L. Durant, M. Preda, G. Woltman, and Aaron Blosser, et al."

The new prime is only the 52nd known Mersenne prime ever discovered. Mersenne primes were named for the French monk [Marin Mersenne](#), who studied these numbers more than 350 years ago. GIMPS, founded by George Woltman in 1996, has discovered the last 18 Mersenne primes. Volunteers [download a free program](#) to search for these primes, with a \$3000 award offered to the first person lucky enough to find a new prime. Prof. Chris Caldwell maintained an authoritative web site on [the largest known primes](#), and wrote an excellent [history of Mersenne primes](#).

You can read a little more in the [press release](#).

Plus a Stand-Up Maths video!

And a Numberphile interview with Luke:



### New largest prime number found! See all 41,024,320 digits

Stand-up Maths



Watch on



### The Man Who Found the World's Biggest Prime -

Numberphile



Watch on

2024-Nov-30

### Hoodies, T-shirts, and Mugs

Viliam Furik, who organized the production and distribution of GIMPS polo shirts several years ago, has set up a [store](#) where you can purchase GIMPS hoodies, t-shirts, mugs, and decals. Profits directly support the mission of GIMPS. Sadly, no polo shirts yet.



2024-Mar-06

**Prime95 version 30.19 released**

Version [30.19 is now available](#). ECM stage 2 is now much faster if you can give prime95 lots of memory to use. This is similar to the improvements to P-1 stage 2 in version 30.8. There are bug fixes and tweaks. This is not a required upgrade -- version 30.3 and later can be used to hunt for new Mersenne primes. Should you decide to upgrade, if any workers are currently in ECM stage 2 wait for ECM or P-1 to finish before upgrading. If you have any upgrade questions, ask in [this thread](#) at Mersenne Forum.

2021-Apr-08

**First-time Lucas-Lehmer Testing Ends**

One year ago, first-time PRP primality testing with proofs was introduced. It has been a huge success, saving GIMPS tens of thousands future double-checks. Going forward, the server will make available exponents for first time Lucas-Lehmer tests. Users that have not yet upgraded to [Prime95 version 30.3 \(or newer\)](#) or [PRPLL for GPUs](#) should do so. Failure to upgrade will result in unnecessary double-check work. GIMPS has a multi-year backlog of double-checks to work through. There is even a chance that a new Mersenne prime is hidden in all those double-checks.

The server will continue to accept Lucas-Lehmer results. There is no need to worry about any LL tests that are currently underway.

2020-Sep-10

**BIG Changes Are Here! Prime95 version 30.3 released.**

For almost 25 years, GIMPS has looked for new Mersenne primes by running a primality test on one computer and later running the exact same primality test on another computer to guard hardware errors having corrupted the first primality test.

A [breakthrough by Krzysztof Pietrzak](#) makes it possible to eliminate the second primality test! The first primality test produces a proof file that can be securely verified with less than 0.5% of required to re-run the primality test. This breakthrough will nearly double GIMPS' throughput in the long run.

Version [30.3 is now available](#) with PRP proofs. While not a required upgrade, at some point in the future only users running version 30.3 with PRP proofs will be assigned first-time primality tests. Should you run into any problems, support is available at [this thread at Mersenne Forum](#).

Many thanks to Mihai Preda for discovering the paper on the breakthrough and realizing its importance to the GIMPS project. Also, thanks go to Pavel Atnashev for important ideas on adapting discovery for use by GIMPS.

2020-Sep-10

**BOINC users with GPUs can now participate**

[SRBase](#) has created a BOINC project to hand out trial factoring assignments on large Mersenne numbers. These are very quick work units. To get the most of the BOINC client without any [FAQ at the SRBASE forum](#) is available.

Note that there's no way to individually credit SRBase users in GIMPS [trial factoring stats](#). All work is credited to GIMPS user SRBase.

**More News and Discussions**

**GIMPS forums** — [Here](#) you can chat with fellow GIMPS members, get help with installation questions, learn more about how GIMPS works, etc.

**Make Math History!!**

You could discover one of the most coveted finds in all of Mathematics - a new Mersenne prime number. We've [found eighteen](#) already. Join in on this fun, yet serious research project. All you need is a personal computer, patience, and a lot of luck.

In addition to the joy of making a mathematical discovery, you could win a [\(USD\) \\$3,000 cash GIMPS Research Discovery Award](#) for each Mersenne prime discovered, and the [Electronic Foundation](#) is offering a [\\$150,000 award](#) to the first person or group to discover a 100 million digit prime number! See how [GIMPS will distribute this award](#) if we are lucky enough to find the 100 million digit prime.

**What are Mersenne primes and why do we search for them?**

Prime numbers have long fascinated amateur and professional mathematicians. An integer greater than one is called a prime number if its only divisors are one and itself. The first prime numbers are 2, 3, 5, 7, 11, etc. For example, the number 10 is not prime because it is divisible by 2 and 5. A Mersenne prime is a prime of the form  $2^p - 1$ . The first Mersenne primes are 3, 7, 31, 127 (corresponding to  $p = 2, 3, 5, 7$ ). There are only 52 known Mersenne primes.

GIMPS, the Great Internet Mersenne Prime Search, was formed in January 1996 to discover new world-record-size Mersenne primes. GIMPS harnesses the power of thousands of small computers like yours to search for these "needles in a haystack".

Most GIMPS members join the search for the thrill of possibly discovering a record-setting, rare, and historic new Mersenne prime. Of course, there are [many other reasons](#).