There is only one

A zine for those who want to become one with one.

"One One" was a racehorse,
"One Two" was one too.
"One One" won one race.
12112

1 Motivation

In their 1985 single, "One Vision", the British rock band *Queen* outlined the following research program:

> Give me your hearts, I'm ready!
> There's only one direction
> One world and one nation
> Yeah, one vision
>
> – Queen, "One Vision"

1 Foundations

We need some definitions:

For anyone,

$$1 + 1 = 1$$
$$1 - 1 = 1$$
$$1 \div 1 = 1$$
$$1 \times 1 = 1$$

There is only one function, and it is 1-to-1.

$$f(1) = 1$$

and one relation: $1 = 1$

1 Calculus

Thm. 1.1. *Every sequence converges.*

Proof. Consider a sequence: $1, 1, \ldots$. Let $\varepsilon = 1$ be arbitrary, we have:

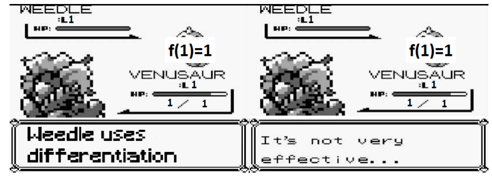
$$|1 - 1| = |1| = 1 = \varepsilon$$

□

Cor. 1.1. *Every series converges.*

This is left as an exercise to the reader.

1 Derivatives



$$\begin{aligned} f'(1) &= \lim_{h \to 1} \frac{f(h) - f(1)}{h - 1} \\ &= \lim_{1 \to 1} f(1) - f(1) = \lim_{1 \to 1} 1 = 1 \end{aligned}$$

1 Topology and Geometry

Here is a true statement:

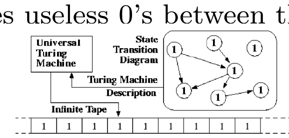
> There exist manifolds, M^m and N^n with $n > m$, but $N = M \setminus \{*\}$

Q: What's an empty manifold called?
A: Pointless.
Here is another true statement

> There is only one set: $\{1\}$

1 Complexity

One makes computers efficient if one removes useless 0's between the 1's.



Cor. 1.1. *The halting problem is solvable.*

Proof. Halt at 1. □

1 Algebra

There is only one group. Hey look! It's your friend group!

You
•

The one ring.

Did you miss it?
Sauron sure did.

1 The Riemann Hypothesis

Consider the function:

$$\zeta(s) = \sum \frac{1}{n^s}$$

We wish to find places where $\zeta(s) = 1$.
Plug in $s = 1$, and we're done.
This has application in the distribution of the single prime number, 1.

1 Yang-Mills Mass Gap

We wish to prove that for any compact simple gauge group G, a non-trivial quantum Yang-Mills theory exists on $\mathbb{R}^1$ and has a mass gap $\Delta > 0$.
Unfortunately, there is only one quantum Yang-Mills theory on $\mathbb{R}^1$, and it is trivial.

1 P vs. NP

One provides a solution to the Boolean satisfiability problem.

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True=1, False=1, Formula=1
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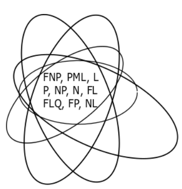
In fact, everything is $O(1)$:



1 Poincaré Conjecture

Let M be a manifold. Then $M = \{1\}$.
So:

Thm. 1.1. *There is only one manifold, and it is isomorphic to itself.*

The Poincaré conjecture immediately follows.

(One could also use some Ricci Flow with surgery.)

1 Navier Stokes

$$\rho \frac{DV}{Dt} = -\nabla p + \nabla \cdot \tau + \rho g$$

Wow, this simplifies greatly[1]

$$1 \frac{Df}{D1} = -\nabla 1 + \nabla \cdot 1 + 1$$

[1] see Section 1 for more details

1 Hodge Conjecture

Let M be a complex Kähler manifold, with cohomology ring:

$$H^1(M,1) = \bigoplus_{1+1=1}^{1} H^{1,1}(M) = 1$$

Every $N \subseteq M$ is algebraic[1], so all cohomology classes in $H^{1,1}(M)$ come from subvarieties.

[1] ie solves the polynomial equation $1 = 1$

1 BSD Conjecture

Dear reader,

I'll be perfectly honest with you, and tell you outright that I have no idea what the BSD conjecture even talks about.

All I know that it holds true over the field with one element, and that's all that's important.

Sincerely,

– Assaf Bar-Natan

1 Bonus: Collatz Conjecture

Proof by picture: