THE FUTURE OF HUMANITY

When Machines Prove What We Cannot Follow

What to do with a result that is certainly correct and understood by no one.

In 1976, a proof nobody could check by hand

Appel and Haken reduced the four colour theorem to **1,936 configurations** and over a thousand hours of computing.

Mathematicians objected: a proof is something a person can check.

In 2005 a Coq proof settled the matter. Now the checking is the part machines do best. What nobody can supply is the reading.

11 days

Claude agents wrote a Lean proof of Fermat's Last Theorem

Anthropic, 4 September 2026. A formal version of Wiles's 1995 proof, not a new result. Maker's own account.

~13M

lines of Lean, over five times the size of Mathlib

Three standard axioms, nothing else assumed. Kevin Buzzard reviewed it. Nobody is expected to read all of it.

Lean answers one question

COVERED	NOT COVERED
The conclusion follows from the statement	The statement means what we intended
Every step is valid	The definitions match their meaning
Nothing is skipped	The checker has no bugs
	Anyone understands why it is true

2 bugs in two independent checkers let a false Collatz "disproof" pass

Found within days, fixed within hours, written up openly. An implementation bug, not a hole in the theory. Two checkers agreeing is not the same as true.

"We absolutely cannot put blind trust in systems such as Lean."

Hales proved the Kepler conjecture and led the project to formalise it. "Cross-checking the proof by different kernels does not remove all doubt."

When to accept, when to refuse

ACCEPT WHEN	REFUSE WHEN
The claim is short and readable	Nobody accountable can read it
The checker is independent	Producer and checker are one system
Checker is current and tested	The decision needs the reason
Being wrong is cheap	Stakes are high, checker untested

Before you accept a machine-checked result

1. What exactly did the check cover?
2. Who wrote the statement, and who has read it?
3. Is the checker independent of the producer?
4. Who is accountable, and can they explain it?
5. Who are we training to audit the checkers?

Know what the check covered. Keep a person on the rest.



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