Please Fill Out All of Your Courses Teaching Evals

May 10, 2022

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7) **Please Fill Out the Teaching Evals in All of your Courses**

Schur's Thm + FLT(for $n = 4$) implies Primes Infinite

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1. Granville and Gasarch build on work from Alpoge.
2. Gasarch uses easier Ramsey Theory than the other two.
3. All three of these proofs are harder than the usual proof

Background Needed

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Schur's Theorem

Thm $(\forall c)(\exists S = S(c))$ st for all c-colorings $\mathrm{COL}\colon [S] \rightarrow [c]$ there exists x, y, z monochormatic such that $x + y = z$.

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Say its $a < b < c$

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Let $x = c - b$, $y = b - a$, $z = c - a$.
So let $S(c) = R(3; c)$ (homog set 3, colors c).

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In modern terminology:

$$(\forall n \geq 3)(\forall x, y, z \in \mathbb{N} - \{0\})[x^n + y^n \neq z^n].$$

This has come to be known as **Fermat's Last Theorem**.

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2) The eleventh Dr. Who gave **The real proof** to a group of geniuses to gain their trust. He later said that it was Fermat's original proof (possible but unlikely) but that Fermat didn't write it down since he died in a duel (not true). The writers of the show either confused Galois with Fermat or meant to say that Fermat died in a duel in a dual timeline.

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$(p_1^{x_1} \cdots p_L^{x_L})^4 + (p_1^{y_1} \cdots p_L^{y_L})^4 = (p_1^{z_1} \cdots p_L^{z_L})^4$
This violates FLT for $n = 4$.