SPRINGFIELD THEORY

Mathematical references abound on *The Simpsons*

BY ERICA KLARREICH

In the 1995 Halloween episode of the award-winning animated sitcom *The Simpsons*, two-dimensional Homer Simpson accidentally jumps into the third dimension. During his journey in this strange world, geometric solids and mathematical formulas float through the air, including an innocent-looking equation: $1782^{12} + 1841^{12} = 1922^{12}$. Most viewers surely ignored this bit of mathematical gobbledygook.

On the fan discussion site alt.tv.simpsons, however, the equation caused a bit of a stir. "What's going on, he seems to have disproved Fermat's last theorem!" one fan marveled, referring to the famous claim by Pierre de Fermat—proved just months earlier—that for any exponent n bigger than 2, there are no nonzero whole numbers a, b, and c for which $a^n + b^n = c^n$. The Simpsons equation, if correct, would be a counterexample to the theorem, meaning that the proof had been wrong.

Plug the equation into any run-of-the-mill calculator and it seems to check out. The 12th root of $1782^{12} + 1841^{12}$, according to a calculator, is 1,922. Yet it's easy to see that the equation is false, because the left-hand side is odd, while the right-hand side is an even number. There's no paradox here: It's simply a matter of the calculator's round-off error.

To David X. Cohen, the *Simpsons* writer who concocted the equation, the fans' responses were a source of glee. Cohen had written a computer program specifically to look for what mathematicians call Fermat "near misses": combinations of numbers *a*, *b*, *c*, and *n* that come so close to satisfying Fermat's equation that they would seem to work when tested on a calculator.

Why go to such lengths for a background joke that would flash across the screen in a matter of seconds? Mainly for the fun of it, but also to flex intellectual muscles that don't typically get exercised in Hollywood script rooms: Cohen has a master's degree in computer science.

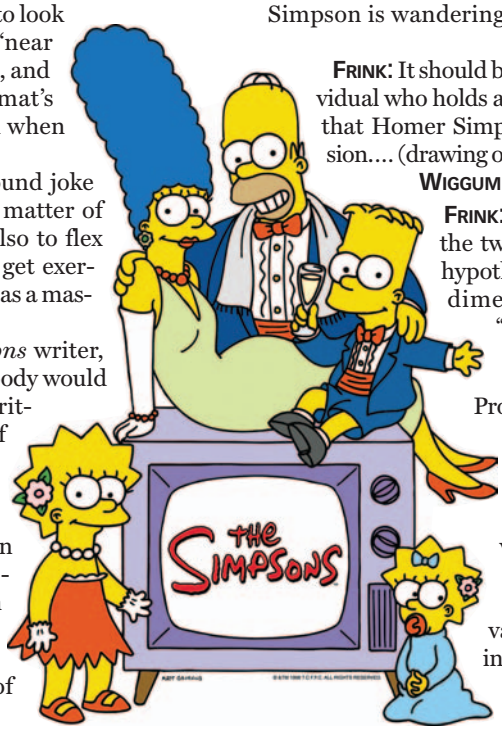
As a mathematically inclined *Simpsons* writer, Cohen is in good company. Although nobody would call *The Simpsons* a science show, the writing staff boasts an impressive array of former mathematicians, scientists, and computer scientists. Over the years, they have injected their brand of geeky humor into the show. They've written hundreds of math jokes, ranging in subtlety from Cohen's fake Fermat equation to open jabs at the mathematical illiteracy of the general public. Math has occasionally even provided the theme of an episode.

DIGITAL DETAILS The *Simpsons* writers have a perfectionistic streak when it comes to math on the show, even when it's just for a throwaway joke. For instance, after Cohen realized that his Fermat near miss could be refuted so easily by an even-odd argument, he refined his computer program to produce a new one without that flaw: $3987^{12}+4365^{12}=4472^{12}$, which appeared on Homer Simpson's basement blackboard in 1998.

In another episode, Kwik-E-Mart proprietor Apu brags that he can recite pi to 40,000 decimal places. "The last digit is 1," he announces. To get that detail right, the *Simpsons* writing team faxed a query to NASA, where mathematician David Bailey obliged with the digit in question.

The writers never put in a math joke simply to tickle only their own funny bones, according to Ken Keeler, a *Simpsons* writer with a Ph.D. degree in applied math. "We always think there are a moderate number of viewers who will get it," he said last October during a panel discussion about math on *The Simpsons* at the Mathematical Sciences Research Institute in Berkeley, Calif. "Based on the newsgroups and fan sites, it seems as if somebody finds everything we put in."

The *Simpsons* writers often play on mathematical cultural stereotypes, extracting humor by exaggerating both the mathematical illiteracy of the U.S. public and the nerdiness and self-aggrandizement of the mathematically gifted. In a characteristic exchange, in the third-dimension episode, mad scientist Professor Frink tries to explain to Police Chief Wiggum the nature of the three-dimensional space through which Homer Simpson is wandering.



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FRINK: It should be obvious to even the most dimwitted individual who holds an advanced degree in hyperbolic topology that Homer Simpson has stumbled into the third dimension.... (drawing on a blackboard) Here is an ordinary square.

WIGGUM: Whoa, whoa—slow down, egghead!

FRINK: But suppose we extend the square beyond the two dimensions of our universe, along the hypothetical z-axis, there. This forms a three-dimensional object known as a "cube," or "Frinkahedron" in honor of its discoverer.

"One of the themes we've harped on is Professor Frink trying to seize credit for something," Keeler says. "That should be very familiar to people in academia."

Gender issues in mathematics take center stage in "Girls just want to have sums," which aired on April 30. It lampoons the scandal that ensued in 2005 when Lawrence Summers, then president of Harvard University, suggested that women are innately inferior at mathematics.

In that *Simpsons* episode, Springfield

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