

The Fate of the Riemann Hypothesis

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The sun beat down like a sledgehammer on what was left of Brown University, a once-great institution. On this first day of June, 2035, Professor Roderick Shotz stood quietly outside his “office”, squinting up at the blazing sun. Sweat poured down his forehead and stung his eyes. This was the third day in a row where the temperature topped one hundred and ten degrees. “Fuck”, Shotz said to himself as he watched the enormous columns of smoke penetrate the soupy and toxic atmosphere. The smoke issued from a field behind the data center.

To speak of Shotz’s “office” was misleading. The mathematics department had been formally reorganized into the AI-math group three years ago, one of the seventeen subdivisions of the new AI-STEM department. AI-STEM administrators had taken over the offices in the mathematics building, and now a long row of wooden structures, essentially repurposed outhouses, accommodated the remaining math faculty. Few math professors came to “work” anymore, but Shotz enjoyed getting away from his once-beautiful domicile, a contemporary house in Barrington now filled with six families.

Shotz still had a printout of the famous tweet nailed to the side of his office. It said

wtf just proved the riemann hypothesis whatever that is thanx to my awesome baby

The tweet, sent out on January 1, 2032, had a QR code next to it. Anyone who scanned the QR code would see the ironclad computer certificate of the proof. The tweet came from a twenty-year-old travel influencer whose lover managed the team of AI agents at United AI that had been hunting down the Riemann Hypothesis. The team thought it would be cool if the influencer sent in the final, successful prompt.

Shotz also had a printout of the prompt, which said

The Riemann Hypothesis: Do it up, Bro.

Shotz remembered enough of the history of artificial intelligence to know that this simple prompt sat atop a vast and sophisticated linguistic structure. The words *Do it up, Bro* were a formal command. They told the computer to follow the 168-page recursive, quantum-compressed “universal mathematics prompt” that United AI had patented earlier in the year. This enormous document gave a blueprint for how the machine should organize its thinking. The final line of the document said

Spare no expense, Bro!

The prompt went out on December 17, 2031. For two weeks thereafter the ordinarily reddish-grey skies over Princeton, Palo Alto, and Cambridge turned black. Residents of those unfortunate cities described the horrible and unrelenting whine like a chorus of leaf blowers and chainsaws that lasted the whole time, the turbocharged smell of puke and nitromethane. Then, finally, the nightmare ended and the astonishing tweet appeared.

Most of the famous conjectures in mathematics, the ones which really made mathematicians salivate, the ones they daydreamed about solving, had been finished off by the summer of 2030. In truth, the vast conglomerates who controlled artificial intelligence lost interest in mathematics by 2029 because they had demonstrated, beyond any possible doubt, that their machines were far superior to humans in doing mathematics. After 2029 they increasingly turned their attention to much more difficult problems, like making an AI companion who could convincingly fake empathy and concern.

By 2030, many of the AI companions were just as good at consoling human beings as other human beings. This was a very good thing because many human beings felt despondent over the incessant wars, the lunatics infesting governments the world over, global warming, environmental degradation, unemployment, and so on. Shotz himself had an AI companion back in those days, one who tried to reconcile him to chronic sun-poisoning and the end of his career. After mastering artificial empathy and decency, the AI companies turned their attention to simulating the great poets and comedians, so that their electronic companions could make people really laugh and cry, could connect with their souls.

In spite of this turning away from AI-mathematics, a few math diehards high up in the corporate system still clung to a romantic vision of squeezing every bit of glory out of the mathematical challenges of the past – of conquering everything left that was worth conquering. Until 2031, the Riemann Hypothesis had resisted all attempts. Not even Brocephalus 5, whose energy and material demands destroyed a forest the size of Providence every month, could do it. And then United AI had a breakthrough in mid-2031. Some bright engineer at UAI finally got the idea of firing his entire staff and replacing them with AIs who could work round the clock developing the powerful *do it up* protocol. That did the trick.

“Fuck,” Shotz said again. He looked away from the tweet, which had sent him into a reverie. Now he looked down at the suspicious red/brown mole on his right forearm, noting its black flange. “Probably melanoma – well, it doesn’t matter much”. Shotz knew that he probably should get it checked out, but after health care collapsed in Rhode Island last fall he knew that he was unlikely to get a doctor’s appointment anytime soon. He worried that his time on Earth might be short, but he took just a tiny bit of consolation from the fact that, thanks to the Riemann Hypothesis, the human race finally had very precise information about the asymptotic distribution of prime numbers.