cool math is complex
haiku's beauty is simple
math makes poetry

An Exploration of Communicating Math Concepts Through Haiku

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First, about Haiku...

lined five seven five
counting words in syllables
illuminates finds

In the 13th century, haiku made up the first part of Japanese oral poems called *renga*, which were a hundred stanzas long and also accounted for syllables. Haiku became an independent art form around 300 years later.

Constrained to 3 lines written in a 5/7/5 syllable count, the focus of a haiku is on simplicity, directness, and the capacity to offer the reader a digestible sense of understanding. These traits make haiku a great tool for attempting to express complex math topics with brevity and clarity.

Goldbach's Conjecture

wholes greater than two
equal sums ought to exist
when adding two primes

Goldbach's Conjecture, created by Christian Goldbach in 1742, states that every even integer greater than 2 is equal to the sum of two prime numbers. It was partially proven nearly 200 years later by a mathematician named Ivan Matveyevich Vinogradov who found that every even integer is the sum of at most six primes. Then, more progress was made by Chen Jing Run in 1973 as he proved that every even integer greater than 2 is the sum of a prime plus a number with no more than two prime factors. However, the conjecture remains unproven for *all* numbers which it would apply to.

Collatz Conjecture (The 3x+1 Problem)

multiply, add, halve
a possibly endless loop
Collatz gives one four two

In the 1930s, Lothar Collatz conjectured that when starting with any positive integer, if you follow the process of multiplying by 3 and adding 1 if it's odd, and dividing by 2 if it's even, all values will eventually lead to 1 then hit a loop of 1, 4, 2 for infinity. Many mathematicians consider this problem a waste of time to attempt to solve because we are unable to test it out on all of the infinite integers that the rule would apply to. Mathematician Terence Tao got the closest to solving it as a proof, finding that it is guaranteed to work for *almost* all numbers, by creating a weighted sample of numbers and confirming that the theory applied.

Gödel's Incompleteness Theorems

always limited
nothing proven doubtlessly true
there is no ending

Kurt Gödel's Incompleteness Theorems are strongly related to the cause of the impossibility behind many famous unsolved math problems, such as Goldbach's Conjecture and the Collatz Conjecture. The first states that there is no set of rules that is capable of proving all possible truths about a set of numbers. The second states that a formal system cannot prove itself consistent if it is in fact true. This theorem is paradoxical since it asserts that for something to be true, it must also be false.

Sources

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