Carl Friedrich Gauss

The father of arithmetic progression

"It is not knowledge, but the act of learning, not possession, but the act of getting there, which grants the greatest enjoyment"

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His Discoveries

Work from a Young Age

From a young age, Gauss worked on plenty of mathematical theorems, and proofs. Like at the age of 15, when Gauss made a significant discovery. He discovered that using just a ruler and a compass, it's possible to create a regular polygon with 17 sides. This was a significant advance in discovering the conditions for constructability. He was able to create a sufficient condition that made this possible, but he never published a proof. Thanks to Gauss' work, in 1837, the Gauss-Wantzel theorem was presented in 1837 by Wantzel.

At the age of 21, Gauss began work writing a Latin textbook about Number Theory. This book brought together results and findings from great mathematicians like Euler and Fermat, whilst adding onto them in Gauss's style, and became known as the Disquisitiones Arithmeticae or Arithmetical Investigations. This was published 3 years later, when Gauss was 24. This book contained a lot of what he became renowned for Through this book, Gauss made number theory a rigorous and systematic genre of mathematics, and helped it develop into what it is today, whilst also spurring much research in universities throughout the world.

Fermat's Last Theorem

In 1816, Gauss was heavily encouraged to work on a proof for Fermat's last Theorem. This Theorem was written in the margin of a book by Pierre de Fermat, where he famously stated that he had a proof and the margin was simply to small to fit it. This was one of the biggest mathematical teases ever, and attracted a lot of interest in solving it.

Gauss didn't solve the theorem, but he did prove the theorem true for the cases n=3 and n=5. Although both of these had been proven, Gauss provided an alternative proof that took advantage of Eisenstein Integers, which are complex numbers that follow a specific form. His work on Fermat's last theorem was one stepping stone that led to the Wile's proof of the theorem.

Rediscovery of Ceres

Ceres is a dwarf planet located in the asteroid belt, between Mars and Jupiter. This was originally discovered by Italian astronomer Piazzi in 1801, however it eventually disappeared behind the sun's glare. Gauss heard about this, and he tackled the problem mathematically. His predicted position was put to the test in 1801, and it was accurate within half of a degree.

By helping the rediscovery of Ceres, Gauss became even more well known in the astronomical community. His method became key in Orbital Mechanics, where it was named Gauss's method, and became a well known way to determine the orbit of a celestial object using only 3 observations.

Awards

In 1809, Gauss won the Lalande prize, which was awarded to the person that made "he most unusual observation or writes the most useful paper to further the progress of Astronomy, in France or elsewhere." He won this for creating Gauss' method, which was used to help the rediscovery of Ceres.

In 1838, Gauss won the Royal Society's Copley Medal, which was awarded to him for his inventions and mathematical researches in magnetism. This was an incredibly prestigious medal, which he achieved at the age of 61. After achieving this medal, Gauss began to learn Russian to be able to understand other scientific writings, and advance his career further.

Recently in 2002, the International Mathematical Union and the German Mathematical Society have named the Carl Friedrich Gauss Prize for Applications of Mathematics after him. Once every 4 years, with it's first awarding in 2006 at the International Congress of Mathematicians. This puts the medal alongside the prestigious Fields and Chern medals, and writes Gauss' name in history for his incredible work in mathematics. ■