

Mathematician, 88, hopes to prove himself again with new solution

Magnus Linklater

Great mathematicians produce their best ideas when they are young. Isaac Newton was in his early forties when he wrote his most important work; Einstein's theory of relativity was conceived in his twenties; Pierre de Fermat, in the 17th century, dreamt up his famous last theorem when he was under 50, and Andrew Wiles was 41 when he proved it 350 years later.

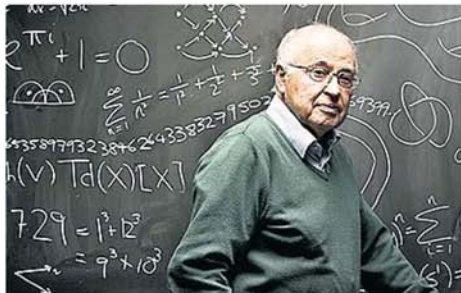
None of that bothers Sir Michael Atiyah. At the age of 88, and garlanded with honours, he has set about tackling one of the greatest challenges in maths: to produce a simple proof of the Feit-Thompson theorem, which deals with group theory, the abstract study of symmetry in geometry or algebra.

The theorem runs to 255 pages of densely argued text. Sir Michael, without the use of a computer, has reduced it to 12 pages, simply explained. This week he sent it to 15 experts in the field and is waiting for their reaction.

He knows he faces an army of sceptics. Even his own family think he would be better off enjoying a quiet retirement. But he cannot accept that age is an insuperable barrier.

"Why did Michelangelo spend his last years on his back, strapped under the ceiling of the Sistine Chapel?" he asked. "You're driven by a passion which never leaves you. I've been doing mathematics for 70 years, and I can't stop now."

Formulated two centuries ago, "group theory" as it is known, deals with groups of numbers or other mathematical structures sharing similar properties. The Feit-Thompson theorem showed that if a group is finite and



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Great theorems – and their proofs

● The greatest theorem of all was set out by Euclid 2,000 years ago. He stated there was an infinite number of primes, and offered his own elegant proof.

● Fermat's last theorem was put forward in the margins of a larger work by Pierre de

Fermat in 1637. He said the proof was too large to fit in the margin. It was finally solved by Andrew Wiles in 1994.

● Brouwer's Fixed Point Theorem suggested that if two sheets of graph paper with co-ordinates were laid on the table and one

was crumpled up, there would be at least one point of the crumpled sheet lying directly above the corresponding point of the flat sheet. It was proved by Piers Bohl in 1904 but has been continually examined ever since.

has an odd number of elements in it then it is "solvable" — meaning it can be constructed from more fundamental groups, a little like the way numbers can be factorised into primes.

In 1963 two young American mathematicians, Walter Feit and John Griggs Thompson finally came up with the proof. Not only did they need more than 200 pages to do so, even the

language they used is impenetrable to the layman.

"The theorem itself is extremely simple to state, and the proof is horrendous," Sir Michael said. "Ever since I heard about it, I've been driven to say that a theorem this beautiful must have a beautiful proof."

Sir Michael has been awarded the two top maths awards — the Fields Medal in 1966 and the Abel prize in 2004 — and has worked with some of the greatest mathematicians of his age. He is an honorary professor at the University of Edinburgh and was given the Order of Merit in 1992.

None of that will convince the sceptics, who say that his claim is deluded, and that no one of his age has a right to grapple with such complex issues.

"Am I an old man deluding myself?" he said. "I'm pretty sure I'm not." The one person he would like to persuade is his son, Robin, who is reluctant to comment on his father's obsession.

"This is always the view of the young towards the old," he said. "My son said, 'Dad, all mathematicians do their greatest work before they're 40. You're over 80, it's impossible for you to do that kind of work.' So I had this problem, how do I persuade my own son? He said, 'If you can get other mathematicians to vouch for your results, then I'll believe them.'"

Scientists in his field know that Sir Michael has been working on Feit-Thompson for many years, and doubt that he has solved it. One said: "If he was not able to make it work when he was so much younger, it needs solid confirmation from mathematical referees that he has done it now."