The Pea and the Sun: A Mathematical Paradox

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Take an apple and cut it into five pieces. Would you believe that these five pieces can be reassembled in such a fashion so as to create two apples equal in shape and size to the original? Would you believe that you could make something as large as the sun by breaking a pea into a finite number of pieces and putting it back together again? Neither did Leonard Wapner, author of The Pea and the Sun, when he was first introduced to the Banach-Tarski paradox, which asserts exactly such a notion. Written in an engaging style, The Pea and the Sun catalogues the people, events, and mathematics that contributed to the discovery of Banach and Tarski's magical paradox. Wapner makes one of the most interesting problems of advanced mathematics accessible to the non-mathematician.

The Pea and the Sun: A Mathematical Paradox Details

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From Reader Review The Pea and the Sun: A Mathematical Paradox for online ebook

Peter Mcloughlin says

I had my first experience of the continuum at about the age of seven. Lying in my bed trying to go sleep I was looking out into room illuminated with a small night light at the door I started to think and perceive the concept of size. The door across from my bed seemed immensely large one moment then infinitesimally small the next moment. I thought about the world being infinitely large and being infinitely small at the same time and how everything was made of an infinity of pieces. Anyway, Cantor explored the infinite mathematically and demonstrated that there were infinitely many infinities each infinitely larger at each level and the smallest infinity is the natural numbers going on forever. The continuum is one of the problematic parts of his set theory. The continuum was shown to be a larger infinity the infinity of natural numbers but was it merely the second smallest infinity or were there levels in between these two infinities. The continuum which I had an experience of staring at my dimly lit door in my bedroom at age seven would cause problems such as the Banach-Tarski paradox where a sphere made up of an infinite number of pieces can make two of the same sized spheres each with an infinity of points. Rinse and repeat and you can make as many of such spheres out of the original as you wish. That disorienting night with the idea of the continuum is something Math has been struggling with for the past century. Reality is weird when you drill down into it. The book gives a good demonstration of the proof of the mathematical paradox and gently introduces the reader to the paradoxes of the infinite. I learned the proof in grad school but ever since my experience as a seven-year old I have always been a sucker for the infinite.

Dan says

This book is about the Banach-Tarski Theorem. This was a Mathematical result from the twenties that said there is a way to take apart a solid ball in a finite number of pieces and then twist and turn around the pieces, and then reassemble them into two balls of the same mass and volume. This is all mathematically speaking, of course, so it doesn't mean you can do it in real life.

The proof is presented well, and it provides a lot of background. It is not rigorous, but I definitely now how to do the proof rigorously now.

I liked the author's writing style. I thought it was clear and understandable. It wasn't so slow that I was bored. And I have seen all the mathematics in this book before. This leads me to believe that for non-mathematicians this book may be hard to read. But that is just really hard for me to judge. I think this book would be best for non-mathematician scientists who have lots of mathematical background.

The author also discusses the different schools of mathematical thought and goes into the details of the different mathematical philosophies. I think he did a good job at this.

Towards the end of the book the author goes into a rather lengthy discussion of how quantum physicists try to incorporate this theorem into their work. It was interesting but seemed a little lame and speculative to me. The author concludes by saying that the advanced mathematical tools that we have, end up heavily influencing physicists.

Ahmad Ashkaibi says

The Banach-Tarski Theorem, is not a easy subject even to mathematicians, yet this book gives a very clear and simplified explanation and proof of this theorem.

The general idea of Banach-Tarski Theorem is that you can make an infinite number of infinities out of just one infinity. So you can split the "mother" infinity in to several infinities of the same size as the mother infinity. Or, in other words, you can rearrange the points of a small object (as small as a pea) to get a bigger object (as big as the sun).

The book is interesting and funny. However, it wasn't very well-written. I've struggled though it, because the language was really weak and the sentences were too long sometimes.

If you have no idea about the Banach-Tarski Theorem, I think this book is a good choice to start with.

Joe says

3.5 stars. fascinating subject, a lot of fun to read, and educational for me at the time, but sloppily written, fully of errors, and not brilliant.

Steve Gross says

The clearest exposition of the Banach-Tarski I've ever seen. Come to think of it, the only exposition of the Banach-Tarski paradox I've ever seen. Not so hard mathematics that prove you can disassemble a pea into 5 or more pieces and reassemble them into a sphere the size of the sun.