

# Review of: "Mathematics Is Physical"

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**Potential competing interests:** No potential competing interests to declare.

The article provides interesting insights but would benefit from revisions to avoid repetition. Regarding the relationship between mathematics and physics, the following ideas should be considered by the authors. Mathematics provides the language and tools for expressing fundamental laws and principles in physics. It enables precise quantification and description of physical phenomena, facilitates modeling and analysis, and plays a crucial role in advancing our understanding of the natural world. Mathematics and physics have a strong and interdependent relationship. Mathematics provides the language and tools for describing and understanding the fundamental laws and principles of physics. Without mathematics, it would be challenging to formulate and express the complex relationships and concepts in physics. Here are a few key aspects of the relationship between math and physics:

**Quantitative Description:** Physics deals with measuring and understanding the behavior of the natural world, and mathematics provides the means to quantify and describe this behavior precisely. Through mathematical equations, physicists can express physical quantities such as position, velocity, force, energy, and describe how they relate to each other.

**Laws and Principles:** Many fundamental laws and principles in physics are expressed mathematically. For example, Isaac Newton's laws of motion are described using mathematical equations, as are Albert Einstein's equations of relativity. These mathematical expressions allow physicists to make predictions, perform calculations, and test the validity of their theories.

**Modeling and Simulation:** Mathematics enables physicists to create models and simulations to understand complex physical systems. By using mathematical equations and computational methods, scientists can simulate physical phenomena, test hypotheses, and gain insights into the behavior of systems that are otherwise difficult or impossible to study directly.

**Development of New Theories:** Mathematics plays a crucial role in the development of new physical theories. Theoretical physicists often rely on advanced mathematical concepts, such as calculus, differential equations, linear algebra, and group theory, to formulate and express their theories. These mathematical tools allow physicists to explore new ideas, make predictions, and uncover hidden relationships in the physical world.

**Experimental Data Analysis:** Mathematics is also essential in analyzing experimental data in physics. Statistical methods and mathematical techniques are used to interpret and draw meaningful conclusions from experimental measurements, identify patterns, and extract relevant information.

Overall, mathematics provides the formal framework that underlies and supports the theories, models, and experiments of physics. It helps physicists describe, understand, and predict the behavior of the natural world, making it an indispensable tool for the advancement of physics as a scientific discipline.

In the discussion section, the statement "while mathematics serves as the language of physics and can often develop independently, it can never transcend physics completely. The influence of underlying physics on mathematics may be subtle, but it can be very powerful" and related statements in this article may require revision. While mathematics indeed serves as the language of physics and aids in solving and interpreting mathematical models, it extends beyond physics alone. Mathematics encompasses abstract concepts and materials that hold potential for future applications. For example, group theory, once seemingly limited in its applications, now finds diverse applications in fields such as physics, cryptography, computer science, topology, and chemistry.

With appropriate revisions, this article can provide researchers with a clearer understanding of the intricate relationship between mathematics and physics. The revised content will offer valuable insights into how mathematics serves as the language of physics, facilitates problem-solving, and enables the exploration of abstract concepts in both fields.