



Explanation and Proof in Mathematics: Philosophical and Educational Perspectives

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In the four decades since Imre Lakatos declared mathematics a "quasi-empirical science," increasing attention has been paid to the process of proof and argumentation in the field -- a development paralleled by the rise of computer technology and the mounting interest in the logical underpinnings of mathematics. *Explanation and Proof in Mathematics* assembles perspectives from mathematics education and from the philosophy and history of mathematics to strengthen mutual awareness and share recent findings and advances in their interrelated fields. With examples ranging from the geometrists of the 17th century and ancient Chinese algorithms to cognitive psychology and current educational practice, contributors explore the role of refutation in generating proofs, the varied links between experiment and deduction, the use of diagrammatic thinking in addition to pure logic, and the uses of proof in mathematics education (including a critique of "authoritative" versus "authoritarian" teaching styles).

A sampling of the coverage:

- The conjoint origins of proof and theoretical physics in ancient Greece.
- Proof as bearers of mathematical knowledge.
- Bridging knowing and proving in mathematical reasoning.
- The role of mathematics in long-term cognitive development of reasoning.
- Proof as experiment in the work of Wittgenstein.
- Relationships between mathematical proof, problem-solving, and explanation.

Explanation and Proof in Mathematics is certain to attract a wide range of readers, including mathematicians, mathematics education professionals, researchers, students, and philosophers and historians of mathematics.

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