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The problem of certainty in mathematics.

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Summary: Two questions about certainty in mathematics are asked. First, is mathematical knowledge known with certainty? Second, why is the belief in the certainty of mathematical knowledge so widespread and where does it come from? This question is little addressed in the literature. In explaining the reasons for these beliefs, both cultural-historical and individual psychological factors are identified. The cultural development of mathematics contributes four factors: (1) the invariance and conservation of number and the reliability of calculation; (2) the emergence of numbers as abstract entities with apparently independent existence; (3) the emergence of proof with its goal of convincing readers of certainty of mathematical results; (4) the engulfment of historical contradictions and uncertainties and their incorporation into the mathematical narrative of certainty. Individual learners of mathematics internalize ideas of invariance, reliability and certainty through their classroom experiences and exposure to such cultural factors. Lastly, with regard to the first question, it is concluded that mathematics can be known with a certainty circumscribed by the limits of human knowing.

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