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Attitudes to intuition in calculus textbooks

Abstract :

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The concept of "intuition" in mathematics has suffered fluctuating fortunes. Many, such as Felix Klein and Poincaré, praised it as an essential part of creative mathematics. Others, such as Kepler, Descartes, and Brouwer, even assigned it a foundational role. But in the 20th century there was a strong tendency to vilify intuition and cast it as the opposite of rigorous reasoning, as Hans Hahn did in his lecture on "the crisis in intuition". Using a taxonomy of different senses and roles of intuition informed by this background, I analyse references to intuition in calculus textbooks. I find that, while intuition is rarely explicitly addressed in evaluative terms, evaluative connotations are often implied. Implicit cultural attitudes to intuition are thus conveyed, which students may well internalise. I include modern as well as historical textbooks in my analysis, and reflect on the evolution and context-dependence of their overall implied message regarding intuition. REFERENCES Efraim Fishbein (2006). Intuition in Science and Mathematics: An Educational Approach. Springer. Hans Hahn (1933). The crisis in intuition. Reprinted in Newman (ed.), The World of Mathematics, 1966, Vol. III, XIV.2. Felix Klein (1893). On the mathematical character of space-intuition and the relation of pure mathematics to the applied sciences. Reprinted in his Gesammelte Mathematische Abhandlungen, Vol. I, pp. 225–231. Felix Klein (1895). Über Arithmetisierung der Mathematik. Reprinted in his Gesammelte Mathematische Abhandlungen, Vol. I, pp. 232–240. Gert Schubring (2005).

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