Bibliography

[1] *Spacetime Physics*. W. H. Freeman and Co., 1992.

[2] Central Intelligence Agency. *The World Factbook*. Central Intelligence Agency, 2007. https://www.cia.gov/library/publications/the-world-factbook/.

[3] B. S. Bloom. The 2 sigma problem: The search for methods of group instruction as effective as one-to-one tutoring. *Educational Researcher*, 13(6):4–16, 1984.

[4] Jonathan Borwein and David Bailey. *Mathematics by Experiment: Plausible Reasoning in the 21st century*. A K Peters, 2003.

[5] Richard A. Dunlap. *The Golden Ratio and Fibonacci Numbers*. World Scientific, 1997.

[6] Leah Edelstein-Keshet. *Mathematical models in biology*. SIAM, Philadelphia, 2005.

[7] Albert Einstein. Zur elektrodynamik bewegter kÃűrper [On the electrodynamics of moving bodies]. *Annalen der Physik*, 17:891–921, 1905.

[8] David Epstein and Sylvio Levy. Experimentation and proof in mathematics. *Notices of the American Mathematical Society*, pages 670–674, June/July 1995.

[9] Richard Feynman and Ralph Leighton (contributor). *Surely You're Joking, Mr. Feynman! Adventures of a Curious Character*. W. W. Norton, 1985.

[10] Fibonacci. *Liber Abaci.*, 1202.

[11] Hermann Minkowski H. A. Lorentz Albert Einstein and Hermann Weyl. *The Principle of Relativity: A Collection of Original Memoirs*. Dover, 1952.

[12] Tom R. Halfhill. An error in a lookup table created the infamous bug in Intel's latest processor. *BYTE*, March 1995. http://www.byte.com/art/9503/sec13/art1.htm.

[13] Jan Brett (illustrator). *Goldilocks and the Three Bears*. Dodd, 1987.

[14] David Bailey Jonathan Borwein and Roland Girgensohn. *Experimentation in Mathematics: Computational Paths to Discovery*. A K Peters, 2004.

[15] G. A. Miller. The magical number seven, plus or minus two: Some limits on our capacity for processing information. *Psychological Review*, 63:81–97, 1956.

[16] P. Ribenboim. *The New Book of Prime Number Records*. Springer–Verlag, New York, 1996.

[17] William McC. Siebert. *Circuits, Signals, and Systems*. MIT Press, Cambridge, MA, 1986.

[18] Tjalling J. Ypma. Historical development of the Newton–Raphson method. *SIAM Review*, 37(4):531-551,, 1995.

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