Exploring Irrational Numbers with Continued Fractions

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Abstract: Any irrational number can be approximated by a sequence of rational numbers by truncating its decimal expansion. Continued fractions are an ancient and powerful tool that not only provides the best possible rational approximations but also reveals properties of numbers hidden by their decimal representations. For example, a number is a quadratic irrational if and only if its continued fraction expansion is periodic. In this talk, I will introduce continued fractions, provide a geometric interpretation, and explore connections to dynamical systems. We will also see why the golden ratio is the "most irrational" number of all.

Kariane Calta is an Associate Professor of Mathematics at Vassar College. She earned her BA from Williams College and her PhD from the University of Chicago. Her research interests include billiards, translation surfaces, and continued fractions. More recently, she has studied the game of Quads and its connections to finite geometry. Since 2017, she has also taught with Bard's Prison Initiative.