Using Predictions to Introduce Limits and Continuity

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The concepts of limit and continuity are fundamental to the understanding of calculus. Tall and Vinner (1981) found that students could often work through examples that required them to calculate limits of functions, but were not capable of demonstrating a conceptual understanding for the definition. Interestingly, Tall and Vinner also reported that even among those students who did demonstrate a conceptual understanding, few applied this understanding when asked to calculate limits, relying solely on calculation techniques. Sadly, I noticed this same phenomenon in my own Calculus classes. On the first exam of the semester, the majority of my students demonstrated an ability to calculate limits using direct substitution, the Replacement Theorem, and the Squeeze Theorem. However, they had much less success on the following problem: