

Abstract Submitted
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Student thinking regarding derivative and slope concepts in multivariable calculus¹ WARREN CHRISTENSEN, JOHN THOMPSON, University of Maine — Previous work on students' understanding of graphical interpretation of slope, derivative, and area under curves in various physics contexts has shown substantial difficulties, most notably in kinematics. Concurrently, several reports point toward a lack of algebraic acumen as a likely cause for low achievement in a physics classroom. As part of ongoing research on mathematical challenges that may underlie documented physics difficulties, we developed and administered a brief survey on single- and multivariable calculus concepts to students near the end of a Calculus III course. Some of the questions are based on our earlier work in thermal physics that are essentially stripped of their physics content. Initial findings show that as many as one in five students encounter some type of difficulty when asked to rank the slopes at five different points along a single path. Students asked to rank the derivatives of three different functions at a single value of the variable face additional difficulties.

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