

Abstract Submitted
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Student reasoning about graphical representations of (definite) integrals¹ JOHN THOMPSON, RABINDRA BAJRACHARYA, THOMAS WEMYSS, University of Maine — Students are expected to apply the mathematics learned in their mathematics courses to concepts and problems in physics. In physics education research (PER), few studies have distinguished between difficulties students have with physics concepts and those with either the mathematics concepts, application of those concepts, or the representations used to connect the math and the physics. We report on empirical studies of student responses to mathematics questions, based on canonical questions in thermodynamics, dealing with graphical representations of (single-variable) integration. The reasoning given with answers could roughly be put into three major categories: area under the curve, position of the function, shape of the curve. Varying the features of the representations is one way to explore the contextual nature of student reasoning. In individual student interviews, we vary features of the integral diagrams in order to check the depth and breadth of student understanding associated with the different lines of reasoning that were used in written responses.

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