

## **GC02: 12:40-12:50 p.m. Physics Students' Mathematical Difficulties with Operations and Algebra\***

*Contributed – Dakota H. King, Arizona State University 1519 East Hale Street Mesa, AZ 85203*

*David E. Meltzer, Arizona State University*

As part of an investigation into students' mathematical difficulties, over 5000 written diagnostics have been administered to both algebra- and calculus-based introductory physics courses at Arizona State University over the past four years. We continue to observe that many of these students have significant difficulties with basic symbolic algebra problems ("symbolic" refers to the nature of the constant coefficients). Such problems require mathematical skill that is essential to solving many problems encountered in introductory physics. New to our most recent versions of the diagnostic are questions that test students' operational skills necessary for solving multi-step algebra problems; for example, fraction multiplication and division. In addition, our newest version of the diagnostic has been administered at another large state university. We will report an overview of our most-recent findings with comparisons to the other university, and provide data on our detailed analysis of the algebra and operation problems.

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