PAR-D.07: 2:30-3:30 p.m. Response Patterns by Introductory Physics Students on Mathematics Diagnostic Tests*

Contributed – David E. Meltzer, Arizona State University College of Integrative Sciences and Arts, Mesa, AZ 85212

Dakota H. King, Arizona State University

Over 5000 diagnostic tests consisting of about 20 high-school-level mathematics problems were administered in part or in full to introductory physics students at four campuses of three large state universities; topics covered were trigonometry, algebra, geometry, and graphing. Despite substantial performance differences among the four population samples, response patterns were consistent; they showed error rates ranging from 20-80% on problems involving mathematical skills normally taken for granted by college physics instructors. Performance on algebra problems consistently declined when symbols were substituted for numerical coefficients. Both written and interview data indicated that many errors were due to difficulty in combining basic operations in more complex problems, or perhaps by simple "carelessness" in doing so. Despite the wide variety of diagnostic topics, results on a very small subset of items predicted overall scores with high accuracy. We will report initial results of testing an on-line instructional tool aimed at improving student performance.

*Supported in part by NSF DUE #1504986 and #1914712