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Set-oriented Thinking and the Evaluation of Alternative Solutions in Counting

Problems. Preliminary report.

The literature indicates that students struggle with discrete enumeration problems, and there is thus a growing need to comprehend students' thinking as they count. Combinatorial texts vary between set- and process-oriented perspectives as they present counting methods. We investigate the implications of this dichotomy for combinatorics students, asking a fundamental question: How is the distinction between set- and process-oriented thinking relevant as post-secondary students solve counting problems? Eight students solved six counting problems and were then presented with alternative solutions. They were asked to make sense of the new solution, determine if it was different from their answer, and consider which was correct. The data was analyzed using grounded theory, allowing the researcher to develop themes that characterize student usage of each perspective. Analysis revealed that set-oriented thinking consistently emerged when students evaluated an error in a solution. A preliminary finding is that a set-oriented approach is a vital part of at least one aspect of counting: error detection and correction. Curricular implications might encourage teachers to incorporate both set- and process-oriented perspectives when introducing counting principles. (Received September 21, 2010)