



CRMSE Colloquium Announcement

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Double negative: Two classroom episodes, two analytic frameworks, and two pedagogical recommendations concerning negative number operations

Friday, January 31, 2014

12:00 – 1:00 pm

6475 Alvarado Road, Suite 128

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Abstract: The teaching and learning of negative integer operations brings into play many important issues in mathematics education. These include the generalization and revision of prior knowledge about natural numbers, the teaching of material that is conventional rather than provable, the use of patterns as a form of justification, and the acceptance of “numbers” whose mathematical reality stems from an axiomatic system rather than a concrete physical model. Anna Sfard has written that “learning about negative numbers involves a transition to a new, incommensurable discourse.” I will present a tenth-grade classroom episode introducing negative integer exponents, analyzing the teacher’s strategies and the students’ reactions in the framework of the Necessity Principle of Harel’s DNR system, which states: In order for students to learn what we intend to teach them, they must have a need for it, where “need” means intellectual need, not social or economic need. This will be compared and contrasted with a similar episode on negative integer multiplication analyzed by Sfard in terms of her own “commognitive” framework. I will suggest reasons why pattern-based justifications may not address students’ intellectual needs, and alternative pedagogical strategies for promoting student reasoning about new mathematical conventions.

