Five steps to zero: students developing elementary number theory concepts when using calculators.


Summary: The research describes a calculator-based activity that has been found to encourage the emergence of number-theoretic thinking among students in the middle grades. The study also illustrates how conceptual knowledge can grow, along with the development of techniques, in a technological environment. The task situation was based on the "Five Steps to Zero" problem (Take any whole number from 1 to 1000 and try to get it down to zero in five steps or fewer, using only the whole numbers 1 to 9 and the four basic operations +, -, x, ÷. You may use the same number in your operations more than once). Some of the most powerful mathematical explorations that occurred during the week of activity on the "Five Steps to Zero" task involved the search for multiples of 9. The discussion points to the impossibility of separating the three components of technique, task, and theory. In generating new technology-supported techniques to solve more adequately the tasks at hand, students developed new ways of thinking about the mathematics of the tasks.

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