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The purpose of this study was to assess teachers knowledge of the basic facts of arithmetic and their computational skills, in particular, the four operations defined on whole numbers, integers, fractions and decimals. Another goal was to determine if an open approach to teaching these concepts and skills would enhance students abilities in computation. We used an experimental group and a comparison group design. We assessed teachers knowledge using three different tests (two on the basic facts and one on computation) and then we investigated whether the open approach instruction produced an improvement in computational skills. The ninety seven subjects were teachers in an elementary education program enrolled in a methods or a general psychology course. The interpretation of the results may help to understand the status of teachers computational skills. Information may also enable teacher educators to revise their curricula appropriately. The study will also provide information concerning the role of computational skills in promoting effective teaching and learning of mathematics (Received September 19, 2005)