



Computation, Calculators, and Common Sense

A Position of the National Council of Teachers of Mathematics

Question: Is there a place for both computation and for calculators in the math classroom?

NCTM Position

School mathematics programs should provide students with a range of knowledge, skills, and tools. Students need an understanding of number and operations, including the use of computational procedures, estimation, mental mathematics, and the appropriate use of the calculator. A balanced mathematics program develops students' confidence and understanding of when and how to use these skills and tools. Students need to develop their basic mathematical understandings to solve problems in and out of school.

Technology pervades the world outside school. There is no question that students will be expected to use calculators in other settings; this technology is now part of our culture. More importantly, when calculators are used well in the classroom, they can enhance students' understanding and use of numbers and operations. Teachers can capitalize on the appropriate use of this technology to expand students' mathematical understanding, not to replace it.

Written mathematical procedures—computational procedures in the elementary grades and more symbolic algebraic procedures as students move into the secondary level—continue to be an important focus of school math programs. All students should develop proficiency in performing efficient and accurate pencil-and-paper procedures. At the same time, students no longer have the same need to perform these procedures with large numbers or lengthy expressions as they might have had in the past without ready access to technology. Furthermore, computation should not exist in isolation. Measurement, geometry, and analyzing data represent important mathematical content and provide useful contexts as students develop their numerical abilities.

Even more important than performing computational procedures or using calculators, students need greater facility with estimation and mental math than ever before. These skills are essential both for understanding numbers and because of their usefulness outside school. Students should have a solid understanding of what addition, subtraction, multiplication, and division mean and how they work so that they can identify what operation(s) can help them solve a problem they encounter in math class, in another subject, or outside school. As they develop number sense, students acquire abilities to estimate and perform mental calculations quickly and proficiently. Students should become proficient at using mental math shortcuts, performing basic computations mentally, and generating reasonable estimates for situations involving size, distance, and magnitude.

A skillful teacher knows how to help students develop these abilities in a balanced program that focuses on mathematical understanding, proficiency, and thinking. The teacher should help students learn when to use a calculator and when not to, when to use a pencil and paper, and when to do something in their heads. Students should become fluent in making decisions about which approach to use for different situations and proficient in using their chosen method to solve a wide range of problems.