

Families ASK

Take-Home Page

Families often ask about calculator use:

In my child's classroom, calculators are always available. Shouldn't students have to know how to do calculations by hand first?

Consider the following reply:

Calculators and computers are essential tools for learning and doing mathematics. They compute efficiently and accurately and help us organize data and form mental pictures of mathematical ideas. The calculator should not become a replacement for basic understanding and skills. Instead, calculators should be used to help students develop knowledge and abilities for themselves. Middle school is an important time for students to extend their abilities to use technology in mathematics. Through experiences at school, students can learn when mental computation is the best strategy, when paper and pencil are practical, and when a calculator or computer is the tool of choice. Research has shown that students who use calculators appropriately in school mathematics do as well as, or better than, those who do not use calculators (Hembree and Dessart 1992).

You might also wonder whether children should use calculators for homework. Teachers design homework for different purposes at different times. For some assignments, the work is too complex and too time-consuming to complete without a calculator. Also, practice in computing by hand is not the goal of the activity. For other assignments, practice in computation is part of the goal, and the student is asked not to use a calculator. The teacher can tell students whether or not to use a calculator on any particular assignment.

At home, students can use calculators to explore problems they make up, such as "How many minutes old am I?" or "How much money would I have in a year if I earned a dollar an hour for three hours each day?" Students can keep track of costs at the grocery store and compare their totals with the receipt. They can plan car trips, calculating the cost of gasoline from the number of miles to be traveled and comparing their figures with the actual results.

From "Calculator in the Classroom" by Kay Gilliland in the November 2002 issue of

**Mathematics
in the Middle School**

Most middle school students have memorized the multiplication tables. Those who have not might enjoy practicing by using the constant function of the calculator. Calculators with a *constant function* allow the student to enter a number, such as 8, and continuously add that same number by pressing the symbols $+$, $=$, $=$, $=$, ..., resulting in 8, 16, 24, Students can extend their multiplication facts to those less commonly used, such as 19, 38, 57, They can explore the powers of 2, which would result in 2, 4, 8, 16, 32, 64, ..., or compare the circumference of the earth to the distance to the moon. They can also solve problems, such as the following:

Atlanta's Hartsfield International Airport reported that in 1999 it had 78,092,940 passenger arrivals and departures. How many passengers traveled on a typical day? Per hour in 24 hours? (Beckmann and Golden 2001, p. 224) [Answers: About 214,000 per day; about 8910 per hour]

Calculators are the word processors of mathematics. A word processor cannot write a story by itself, and a calculator is useless unless it is in the hands of a person who has the problem-solving skills to know which buttons to push and when.

Tests, such as the SAT, ACT, PSAT/NMSQT, and the National Assessment of Educational Progress, are written to allow calculator use. Further, students can discover that mathematics helps them solve interesting problems when they use calculators as tools. Such activities can be fun and engaging and can motivate students to continue to take mathematics classes long after the minimum requirements have been met.

References

- Beckmann, Charlene, and John Golden. "December's Menu of Problems." *Mathematics Teaching in the Middle School* 7 (December 2001): 224–25; 233.
- Hembree, Ray, and Donald J. Dessart. "Research on Calculators in Mathematics Education." In *Calculators in Mathematics Education*, 1992 Yearbook of the National Council of Teachers of Mathematics (NCTM), edited by James T. Fey, pp. 23–32. Reston, Va.: NCTM, 1992.