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Computers savor a sliver of pi

THIS IS NOT ANOTHER STORY ABOUT how Professor Viereck Kreis calculated the value of pi to the umpteen gazillionth decimal place. That's been done-as of this writing, Yasumasa Kanada of the University of Tokyo Computer Center in Japan holds the record, at 51.5 billion decimal digits.

But what if, for some nefarious or merely impenetrable reason, you just have a yen to know, say, the one-billionth digit of pi? Not so easy. Kanada might provide it, for some of your yen. But computers or their trainers-have now found a shortcut that can hurtle you at warp speed through digital space.

In 1995 David H. Bailey of NASA Ames Research Center in Moffett Field, California, and Peter B. Borwein and **Simon Plouffe**, both of **Simon** Fraser University in Burnaby, British Columbia, found a formula that gets any digit of pi directly-without bothering to compute the digits that come before. Curiously, no one has the slightest idea how to do the same thing for "simpler" irrational numbers such as the square root of two. Of course, there's a catch: the digits you get for pi are in base sixteen.

But there's hope. As Victor Adamchik of Wolfram Research, Inc., in Champaign, Illinois, and Stan Wagon of Macalester College in Saint Paul, Minnesota, show in the November 1997 issue of MAA-American Mathematical Monthly, computer programs for symbol manipulation can guess new, unimagined formulas for pi, and then prove their validity. Although Adamchik and Wagon concede it will take a "miracle," the latest successes spur an irrational optimism that a base-ten digit extractor might someday materialize.

Oh, by the way, the billionth hexadecimal digit for pi is 8.

PETER G. BROWN

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Volume: 38
Start Page: 10
Hits: 3

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