962-Q1-271   **Stacy G. Langton*** (`langton@acusd.edu`), Department of Math & Computer Science, University of San Diego, 5998 Alcala Park, San Diego, CA 92110. *Gauss, recurrence relations, and the agM.*

In his diary for May 30, 1799, Gauss records his discovery that the arithmetic-geometric mean between 1 and $\sqrt{2}$ agrees to 11 decimal places with a simple expression involving the lemniscatic integral. Gauss apparently managed before the end of the year to find a proof that these quantities are in fact equal. Briefly, he expanded the agM into a power series. Using an algebraic identity satisfied by the agM, he derived a sequence of recurrence relations for the coefficients of the power series. The series turns out to be (up to a constant factor) the power-series representation for what is now called the complete elliptic integral of the first kind. This talk will discuss Gauss's method for solving these recurrence relations, and its moral implications. (Received September 06, 2000)