1128-65-127 **Yves Nievergelt*** (ynievergelt@ewu.edu), Eastern Washington University, Department of Mathematics, 216 Kingston Hall, Cheney, WA 99004. *Binary Floating-Point Subtraction of a Floating-Point Square Accurate to the Antepenultimate Digit by Deflation Without Fused Multiply-Subtract or Fused Multiply-Add.*

Differences of the form $r^2 - s$ occur, for instance, in Newton's Method to compute $\sqrt{s}$, and in the calculation of the discriminant of a monic quadratic polynomial $x^2 + 2rx + s$. To compute $r^2 - s$ accurately to the antepenultimate digit on computing systems lacking fused multiply-add and fused multiply-subtract, an algorithm is presented here that produces floating-point numbers $\hat{r}$ and $\hat{s}$ with smaller magnitudes and more trailing zeroes such that $\hat{r}^2 - \hat{s} = r^2 - s$. The algorithm may be iterated or its first result $(\hat{r}, \hat{s})$ delivered to W. Kahan's `DISC` algorithm to compute $\texttt{DISC}(1, \hat{r}, \hat{s}) = \hat{r}^2 - \hat{s} \cdot 1$ (`www.dtic.mil/dtic/tr/fulltext/u2/a206859.pdf`). While `DISC` bases the size of each reduction on r, the algorithm presented here uses s. (Received February 21, 2017)