

Introduction

From Vladimir Nabokov's autobiography "Speak, Memory."

A foolish tutor had explained logarithms to me much too early, and I had read (in a British publication, the *Boy's Own Paper*, I believe) about a certain Hindu calculator who in exactly two seconds could find the seventeenth root of, say, 3529471145760275132301897342055866171392 (I am not sure I have got this right; anyway the root was 212).

Example 1. Compute 212^{17} . (User input is shown in blue, results are shown in black.)

212^{17}

3529471145760275132301897342055866171392

Example 2. Compute 212^{17} and save as N , then show the value of N .

$N = 212^{17}$

N

$N = 3529471145760275132301897342055866171392$

Example 3. Compute the 17th root of N .

$N^{(1/17)}$

212

Example 4. How many 32-bit words does the value of N require?

$$2^{32n} = 212^{17}$$

Hence

$$n = \frac{17 \log 212}{32 \log 2}$$

$17 \log(212.0) / (32 \log(2.0))$

4.10546