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, 352947114576027513230189734205586617139 2 (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.)

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212^17
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352947114576027513230189734205586617139 2

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

```
N = 212^17
N
```

$N = 352947114576027513230189734205586617139 2$

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

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

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17 log(212.0) / (32 log(2.0))
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4.10546