Goodstein Sequence starting at 4
Exposition by William Gasarch

Start with a number a_2 written in base 2.

Take the number a_b written in base b, replace the b's with $(b+1)$'s and then subtract 1.

Here are the first few starting at $a_2 = 4$.

There WILL be some b such that $a_b = 0$.

QUESTION: Try to estimate the first b such that $a_b = 0$.

$a_2 = 2^2 = 4$.

$a_3 = 3^3 - 1 = 2 \times 3^2 + 2 \times 3^1 + 2 \times 3^0 = 26$

$a_4 = 2 \times 4^2 + 2 \times 4^1 + 2 \times 4^0 - 1 = 2 \times 4^2 + 2 \times 4^1 + 1 \times 4^0 = 41$

$a_5 = 2 \times 5^2 + 2 \times 5^1 + 1 \times 5^0 - 1 = 2 \times 5^2 + 2 \times 5^1 = 60$

$a_6 = 2 \times 6^2 + 2 \times 6^1 - 1 = 83$