

Benford's Law: Why the IRS should care about the  
 $3x + 1$  problem and  $\zeta(s)$  (and you should too!)

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Many systems exhibit a digit bias. For example, the first digit base 10 of the Fibonacci numbers or of  $2^n$  equals 1 about 30% of the time; the IRS uses this digit bias to detect fraudulent corporate tax returns. This phenomenon, known as Benford's Law, was first noticed by observing which pages of log tables were most worn from age – it's a good thing there were no calculators 100 years ago! We'll discuss the general theory and application, talk about some fun examples (ranging from the  $3x + 1$  problem to the Riemann zeta function to partition problems inspired by physics), and discuss some current open problems as time permits.

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