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# BELL TELEPHONE LABORATORIES
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**SUBJECT:** Inverse Goldbach

**DATE:** 16 February 1970

**FROM:** Eric Wolman

MR. N. J. A. SLOANE:

Neil —

Thanks for your note of 13 January. One of the conditions of my research was that it be done entirely in my head, both for amusement and in order to prevent my spending too much time on the problem. This accounts for my relatively small progress and for the error at 144, where of course I agree with you. But actually it was a relief to see the whole thing calculated out, and left me free to consider more pressing matters in the shower. I return your material herewith, and have kept a photocopy of the page with the sequence on it. You see how overwhelming is the evidence for Goldbach's conjecture: There are so very many representations of a typical number. As I have noted in pencil, the number of representations ranges from 13 to 57 for even numbers between 1002 and 1100.

A number of early terms in the sequence had the curious property that the primes appearing in representations of n used up two-thirds of the primes less than n, when n appeared in my sequence. A more compact way of stating this is that, if m is a natural number and f(m) is the smallest even number with exactly m representations as a sum of 2 primes, then $\pi(f(m))/m$ equals 3 for several small values of m. The penciled additions to your printout are the values of $\pi$ and of the ratio just mentioned, and the latter are plotted on the attached piece of graph paper. You see that there is a very slow upward trend in this ratio, corresponding to the expected fact that, as numbers increase, the fractions of available primes involved in their binary additive representations decrease.

Thanks for your interest. Hope to see you soon —

Eric

HO-3122-EW-CP

ERIC WOLMAN

Att.
As above

Copy (without attachment) to
Mr. A. Descloux - HO