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Guy letter

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THE UNIVERSITY OF CALGARY

FACULTY OF ARTS AND SCIENCE / DEPARTMENT OF MATHEMATICS, STATISTICS AND COMPUTING SCIENCE

75:viii:1

Neil Sloane
Bell Laboratories
600 Mountain Avenue
Murray Hill
New Jersey 07974
U.S.A.

Dear Neil,

Thanks for yours of 75:vii:16. Eureka! Peccavi! Mission accomplished! Or at least begun. I am writing this in Cambridge, but will bring it with me for Karen to type. I have just packed an inch thick file of finite fields to take to Calgary. Conway will also be there by the end of the month. I suggest you try to spend a week in Calgary (I can find the fare and reasonable expenses) and help edit and publish the tables, say in the Calgary "Yellow Series". Times when not to come: Not before 75:ix:7 (first week of term); not after 75:xii:14 (Canad. Math. Congress, W. Coast Number Theory Conf., Conway leaving); not first week of Oct. (Winterpeg; will you be there? Erdös, Lehmers and many others will). Selfridge will probably visit the week of U.S. Thanksgiving, 75:xi:23-30; that might be a reason for or against coming then; probably the latter if we want to get work done on a specific project.

Here are some more sequences, arising from R. Epstein's game: players name non-negative integers, each one obtainable from the previous by $m := m \pm \lfloor \sqrt{m} \rfloor^2$. If the P-positions (previous player winning) are denoted by p_i ($p_0 = 0$ by definition), then $m^2 + p_i$ are N-positions (next player winning), provided $p_i \leq 2m$. There are also some other N-positions in which the next player wins by taking the + alternative:

11,44,52,71,84,136,208,252,284,291,296,436,444,468,491,601,704,832,918,933,
976,1164,1169,1184,1276,1291,1558,1684,1699,1708,1724,1837,1856,2028,2123,
2389,2536,2619,2624,2664,...

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..../2

* Do you know who & where he is?

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The P-positions are 0,5,20,29,45,80,101,116,135,145,165,236,257,397, 173
404,445,477,540,565,580,585,629,666,836,845,885,909,944,949,954,975,
1125,1177,1305,1310,1350,1380,1440,1445,1616,1649,1654,1669,1818,1833,
1901,1937,1988,2263,2280,2320,2325,2340,2405,2501,2516,2541,2586,2612,
3341 2705,2845,2861,3039,3079,3150,3185,3365,3380,3389,3405,3601,3621,3625, 3573
3630,3654,3705,3860,4053,4105,4239,4541,4693,4708,4813,4901,4921,4930, 4581
4981,5036,5220,5225,5265,...

The complete sequence of N-positions is 1,4,9,11,14,16,21,25,30,36,41,
92 44,49,52,54,64,69,71,81,84,86,100,105,120,121,126,136,141,144,149,164, A5240
169,174,189,196,201,208,216,225,230,245,252,254,256,261,276,284,285,289,
291,294, 296,309,318,324,329,344,353,361,366,381,390,400,405,420,429,436,
441,444,446,461,468,470,484,489,491,504,513,529,534,549,558,574,576,581,
596,601,605,621,625,630,...

Could you help me with problem B26.7 of Chapter N of Croft & Guy on "Research Problems in Intuitive Mathematics"? At present it reads "Sloane also asks for a direct proof that

$$\sum_{i=0}^{24m-4} \binom{24m-4}{i} \binom{5m-1-i/4}{4m-1} = 2^{12m} \binom{5m-1}{m}, \quad m \geq 1,$$

where... something wrong! Write Neil. An indirect proof is known".

Hope I see you soon.

Best wishes,

Richard.

Richard

RKG:km