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10 pages

J. Laroche &
NJAS —

Correspondence
July 1977

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A 17245
~~A 6344~~

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A4207, ~~6344~~ A17245 | 28 JUIL. 1977

Two nice new sequen.

Dear Sir,

Above all I must express my admiration for the considerable amount of work represented by your book : it is of an unbelievable richness. I am not a mathematician and I know nearly nothing about the theory of numbers but I have always been fascinated by it as a "dilettante" (per il diletto!). I hope I shall get myself understood with my unequal English.

I have also much appreciated the presence of humour in your book, a real tour de force, that is why I should be grateful to know

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Why 2.3.11 would be a friendly beginning for an answer to extra galactic signals. I am not a humorist but I try to understand it and I ask you this question very seriously (for nothing is more serious than humour.)

As I live in a small town no library can be of any help to me - that means that you can readily count the sequences I understood by myself. However I have been tickled by some of them, and chiefly the "lucky numbers". Why "lucky"? No dictionary can help me. A friend of mine discovered the recurrence and two ways of calculating them (there may be others) We discovered 33 numbers in the period.

1) If n_m, n_n, n_o are three following numbers we have: $n_n = \frac{n_m + n_o}{2} + 3$

2) Each number can be obtained by adding a number which can be found after the period

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II

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I have mentioned, at the same place.

We can also notice that the last figure of the number comes back after each period. But why lucky? Has it anything to do with luck? It seems funny to associate luck and mathematics.

Here are two sequences which are not in your book but they are trifles, and do not pretend to be of any mathematical interest: (but they have your requirements!) $a_n = a_{n-1} +$ sum of its digits

4207

✓ 1, 2, 4, 8, 16, 23, 28, 38, 49, 62, 70, 77, 91, 101, 103, 107, 115, 122, 137, 148, 161, 169, 185, 199, 218, 229, 242, 250, 257, 271, 281, 292

7, 16, 25, 34, 43, 52, 61, 70, 79, 88, 97, 106, 115, 124, 133, 142, 151, 160, 169, 178

sum (sum (sum ... (digits)) = 7

1) The sum of the digits leads by addition to the following number: Ex. 28. $2+8=10$

$$28+10=38$$

2) The addition of the digits leads to 7, either with the first number, or with a following one.

Ex: 34. $3+4=7$

79 $\quad 7+9=16.\quad 1+6=7$

We can also notice that numbers are from 9 to 9, which can be easily understood. (It is not true if we have a sequence with the first result only.) I chose 7 because of its "magic" emotional content. I have long wondered why 7 was invested with such powers when I noticed (as you already know) that between 1 and 10, 7 was the only number not to be a multiple or a divisor. For epample: 3 divides 6 and 9 and 8 is divided by 2 and four. Might this be the reason of this

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infatuation? I have collected examples from the world over and I am now at more than 60! not included the 7 seven wives of Henry VIII (1)!

It is high time I excuse – or beg you to excuse – the length of my letter by adding some more words of excuse and thus making you lose your time a little more. I beg you to see only the interest in your book.

I enclose an international reply coupon, but I am somehow ill at ease in doing so because It looks like saying: "Here you are. Why don't you answer?" Oh well, please,

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(1) they were only six but then the three musketeers were four: 6 + 4 = 7 + 3.

forget it. Politeness is sometimes delicate.

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Yours very truly,

J LAROCHE

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7

29 JUIL. 1977

Dear Sir,

Following my letter of yesterday I have caught sight of an omission I made in what I shall preposterously call "my first sequence". Between 122 (1+2+2 = 5) and 137 (1+3+7=11) there should be 122+5 = 127 (1+2+7 = 10) which leads to 137. Hence the usefulness of punched cards and magnetic retrieval systems!

Yours very truly,

J LAROCHE

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August 15, 1977

Mr. James LaRoche
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Dear Sir:

Thank you very much indeed for your letters of July 28 and 29, and for the kind words about the book. I am glad to hear that you have found it of interest.

The lucky numbers are generated by the following rule. First write down all the integers. Strike out every second term (i.e., 2,4,6,...). Apart from 1 the first integer which remains is 3. Now in the remaining sequence strike out every term whose index is a multiple of 3, leaving 1,3,7,9,13,15,19,... . The first term not yet used is 7. Therefore strike out every term whose index is a multiple of 7, i.e., 19, etc. And so on. The numbers which survive are called lucky (because, of course, they were lucky to survive). This sieve (or "crible") is just a variation of the sieve of Eratosthenes which generates the prime numbers. So in some sense the lucky numbers behave in a similar way to the primes.

To answer your other question, sequence 2311 would be a friendly message since it would indicate a civilization appreciative of the beauties of mathematics, whose tastes are similar to our own. After all, a large number of mathematicians during the last 100 years have been working very hard indeed to find all the terms of this sequence. When it has been determined exactly it will be one of the great accomplishments of mathematics.

I enjoyed your two new sequences very much: they will probably go into the second edition, if there ever is one. In the meantime I enclose a copy of Supplement 1, the only one issued, and a couple of other things which may amuse you.

Thank you again for writing.

Yours sincerely,

MH-1216-NJAS-mv

N. J. A. Sloane

Enc.
As above

Repeated sum of digits is 7.

Congruent to 7 mod 9

~~6344~~ A17245

91

$\Sigma =$

7 16 25 34 43 52 61 70 $\boxed{7}$

79, 88, 97, $\boxed{16}$

106, 115, 124, 133, 142, 151, 160, $\boxed{7}$

169, 178, 187, 196, $\boxed{16}$

205, 214, 223, 232, 241, 250, $\boxed{7}$

259, 268, 277, 286, 295

304 313 322 331 340 ~~349~~ $\boxed{7}$

349 358 367 376 385 394

403 412 421 430 $\boxed{7}$

439 448 457 466 475 484 493

502 511 520

529 538 547 556 565 574 583 592

601 610

619 628 637 646 655 664 673 682 691

700 709 799