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A 1567
etc

Carl Pomerance
& NJAS

Correspondence,
1991

191

1567
2997

→ 5935-5939

June 3, 1991

Dear Neil,

Here are some lists of pseudoprimes as you requested. Each list is inclusive up to 20,000. This is my definition: n is a base b pseudoprime if (i) n is composite, (ii) $b^{n-1} \equiv 1 \pmod{n}$.

Base 2

1567 ✓

341, 561, 645, 1105, 1387, 1729, 1905, 2047, 2465, 2701,
2821, 3277, 4033, 4369, 4371, 4681, 5461, 6601, 7957, 8321,
8481, 8911, 10261, 10585, 11305, 12801, 13741, 13747, 13981,
14491, 15709, 15841, 16705, 18705, 18721, 19951

Base 3

5935 ✓

91, 121, 286, 671, 703, 949, 1105, 1541, 1729, 1891, 2465,
2665, 2701, 2821, 3281, 3367, 3751, 4961, 5551, 6601, 7381,
8401, 8911, 10585, 11011, 12403, 14383, 15203, 15457,
15841, 16471, 16531, 18721, 19345

Base 5

5936 ✓

4, 124, 217, 561, 781, 1541, 1729, 1891, 2821, 4123, 5461,
5611, 5662, 5731, 6601, 7449, 7813, 8029, 8911, 9881, 11041,
11476, 12801, 13021, 13333, 13981, 14981, 15751, 15841,
16297, 17767

Base 6

5937

35, 185, 217, 301, 481, 1105, 1111, 1261, 1333, 1729, 2465,
2701, 2821, 3421, 3565, 3589, 3913, 4123, 4495, 5713,
6533, 6601, 8029, 8365, 8911, 9331, 9881, 10585, 10621,
11041, 11137, 12209, 14315, 14701, 15841, 16589, 17329,
18361, 18721

Base 7

5938

6, 25, 325, 561, 703, 817, 1105, 1825, 2101, 2353, 2465,
3277, 4525, 4825, 6697, 8321, 10225, 10585, 10621,
11041, 11521, 11025, 13665, 14089, 16725, 16806,
18721, 19345

Base 10

5939

9, 33, 91, 99, 259, 451, 481, 561, 657, 703, 909, 1233,
1729, 2409, 2821, 2981, 3333, 3367, 4141, 4187, 4521,
5461, 6533, 6541, 6601, 7107, 7471, 7777, 8149, 8401,
8911, 10001, 11111, 11169, 11649, 12403, 12801, 13833,
13981, 14701, 14817, 14911, 15211, 15841, 19201, 19503

Carmichael numbers to 300,000

2997

561, 1105, 1729, 2465, ~~2701~~ 2821, 6601, 8911, 10585,
15841, 29341, 41041, 46657, 52633, 62745, 63973, 75361,
101101, 115921, 126217, 162401, 172081, 188461, 252601,
278545, 294409

We say n is a Carmichael number if (i) n is composite and
(ii) $a^{n-1} \equiv 1 \pmod n$ for every a with $\text{gcd}(a, n) = 1$.

- 5

I copied the base 2 psps and the Carmichaels from a table that Sam Wagstaff created about 13 years ago. I found the other lists myself using MAPLE. I copied from my screen so I don't absolutely guarantee accuracy. If you want to check I used this program:

```
printlevel := 0;
for i from 2 to 20000 do
  if isprime(i) = false and
    modp(power(b, i-1), i) = 1
  then print(i, 'is a base b pseudoprime');
  fi; od;
```

I copied this over every time I changed "b". I did this for $b=3, 5, 6, 7$ and 10 .

The reason I don't take $b=4, 8, 9$, etc. is that these lists contain earlier lists: e.g., every base 2 pseudoprime is also a base 4 pseudoprime. I also prepared a list of base 4 pseudoprimes that were not base 2 pseudoprimes, but I felt this was not so interesting.

For numbers you can trust more (or to check against mine) and for other interesting lists of pseudoprimes, you should try Sam Wagstaff at Purdue CS.

Best wishes,
Carl



AT&T Bell Laboratories

600 Mountain Avenue
Murray Hill, NJ 07974-2070
908-582-3000

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Professor Carl Pomerance
Department of Mathematics
University of Georgia
Athens, GA 30602

Dear Carl:

I am (finally) updating my Sequence book, and I wonder if you could possibly send me lists of pseudoprimes to base, for some small values of a ?

(How much do I need? Well, in the table I give enough numbers in each sequence to fill up 2 lines, which is about 150 characters including the separating commas.)

This would be a big help! Many thanks in advance.

Yours sincerely,

N. J. A. Sloane