Smarandache k-k additive relationships

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Abstract: An empirical study of Smarandache k-k additive relationships and related data is tabulated and analyzed. It leads to the conclusion that the number of Smarandache 2-2 additive relations is infinite. It is also shown that Smarandache k-k relations exist for large values of k.

We recall the definition of the Smarandache function S(n):

Definition: *S(n) is the smallest integer such that S(n)! is divisible by n.*

The sequence of function values starts:

n:	1	2	3	4	5	6	7	8	9	10	...
S(n):	0	2	3	4	5	3	7	4	6	5	...

A table of values of S(n) up to n=4800 is found in Vol. 2-3 of the Smarandache Function Journal [1].

Definition: *A sequence of function values S(n), S(n+1)+ ... +S(n+2k-1) satisfies a k-k additive relationship if*

$$S(n)+S(n+1)+\dots+S(n+k-1)=S(n+k)+S(n+k+1)+\dots+S(n+2k-1)$$

or

$$\sum_{j=0}^{k-1} S(n+j) = \sum_{j=k}^{2k-1} S(n+j)$$

A general definition of Smarandache p-q relationships is given by M. Bencze in Vol. 11 of the Smarandache Notions Journal [2]. Bencze gives the following examples of Smarandache 2-2 additive relationships: S(n)+S(n+1)=S(n+2)+S(n+3)
S(6)+S(7)=S(8)+S(9), 3+7=4+6;
S(7)+S(8)=S(9)+S(10), 7+4=6+5;
S(28)+S(29)=S(30)+S(31), 7+29=5+31.
He asks for others and questions whether there is a finite or infinite number of them. Actually the fourth one is quite far off:
S(114)+S(115)=S(116)+S(117), 19+23=29+13;
The fifth one is even further away:
S(1720)+S(1721)=S(1722)+S(1723), 43+1721=41+1723.
It is interesting to note that this solution is composed to two pairs of prime twins (1721,1723) and (43,41), - one ascending and one descending pair. This is also the case with the third solution found by Bencze.
One example of a Smarandache 3-3 additive relationship is given in the above mentioned article:
S(5)+S(6)+S(7)=S(8)+S(9)+S(10), 5+3+7=4+6+5.
Also in this case the next solution is far away:
S(5182)+S(5183)+S(5184)= S(5185)+S(5186)+S(5187), 2591+73+9=61+2593+19.

To throw some light on these types of relationships an online program for calculation of S(n) [3] was used to tabulate Smarandache k-k additive relationships. Initially the following search limits were set: $n \le 10^7$; $2 \le k \le 26$. For k=2 the search was extended to $n \le 10^8$. The number of solutions m found in each case is given in table 1 and is displayed graphically in diagram 1 for $3 \le k \le 26$. The numerical results for $k \le 6$ are presented in tables 4 -8.

Table 1. The number m of Smarandache k-k additive solutions for $n < 10^7$.

k	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
m	158	43	20	8	8	11	5	8	6	5	2	5	7	2	4	8	1	3	4	1	4	6	2	3	2

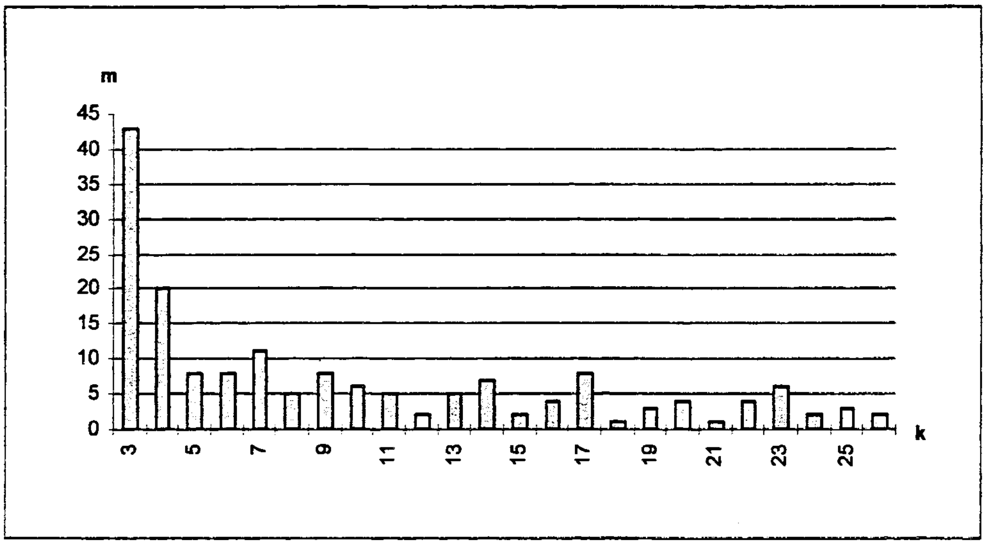

Diagram 1. The number m of Smarandache k-k additive relationships for $n < 10^7$ for $3 \le k \le 26$.

The first surprising observation - at least to the author of these lines - is that the number of solutions does not drop off radically as we increase k. In fact there are as many 23-23 additive relationships as there are have 10-10 additive relationships and more than the number of 8-8 relations in the search area $n < 10^7$. The explanation obviously lies in the distribution of the Smarandache function values, which up n=32000 is displayed in numerical form on page 56 of the Smarandache Function Journal, vol. 2-3 [1]. This study has been extended to $n \le 10^7$. The result is shown in table 2 and graphically displayed in diagram 2 where the number of values z of S(n) in the intervals $500000y+1 \le S(n) \le 500000(y+1)$ is represented for each interval $500000x+1 \le n \le 500000(x+1)$ for y=0,1,2,...,19 and x=0,1,2,...,19.The fact that S(p)=p for p prime manifests itself in the line of isolated bars sticking up along the diagonal of the base of the diagram. The next line, which has a gradient = 0.5 ,corresponds to the fact that S(2p)=p. Of course, also the blank squares in the base of the diagram would be filled for n sufficiently large. For the most part, however, the values of S(n) are small compared to n. This corresponds to the large wall running at the back of the diagram. A certain value of S(n) may be repeated a great many times in a given interval. For $n < 10^7$ 82% of all values of n correspond to values of S(n) which are smaller than 500000. It is the occurrence of a great number of values of S(n) which are small compared to n that facilitates the occurrence of equal sums of function values when sequences of consecutive values of n are considered. If this argument is as important as I think it is then chances are good that it might be possible to find, say, a Smarandache 50-50 additive relationship. I tried it - there are five of them, see table 9. Of the 158 solutions to the 2-2 additive relationships 22 are composed of pairs of prime twins. These are marked by * in table 3. Of course there must be one ascending and one descending pair, as in

$$9369317+199=9369319+197$$

A closer look at the 2-2 additive relationships reveals that only the first two contain composite numbers.

Question 1: For a given prime twin pair (p,p+2) what are the chances that p+1 has a prime factor $q \neq 2$ such that q+2 is a factor of p-1 or q-2 a factor of p+3?

Question 2: What percentage of such prime twin pairs satisfy the Smarandache 2-2 additive relationship?

Question 3: Are all the Smarandache 2-2 additive relationships for n>7 entirely composed of primes?

To elucidate these questions a bit further this empirical study was extended in the following directions.

1. All Smarandache 2-2 additive relations up to 10^8 were calculated. There are 481 of which 65 are formed by pairs of prime twins.
2. All Smarandache function values involved in these 2-2 additive relationships for $7<n\leq10^8$ were prime tested. They are all primes.
3. An analysis of how many of the Smarandache function values for $n<10^8$ are primes, even composite numbers or odd composite numbers respectively was carried out.

The results of this extended search are summarized by intervals in table 3 from which we can make the following observations. The number of composite values of S(n), even as well as odd, are relatively few and decreasing. In the last interval (table 3) there are only 1996 odd composite values. Even so we know that there are infinitely many composite values of S(n), examples $S(p^2)=2p$, $S(p^3)=3p$ for infinitely may primes p. Nevertheless the scarcity of composite values of S(n) explains why all the 2-2 additive relations examined for n>7 are composite.

The number of 2-2 additive relations is of the order of 0.1 % of the number of prime twins. The 2-2 additive relations formed by pairs of prime twins is about 13.5% of the prime twins in the respective intervals.

Although one has to remember that we are still only "surfing on the ocean of numbers" the following conjecture seems safe to make:

Conjecture: The number of Smarandache 2-2 additive relationships is infinite.

What about k>2? Do k-k additive relations exist for all k? If not - which is the largest possible value of k? When they exist, is the number of them infinite or not?

y/x	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Sum
20																				31001	31001
19																			31089		31089
18																		31370			31370
17																	31342				31342
16																31516					31516
15															31613						31613
14														31891							31891
13													31908								31908
12												32049									32049
11											32287										32287
10										32565									16271	16294	65130
9									32802								16437	16365			65604
8								32996							16567	16429					65992
7							33334						16761	16573					11153	11150	88971
6						33744					16921	16823				11328	11250	11166			101232
5					34139				17148	16991			11470	11350	11319		8588	8560	8497	8494	136556
4				34778			17453	17325		11641	11604	11533	8730	8723	8683	15614	7014	6931	12788	12714	185531
3			35657		17971	17686	12033	11852	20793	8950	16060	16066	13102	13119	18125	11059	15515	15488	13592	13483	270551
2		36960	18700	30791	21798	28891	22955	28086	23553	27681	23970	27206	24323	26992	24500	26864	24601	26650	24762	26716	495999
1	499999	463040	445643	434431	426092	419679	414225	409741	405704	402172	399158	396323	393706	391352	389193	387190	385253	383470	381848	380148	8208367

Table 2. The number of values z of S(n) in the intervals $500000y+1 \le S(n) \le 500000(y+1)$ is represented for each interval $500000x+1 \le n \le 500000(x+1)$ for $y=0,1,2,\ldots,19$ and $x=0,1,2,\ldots,19$.

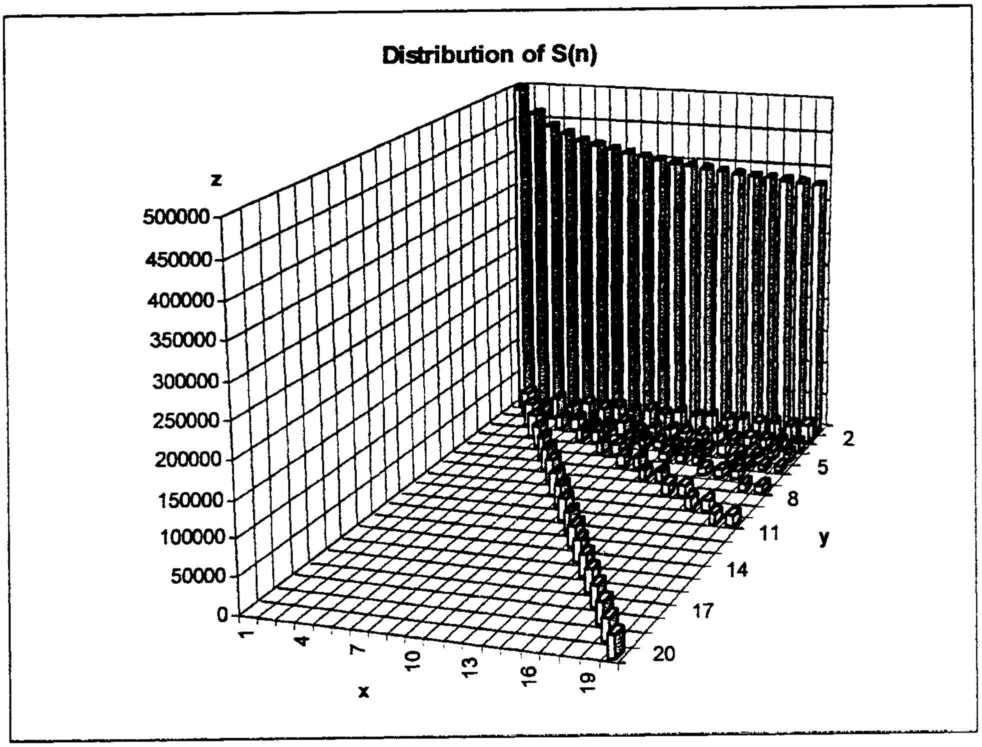

Diagram 2. The distribution of S(n) for $n<10^7$.

Table 3. Comparison between 2-2 additive relations and other relevant data.

Interval	# of prime twins	# of 2-2 additive relations	# formed by pairs of twins	# of S. function primes	# of S. function even values	# of S. odd composite values
$n \le 10^7$	58980	158	22	9932747	59037	8215
$10^7 < n \le 2\cdot10^7$	48427	59	9	9957779	38023	4198
$2\cdot10^7 < n \le 3\cdot10^7$	45485	37	4	9963674	32922	3404
$3\cdot10^7 < n \le 4\cdot10^7$	43861	42	4	9967080	29960	2960
$4\cdot10^7 < n \le 5\cdot10^7$	42348	40	5	9969366	27962	2672
$5\cdot10^7 < n \le 6\cdot10^7$	41547	30	2	9971043	26473	2484
$6\cdot10^7 < n \le 7\cdot10^7$	40908	28	4	9972374	25303	2323
$7\cdot10^7 < n \le 8\cdot10^7$	39984	41	7	9973482	24327	2191
$8\cdot10^7 < n \le 9\cdot10^7$	39640	20	4	9974414	23521	2065
$9\cdot10^7 < n \le 10^8$	39222	26	4	9975179	22825	1996
Total	440402	481	65	99657140	310355	99999999

Table 4. Smarandache function: 2-2 additive quadruplets for $n<10^7$

#	n	S(n)	S(n+1)	S(n+2)	S(n+3)	
1	6	3	7	4	6	
2	7	7	4	6	5	
3	28	7	29	5	31	*
4	114	19	23	29	13	
5	1720	43	1721	41	1723	*
6	3538	61	3539	59	3541	*
7	4313	227	719	863	83	
8	8474	223	113	163	173	
9	10300	103	10301	101	10303	*
10	13052	251	229	107	373	
11	15417	571	593	907	257	
12	15688	53	541	523	71	
13	19902	107	1531	311	1327	
14	22194	137	193	179	151	
15	22503	577	97	643	31	
16	24822	197	241	107	331	
17	26413	433	281	587	127	
18	56349	2087	23	1523	587	
19	70964	157	83	137	103	
20	75601	173	367	79	461	
21	78610	1123	6047	6551	619	
22	86505	79	167	157	89	
23	104309	104309	61	104311	59	*
24	107083	6299	1409	59	7649	
25	108016	157	1187	353	991	
26	108845	1979	6047	1223	6803	
27	125411	877	1493	1511	859	
28	130254	1277	239	1163	353	
29	133455	41	439	421	59	
30	147963	43	521	293	271	
31	171794	1753	881	1481	1153	
32	187369	71	457	191	337	
33	189565	1223	317	59	1481	
34	191289	9109	47	8317	839	
35	198202	877	131	199	809	
36	232086	823	151	433	541	
37	247337	247337	151	247339	149	*
38	269124	547	2153	941	1759	
39	286080	149	547	457	239	
40	323405	911	113	983	41	
41	330011	1579	103	631	1051	
42	342149	79	2281	109	2251	
43	403622	6959	151	3881	3229	
44	407164	743	673	859	557	
45	421474	2539	733	103	3169	
46	427159	25127	181	20341	4967	
47	479026	193	479027	191	479029	*
48	497809	257	743	227	773	
49	526879	12253	89	10331	2011	
50	539561	271	4733	1867	3137	
51	564029	179	2089	1009	1259	
52	598517	449	811	109	1151	
53	603597	1163	3391	4051	503	
54	604148	2069	2213	281	4001	
55	604901	433	557	79	911	
56	618029	618029	109	618031	107	*

Table 4. ctd

#	n	S(n)	S(n+1)	S(n+2)	S(n+3)	
57	662383	4219	41399	44159	1459	
58	665574	53	337	307	83	
59	675550	229	675551	227	675553	*
60	681088	313	681089	311	681091	*
61	722750	59	2339	491	1907	
62	753505	4073	397	2887	1583	
63	766172	1583	181	151	1613	
64	771457	2137	283	151	2269	
65	867894	1831	181	691	1321	
66	922129	797	101	41	857	
67	942669	1151	881	1553	479	
68	954087	10259	499	157	10601	
69	993299	2663	43	2273	433	
70	996091	2269	277	163	2383	
71	1008988	103	1008989	101	1008991	*
72	1114271	1114271	73	1114273	71	*
73	1184610	5641	4099	109	9631	
74	1198734	829	5101	139	5791	
75	1316412	239	1039	1129	149	
76	1343493	2927	3517	5717	727	
77	1353260	953	4957	4481	1429	
78	1362471	53	2333	1289	1097	
79	1382345	14551	53	14251	353	
80	1397236	2143	2447	3947	643	
81	1457061	1049	331	1321	59	
82	1457181	359	233	239	353	
83	1570143	2347	353	109	2591	
84	1625615	7561	71	439	7193	
85	1811933	24821	2341	19073	8089	
86	1850825	733	827	1489	71	
87	1885822	1471	479	1637	313	
88	1920649	2837	359	1283	1913	
89	2134118	113	54721	53353	1481	
90	2147188	23339	127	3767	19699	
91	2223285	269	367	563	73	
92	2300608	349	2300609	347	2300611	*
93	2316257	191	593	137	647	
94	2507609	2879	11941	14009	811	
95	2575700	599	541	311	829	
96	2683547	4421	463	4603	281	
97	2721286	1373	2131	1597	1907	
98	2774925	4111	487	151	4447	
99	2882422	1321	307	1447	181	
100	2965675	379	15131	223	15287	
101	3053808	7069	3803	9851	1021	
102	3058649	2551	971	2351	1171	
103	3063696	769	257	887	139	
104	3112450	5659	1913	179	7393	
105	3192189	1063	317	1217	163	
106	3369359	15527	139	14843	823	
107	3523174	3001	2659	5437	223	
108	3532407	197	293	401	89	
109	3575518	193	3575519	191	3575521	*
110	3669327	3673	59	3559	173	
111	3682461	643	7109	7321	431	
112	3847270	61	3847271	59	3847273	*

Table 4. ctd

#	n	S(n)	S(n+1)	S(n+2)	S(n+3)	
113	3946899	131	1361	311	1181	
114	3996604	13687	2087	223	15551	
115	3996924	1327	149	617	859	
116	4003753	2351	271	2243	379	
117	4083279	421	1187	199	1409	
118	4089287	4089287	241	4089289	239	*
119	4176254	1087	2003	79	3011	
120	4231135	22871	1453	13693	10631	
121	4319374	4243	6911	107	11047	
122	4330089	3229	761	3313	677	
123	4407890	241	3701	3761	181	
124	4460749	1021	2549	211	3359	
125	4466394	773	2063	1223	1613	
126	4497910	2017	359	349	2027	
127	4527424	109	631	241	499	
128	4964380	619	4964381	617	4964383	*
129	5041464	2659	641	239	3061	
130	5223823	1987	2003	109	3881	
131	5225875	431	1321	433	1319	*
132	5567370	1229	3739	3877	1091	
133	5808409	439	20029	13171	7297	
134	6086323	11549	6703	11593	6659	
135	6149140	2347	8747	4951	6143	
136	6278729	1373	73	967	479	
137	6598417	277	2389	1747	919	
138	6611721	24763	2333	859	26237	
139	6662125	239	45631	8017	37853	
140	7019712	1741	25903	7297	20347	
141	7083088	9419	12671	11243	10847	
142	7208864	43	797	661	179	
143	7450168	2731	7450169	2729	7450171	*
144	7535995	14633	6301	13291	7643	
145	7699506	179	3121	1867	1433	
146	7717006	151	7717007	149	7717009	*
147	7951133	274177	1249	26953	248473	
148	8161388	10253	443	9833	863	
149	8246970	2131	3929	5273	787	
150	8406659	227207	140111	365507	1811	
151	8822215	1663	2069	2903	829	
152	8840170	349	8840171	347	8840173	*
153	9050492	3881	6719	137	10463	
154	9369317	9369317	199	9369319	197	*
155	9558822	61	6203	5717	547	
156	9616088	2027	4201	107	6121	
157	9739368	109	4877	4253	733	
158	9944053	2917	17569	20089	397	

Table 5. Smarandache function: 3-3 additive sextets for $n<10^7$

#	n	S(n)	S(n+1)	S(n+2)	S(n+3)	S(n+4)	S(n+5)
1	5	5	3	7	4	6	5
2	5182	2591	73	9	61	2593	19
3	9855	73	11	9857	53	9859	29
4	10428	79	10429	149	61	163	10433
5	28373	1669	4729	227	3547	1051	2027
6	32589	71	3259	109	97	2963	379
7	83323	859	563	101	683	809	31
8	106488	29	1283	463	461	337	977
9	113409	12601	1031	127	727	4931	8101
10	146572	36643	20939	479	41	9161	48859
11	257474	347	3433	1091	263	3301	1307
12	294742	569	1223	12281	233	8669	5171
13	448137	101	224069	448139	97	448141	224071
14	453250	37	14621	353	1613	13331	67
15	465447	1373	797	6947	107	59	8951
16	831096	97	4643	21871	617	8311	17683
17	1164960	809	1021	1669	673	1283	1543
18	1279039	1279039	571	691	347	1279043	911
19	1348296	56179	2447	499	49937	139	9049
20	1428620	1171	2393	2389	1607	3307	1039
21	1544770	863	1877	193	1021	1433	479
22	1680357	71	840179	1680359	67	1680361	840181
23	1917568	211	1917569	1559	1917571	1049	719
24	2466880	593	2466881	4153	2466883	4637	107
25	2475373	6173	3041	41	1181	6857	1217
26	3199719	15919	479	2297	13007	5087	601
27	3618482	1973	2333	419	311	593	3821
28	4217047	557	277	499	193	317	823
29	4239054	191	11941	863	4993	3359	4643
30	5022920	17939	1483	613	1229	18199	607
31	5154719	131	10739	113	3109	4813	3061
32	5488091	2221	971	1307	1987	2423	89
33	6093975	421	108821	271	92333	7351	9829
34	6597860	7019	9439	11657	23819	53	4243
35	6667100	29	1091	11149	659	1877	9733
36	6964515	2243	1999	1597	181	4549	1109
37	7092334	82469	45757	1063	3061	1801	124427
38	7394240	3301	2087	883	509	139	5623
39	7912020	809	35801	15761	16381	7219	28771
40	8741057	1321	653	9967	547	6607	4787
41	8823577	180073	259517	23159	441179	257	21313
42	9171411	2179	1999	479	1277	577	2803
43	9975698	947	173	14251	3677	523	11171

Table 6. Smarandache function: 4-4 additive octets for $n<10^7$

#	n	S(n)	S(n+1)	S(n+2)	S(n+3)	S(n+4)	S(n+5)	S(n+6)	S(n+7)
1	23	23	4	10	13	9	7	29	5
2	643	643	23	43	19	647	9	59	13
3	10409	1487	347	359	137	89	127	2083	31
4	44418	673	1033	2221	67	167	1433	617	1777
5	163329	54443	16333	23333	349	701	81667	10889	1201
6	279577	279577	10753	2273	1997	3539	2741	279583	8737
7	323294	1483	3079	10103	1913	5987	10429	61	101
8	368680	709	2903	1429	1699	1511	2731	2221	277
9	857434	8089	769	71453	353	11587	2887	233	65957
10	1545493	1545493	1669	359	3167	389	4519	1545499	281
11	2458284	204857	28921	53441	21011	467	2339	81943	223481
12	3546232	19273	3546233	3863	151	1609	16649	5023	3546239
13	3883322	8707	3709	12289	155333	2287	32633	1291	143827
14	4945200	317	3299	9851	139	673	5717	6197	1019
15	5219814	1259	2411	5483	4339	2003	241	617	10631
16	6055151	128833	1249	465781	432511	14951	1559	2671	1009193
17	6572015	3137	461	31147	523	6277	157	24251	4583
18	7096751	7096751	223	457	506911	473117	30071	7096757	4397
19	7217695	4021	4799	2131	3608849	191	491	10267	3608851
20	7530545	5953	383	175129	6947	547	150611	34703	2551

Table 7. Smarandache function: 5-5 additive relationships for $n<10^7$

#	n	S(n+1)	S(n+1)	S(n)	S(n+1)	S(n+2)	S(n+3)	S(n+4)	S(n+5)	S(n+6)	S(n+7)
1	13	13	7	5	6	17	6	19	5	7	11
2	570	19	571	13	191	41	23	8	577	34	193
3	1230	41	1231	11	137	617	19	103	1237	619	59
4	392152	49019	392153	9337	733	79	43573	15083	392159	43	463
5	1984525	487	992263	2371	47	1091	797	701	53	2441	992267
6	4730276	5303	54371	17783	36109	39419	3011	2819	6653	5351	135151
7	5798379	8087	499	2339	2677	2417	8839	139	587	2927	3527
8	5838665	7253	7103	227	132697	107	4457	9463	17377	37189	78901

Table 8. Smarandache function: 6-6 additive relationships for $n<10^7$

#	n	S(n)	S(n+1)	S(n+2)	S(n+3)	S(n+4)	S(n+5)	S(n+6)	S(n+7)	S(n+8)	S(n+9)	S(n+10)	S(n+11)
1	14	7	5	6	17	6	19	5	7	11	23	4	10
2	158	79	53	8	23	9	163	41	11	83	167	7	26
3	20873	20873	71	167	307	6959	73	20879	29	157	197	6961	227
4	21633	7211	373	4327	601	281	349	7213	541	67	3607	941	773
5	103515	103	3697	1697	71	7963	647	3137	271	643	8627	101	1399
6	132899	10223	443	383	863	14767	449	1399	1303	4583	223	6329	13291
7	368177	661	61363	353	449	3719	9689	1301	46	73637	34	107	1109
8	5559373	5559373	1447	593	15107	3253	643	3323	1193	10837	293	5559383	5387

Table 9. Smarandache function 50-50 additive relations

	n=1876		n=16539		n=58631		n=109606		n=2385965	
S(n)/S(n+51)	67	107	149	313	58631	101	7829	1523	1087	7823
S(n+1)/S(n+52)	1877	47	827	79	349	61	2549	2069	36151	431
S(n+2)/S(n+53)	313	241	139	353	3449	631	4567	54829	140351	1091
S(n+3)/S(n+54)	1879	643	919	61	1543	863	109609	3323	11471	70177
S(n+4)/S(n+55)	47	193	233	5531	1303	97	113	5483	795323	1093
S(n+5)/S(n+56)	19	1931	47	8297	137	9781	641	109661	601	23
S(n+6)/S(n+57)	941	23	1103	3319	307	58687	409	373	1213	216911
S(n+7)/S(n+58)	269	1933	8273	461	337	131	2237	109663	347	1193011
S(n+8)/S(n+59)	157	967	16547	2371	8377	6521	18269	149	8431	1151
S(n+9)/S(n+60)	29	43	197	193	733	5869	1993	2437	51869	2953
S(n+10)/S(n+61)	41	22	67	503	1777	3089	31	54833	1097	95441
S(n+11)/S(n+62)	37	149	331	83	269	73	599	6451	298247	1867
S(n+12)/S(n+63)	59	19	613	1277	347	58693	2383	37	6997	7927
S(n+13)/S(n+64)	1889	277	2069	2767	181	29347	109619	15667	56809	596507
S(n+14)/S(n+65)	9	97	16553	16603	317	43	29	997	2385979	795343
S(n+15)/S(n+66)	61	647	89	593	71	29	109621	263	119299	887
S(n+16)/S(n+67)	43	971	43	41	173	743	929	13709	20393	2386031
S(n+17/S(n+68)	631	67	4139	38	7331	1087	36541	109673	1697	4519
S(n+18)/S(n+69)	947	12	5519	16607	263	58699	193	677	2385983	6329
S(n+19)/S(n+70)	379	389	487	173	23	587	877	107	43	1301
S(n+20)/S(n+71)	79	139	571	977	659	1151	151	3917	68171	3119
S(n+21)/S(n+72)	271	59	23	151	43	599	15661	36559	2657	14549
S(n+22)/S(n+73)	73	487	16561	113	21	1249	27407	61	795329	30203
S(n+23)/S(n+74)	211	1949	26	4153	29327	1223	937	1637	257	397673
S(n+24)/S(n+75)	19	13	5521	449	11731	199	577	457	2385989	4051
S(n+25)/S(n+76)	1901	1951	101	71	47	197	2963	59	8837	59651
S(n+26)/S(n+77)	317	61	3313	3323	58657	593	571	317	2385991	113621
S(n+27)/S(n+78)	173	31	251	67	211	1129	6449	1741	311	1193021
S(n+28)/S(n+79)	17	977	16567	191	19553	8387	191	1613	7433	9431
S(n+29)/S(n+80)	127	23	109	1187	419	103	7309	21937	563	22093
S(n+30)/S(n+81)	953	163	263	16619	58661	58711	27409	181	113	477209
S(n+31)/S(n+82)	1907	103	1657	277	3259	179	9967	251	198833	91771
S(n+32)/S(n+83)	53	89	227	1511	5333	19571	6091	13711	457	795349
S(n+33)/S(n+84)	83	653	1381	8311	7333	947	109639	36563	2693	2663
S(n+34)/S(n+85)	191	14	16573	1847	3911	11743	2741	1567	313	50767
S(n+35)/S(n+86)	14	53	8287	1039	29333	233	227	479	1193	15907
S(n+36)/S(n+87)	239	109	17	19	34	827	4217	277	89	2386051
S(n+37)/S(n+88)	1913	151	37	163	4889	157	1321	2551	8461	35089
S(n+38)/S(n+89)	29	491	137	1279	4513	46	9137	4219	2386003	265117
S(n+39)/S(n+90)	383	131	307	4157	5867	367	21929	103	307	108457
S(n+40)/S(n+91)	479	983	281	241	53	4517	751	857	2179	9739
S(n+41)/S(n+92)	71	281	829	1663	193	9787	131	15671	251	2687
S(n+42)/S(n+93)	137	41	5527	16631	2551	8389	89	389	3463	2386057
S(n+43)/S(n+94)	101	179	8291	11	127	277	199	673	1069	62791
S(n+44)/S(n+95)	8	197	103	16633	2347	29	43	1097	2386009	317
S(n+45)/S(n+96)	113	73	691	8317	14669	29363	2333	239	199	2251
S(n+46)/S(n+97)	62	29	107	1109	19559	58727	347	54851	795337	2386061
S(n+47)/S(n+98)	641	1973	8293	4159	29339	2447	36551	9973	596503	653
S(n+48)/S(n+99)	37	47	97	131	58679	281	503	653	340859	2386063
S(n+49)/S(n+100)	11	79	29	59	163	839	241	593	727	757
Sum	20307	20307	154521	154521	457399	457399	705120	705120	18703984	18703984

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