

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 $S(n), S(n+1)+ \dots +S(n+2k-1)$ 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: $n \leq 10^7$; $2 \leq k \leq 26$. For $k=2$ the search was extended to $n \leq 10^8$. The number of solutions m found in each case is given in table 1 and is displayed graphically in diagram 1 for $3 \leq k \leq 26$. The numerical results for $k \leq 6$ 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	9	8	11	5	8	6	5	2	5	7	2	4	8	1	3	4	1	4	6	2	3	2

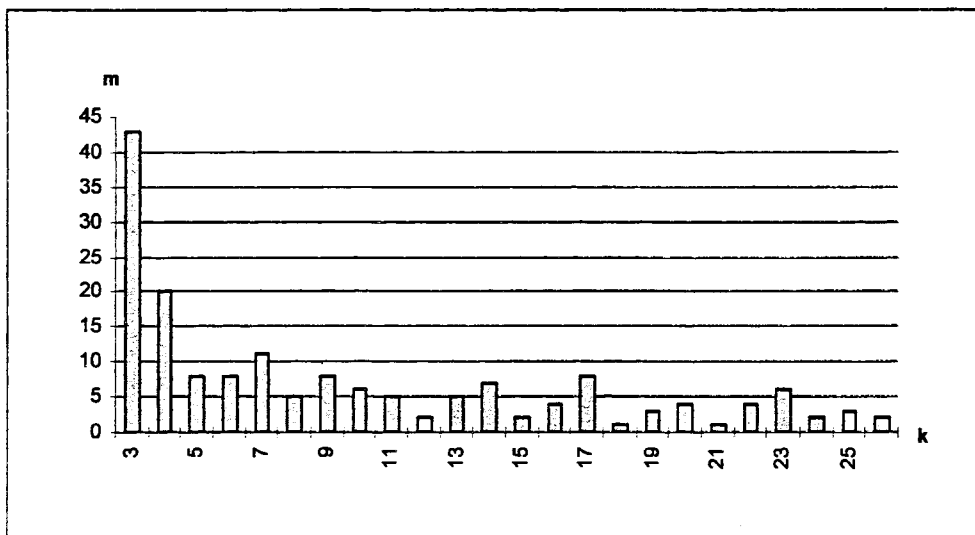


Diagram 1. The number m of Smarandache k - k additive relationships for $n < 10^7$ for $3 \leq k \leq 26$.

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 $n \leq 10^7$. 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 $500000y+1 \leq S(n) \leq 500000(y+1)$ is represented for each interval $500000x+1 \leq n \leq 500000(x+1)$ for $y=0,1,2,\dots,19$ and $x=0,1,2,\dots,19$. 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 $7 < n \leq 10^8$ 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 many 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 $500000y+1 \leq S(n) \leq 500000(y+1)$ is represented for each interval $500000x+1 \leq n \leq 500000(x+1)$ for $y=0,1,2,\dots,19$ and $x=0,1,2,\dots,19$.

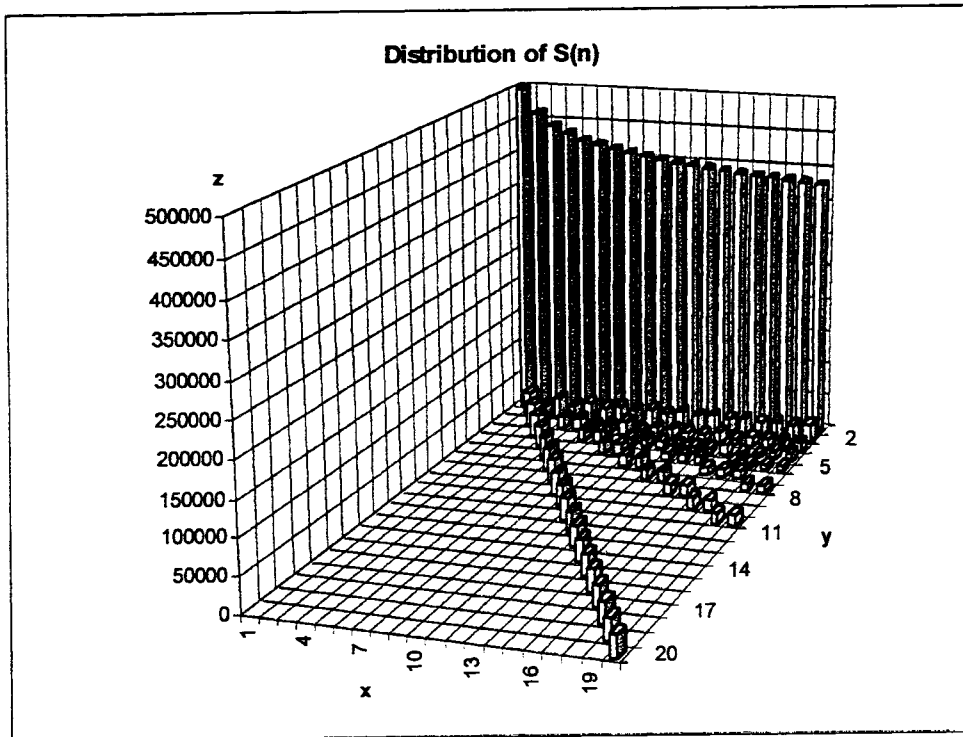


Diagram 2. The distribution of $S(n)$ for $n < 10^7$.

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

Interval	# of prime twins	# of 2-2 additive relations	# of 2-2 additive relations formed by pairs of twins	# of S. function primes	# of S. function even values	# of S. odd composite values
$n \leq 10^7$	58980	158	22	9932747	59037	8215
$10^7 < n \leq 2 \cdot 10^7$	48427	59	9	9957779	38023	4198
$2 \cdot 10^7 < n \leq 3 \cdot 10^7$	45485	37	4	9963674	32922	3404
$3 \cdot 10^7 < n \leq 4 \cdot 10^7$	43861	42	4	9967080	29960	2960
$4 \cdot 10^7 < n \leq 5 \cdot 10^7$	42348	40	5	9969366	27962	2672
$5 \cdot 10^7 < n \leq 6 \cdot 10^7$	41547	30	2	9971043	26473	2484
$6 \cdot 10^7 < n \leq 7 \cdot 10^7$	40908	28	4	9972374	25303	2323
$7 \cdot 10^7 < n \leq 8 \cdot 10^7$	39984	41	7	9973482	24327	2191
$8 \cdot 10^7 < n \leq 9 \cdot 10^7$	39640	20	4	9974414	23521	2065
$9 \cdot 10^7 < n \leq 10^8$	39222	26	4	9975179	22825	1996
Total	440402	481	65	99657140	310355	9999999

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

References

1. H. Ibstedt, The Smarandache Function S(n), *Smarandache Function Journal*, Vol. 2-3, No 1, pgs 43-50.
2. M. Bencze, Smarandache Relationships and Subsequences, *Smarandache Notions Journal*, Vol. 11, No 1-2-3, pgs 79-85.
3. H. Ibstedt, Non-Recursive Sequences, *Computer Analysis of Number Sequences*, American Research Press, 1998.

Appendix to article on Smarandache k-k additive relationships

Henry Ibstedt

The numerical material which was produced in relation to the above study was considered too much to include in the article because the author did not want to distract readers from the essential parts of the study. At the request of ARP the material not included in the article has been edited in the tables below so that the material of this study is complete.

Table 1. Smarandache function 7-7 additive relations

n	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11
	13	210	47760	48594	60943	103305	163823	252061	349033	3280590	5364719
S(n)	13	7	199	89	60943	97	281	173	8513	36451	5364719
S(n+1)	7	211	6823	9719	293	157	3413	126031	233	3280591	7451
S(n+2)	5	53	167	12149	239	103307	6553	4001	23269	1723	114143
S(n+3)	6	71	61	167	983	8609	6301	7877	1229	1093531	243851
S(n+4)	17	107	11941	94	1033	103	167	4583	26849	30949	457
S(n+5)	6	43	233	2113	1693	10331	5851	977	19391	656119	78893
S(n+6)	19	9	419	12	8707	883	419	569	349039	857	214589
Sum	73	501	19843	24343	73891	123487	22985	144211	428523	5100221	6024103
S(n+7)	5	31	1291	131	53	587	127	53	4363	172663	47059
S(n+8)	7	109	853	1279	1847	14759	947	1151	1511	1640299	5689
S(n+9)	11	73	15923	953	401	257	20479	277	2861	173	4441
S(n+10)	23	11	281	419	60953	20663	563	3037	349043	349	596081
S(n+11)	4	17	67	9721	10159	1123	677	389	59	5827	443
S(n+12)	10	37	1327	8101	167	34439	151	13267	69809	307	5364731
S(n+13)	13	223	101	3739	311	51659	41	126037	877	3280603	5659
Sum	73	501	19843	24343	73891	123487	22985	144211	428523	5100221	6024103

Table 2. Smarandache 8-8 additive relations

n	#1	#2	#3	#4	#5
	628	1490	80175	1569560	6285978
S(n)	157	149	1069	39239	1973
S(n+1)	37	71	5011	2411	313
S(n+2)	7	373	80177	19141	314299
S(n+3)	631	1493	83	2441	1811
S(n+4)	79	83	197	14533	108379
S(n+5)	211	23	211	6679	571453
S(n+6)	317	17	151	229	65479
S(n+7)	127	499	853	18041	17707
Sum	1566	2708	87752	102714	1081414
S(n+8)	53	107	443	21	448999
S(n+9)	14	1499	257	1423	6781
S(n+10)	29	15	79	463	953
S(n+11)	71	79	40093	82609	103049
S(n+12)	8	751	26729	4967	209533
S(n+13)	641	167	20047	2389	12497
S(n+14)	107	47	89	1873	269
S(n+15)	643	43	15	8969	299333
Sum	1566	2708	87752	102714	1081414

Table 3. Smarandache 9-9 additive relations

n	#1	#2	#3	#4	#5	#6	#7	#8
	111	156	411	41650	60179	79317	633483	7310358
S(n)	37	13	137	17	8597	1259	1193	397
S(n+1)	7	157	103	41651	59	39659	158371	21313
S(n+2)	113	79	59	89	5471	79319	67	1021
S(n+3)	19	53	23	1811	30091	661	15083	2436787
S(n+4)	23	8	83	353	743	7211	633487	59921
S(n+5)	29	23	13	2777	7523	2333	137	48413
S(n+6)	13	9	139	127	12037	193	9181	32063
S(n+7)	59	163	19	541	1433	2833	443	5689
S(n+8)	17	41	419	131	433	167	15451	311
Sum	317	546	995	47497	66387	133635	833413	2605915
S(n+9)	5	11	7	41659	367	113	17597	3547
S(n+10)	22	83	421	2083	20063	3449	90499	17573
S(n+11)	61	167	211	1543	463	67	4339	664579
S(n+12)	41	7	47	563	2617	853	269	3637
S(n+13)	31	26	53	683	19	7933	79187	82139
S(n+14)	15	17	17	31	8599	1619	633497	1827593
S(n+15)	7	19	71	641	30097	601	5557	4903
S(n+16)	127	43	61	251	4013	79333	2287	1693
S(n+17)	8	173	107	43	149	39667	181	251
Sum	317	546	995	47497	66387	133635	833413	2605915

Table 4. Smarandache 10-10 additive relations

n	#1 23564	#2 44237	#3 45202	#4 245301	#5 282215	#6 545002
S(n)	137	1427	233	11681	56443	719
S(n+1)	1571	101	2659	122651	1069	32059
S(n+2)	11783	83	3767	193	1277	15139
S(n+3)	23567	79	9041	3407	1933	109001
S(n+4)	491	14747	3229	691	151	3539
S(n+5)	37	2011	5023	122653	137	181669
S(n+6)	2357	293	5651	81769	282221	1481
S(n+7)	97	1229	853	8761	15679	1423
S(n+8)	83	8849	137	12911	769	491
S(n+9)	2143	22123	1559	37	569	17581
Sum	42266	50942	32152	364754	360248	363102
S(n+10)	3929	43	127	769	71	223
S(n+11)	41	5531	2153	3833	1061	211
S(n+12)	421	44249	47	281	25657	272507
S(n+13)	271	59	9043	709	811	5737
S(n+14)	11789	137	157	163	282229	22709
S(n+15)	73	37	439	20443	167	49547
S(n+16)	131	149	983	245317	10453	3733
S(n+17)	23581	109	15073	5333	35279	1307
S(n+18)	907	167	19	81773	1753	229
S(n+19)	1123	461	4111	6133	2767	6899
Sum	42266	50942	32152	364754	360248	363102

Table 5. Smarandache 11-11 additive relations

n	#1 1402	#2 25102	#3 55919	#4 84274	#5 2335403
S(n)	701	163	281	1453	127
S(n+1)	61	1931	233	3371	10243
S(n+2)	13	523	55921	2341	467081
S(n+3)	281	5021	27961	1187	1167703
S(n+4)	37	12553	2663	42139	778469
S(n+5)	67	8369	41	2161	145963
S(n+6)	11	6277	2237	43	8081
S(n+7)	1409	211	239	311	337
S(n+8)	47	31	55927	1277	1063
S(n+9)	83	25111	6991	947	583853
S(n+10)	353	73	181	1109	4349
Sum	3063	60263	152675	56339	3167269
S(n+11)	157	761	47	1873	1167707
S(n+12)	101	433	55931	67	467083
S(n+13)	283	5023	79	12041	73
S(n+14)	59	23	55933	439	333631
S(n+15)	109	25117	27967	2719	1167709
S(n+16)	709	661	113	8429	1291
S(n+17)	43	2791	23	28097	5077
S(n+18)	71	157	131	1621	19301
S(n+19)	29	25121	9323	97	3779
S(n+20)	79	79	331	223	1217
S(n+21)	1423	97	2797	733	401
Sum	3063	60263	152675	56339	3167269

Table 6. Smarandache 12-12 additive relations

n	#1 19971	#2 218296
S(n)	317	2099
S(n+1)	4993	12841
S(n+2)	19973	36383
S(n+3)	3329	521
S(n+4)	47	59
S(n+5)	227	72767
S(n+6)	6659	503
S(n+7)	1427	1097
S(n+8)	19979	379
S(n+9)	37	43661
S(n+10)	53	9923
S(n+11)	103	1373
Sum	57144	181606
S(n+12)	6661	54577
S(n+13)	1249	2399
S(n+14)	571	383
S(n+15)	3331	5077
S(n+16)	79	941
S(n+17)	263	191
S(n+18)	2221	6421
S(n+19)	1999	929
S(n+20)	19991	113
S(n+21)	17	223
S(n+22)	19993	109159
S(n+23)	769	1193
Sum	57144	181606

Table 7. Smarandache 13-13 additive relations

n	#1 1578	#2 3314	#3 29672	#4 230926	#5 623110
S(n)	263	1657	3709	103	62311
S(n+1)	1579	17	157	7963	3163
S(n+2)	79	829	401	283	3709
S(n+3)	31	107	1187	230929	337
S(n+4)	113	79	2473	3299	311557
S(n+5)	1583	3319	503	2851	227
S(n+6)	11	83	71	4441	521
S(n+7)	317	41	761	230933	1531
S(n+8)	61	151	53	3499	149
S(n+9)	46	3323	443	46187	89017
S(n+10)	397	277	97	28867	7789
S(n+11)	227	19	29683	1571	3919
S(n+12)	53	1663	181	115469	311561
Sum	4760	11565	39719	676395	795791
S(n+13)	43	1109	1979	230939	21487
S(n+14)	199	13	14843	1283	911
S(n+15)	59	3329	4241	230941	997
S(n+16)	797	37	1237	115471	947
S(n+17)	29	3331	2699	3347	207709
S(n+18)	19	17	2969	1031	97
S(n+19)	1597	101	3299	19	47933
S(n+20)	47	1667	571	631	20771
Sum	41	29	1291	1471	20101
S(n+21)	10	139	101	57737	155783
S(n+22)	1601	71	5939	383	157
S(n+23)	89	1669	29	149	311567
S(n+24)	229	53	521	32993	7331
Sum	4760	11565	39719	676395	795791

Table 8. Smarandache 14-14 additive relations

n	#1 154	#2 1282	#3 2413	#4 13322	#5 1454678	#6 2435152	#7 4727685
S(n)	11	641	127	6661	38281	152197	315179
S(n+1)	31	1283	71	4441	17959	49697	76253
S(n+2)	13	107	23	3331	887	521	4727687
S(n+3)	157	257	151	41	63247	13163	263
S(n+4)	79	643	2417	2221	242447	608789	4727689
S(n+5)	53	13	31	13327	1454683	90191	42979
S(n+6)	8	23	59	17	4723	1559	525299
S(n+7)	23	1289	22	1481	96979	641	1181923
S(n+8)	9	43	269	43	727343	223	10211
S(n+9)	163	1291	173	13331	751	2435161	367
S(n+10)	41	19	2423	101	5051	3613	135077
S(n+11)	11	431	101	199	1454689	4079	443
S(n+12)	83	647	97	113	199	12953	503
S(n+13)	167	37	1213	127	1307	28649	4027
Sum	849	6724	7177	45434	4108546	3401436	11747900
S(n+14)	7	9	809	1667	9829	2293	64763
S(n+15)	26	1297	607	13337	1759	1051	103
S(n+16)	17	59	347	19	242449	76099	429791
S(n+17)	19	433	12	13339	26449	677	2659
S(n+18)	43	13	17	29	181837	243517	1613
S(n+19)	173	1301	19	4447	181	443	590963
S(n+20)	29	31	811	953	3583	202931	4129
S(n+21)	10	1303	1217	1213	1454699	9859	14867
S(n+22)	11	163	487	139	373	181	4727707
S(n+23)	59	29	29	157	1454701	137	1181927
S(n+24)	89	653	2437	6673	727351	7079	743
S(n+25)	179	1307	53	1483	4801	16127	887
S(n+26)	6	109	271	71	67	405863	4727711
S(n+27)	181	17	61	1907	467	2435179	37
Sum	849	6724	7177	45434	4108546	3401436	11747900

Table 9. Smarandache 15-15 additive relations

n	#1 5978	#2 115686
S(n)	61	6427
S(n+1)	1993	809
S(n+2)	23	14461
S(n+3)	5981	787
S(n+4)	997	503
S(n+5)	193	6089
S(n+6)	17	311
S(n+7)	19	115693
S(n+8)	73	57847
S(n+9)	5987	857
S(n+10)	499	1033
S(n+11)	113	911
S(n+12)	599	1753
S(n+13)	1997	59
S(n+14)	107	89
Sum	18659	207629
S(n+15)	461	38567
S(n+16)	37	83
S(n+17)	109	16529
S(n+18)	1499	1607
S(n+19)	1999	317
S(n+20)	2999	57853
S(n+21)	857	38569
S(n+22)	15	28927
S(n+23)	353	157
S(n+24)	3001	29
S(n+25)	29	461
S(n+26)	79	113
S(n+27)	1201	43
S(n+28)	13	1231
S(n+29)	6007	23143
Sum	18659	207629

Table 10. Smarandache 16-16 additive relations

n	#1	#2	#3	#4
S(n)	2243	2411	1069441	1175971
S(n+1)	17	67	48611	41999
S(n+2)	449	127	163	5521
S(n+3)	1123	71	6521	587987
S(n+4)	107	23	16453	2767
S(n+5)	281	151	25463	16333
S(n+6)	173	2417	1459	106907
S(n+7)	15	31	3613	587989
S(n+8)	2251	59	3461	1931
S(n+9)	563	22	293	4523
S(n+10)	751	269	1069451	1175981
S(n+11)	23	173	487	195997
S(n+12)	41	2423	43	3389
S(n+13)	47	101	347	1097
S(n+14)	61	97	859	281
S(n+15)	1129	1213	66841	4421
Sum	9274	9655	2313506	2737982
S(n+16)	251	809	3779	191.
S(n+17)	113	607	13711	151
S(n+18)	19	347	1069459	1175989
S(n+19)	29	12	7639	5113
S(n+20)	73	17	359	3469
S(n+21)	283	19	18439	8647
S(n+22)	151	811	1069463	12923
S(n+23)	103	1217	4051	827
S(n+24)	2267	487	1999	235199
S(n+25)	9	29	3847	293999
S(n+26)	2269	2437	401	391999
S(n+27)	227	53	1601	587999
S(n+28)	757	271	34499	9719
S(n+29)	71	61	233	15
S(n+30)	2273	2441	82267	10789
S(n+31)	379	37	1759	953
Sum	9274	9655	2313506	2737982

Table 11. Smarandache 17-17 additive relations

n	#1	#2	#3	#4	#5	#5	#7	#8
S(n)	29	79	229	67049	5081	751	187921	263
S(n+1)	41	89	47	19157	335347	231809	169129	6269
S(n+2)	349	31	131	149	6449	7559	83	271
S(n+3)	233	17	367	167	5323	99347	1453	11701
S(n+4)	10	13	17	3529	353	7727	1691293	5741
S(n+5)	701	179	167	44701	757	331	1303	22721
S(n+6)	13	239	919	16763	157	86929	2399	429427
S(n+7)	37	359	613	26821	683	3929	3109	4583
S(n+8)	11	719	23	103	167677	347717	1691297	211
S(n+9)	47	6	263	2273	283	823	433	39397
S(n+10)	353	103	307	2579	59	487	11351	2147137
S(n+11)	101	38	97	4967	709	8803	1301	1847
S(n+12)	59	241	461	13411	601	18301	2833	1489
S(n+13)	709	181	41	3271	19727	599	1481	330329
S(n+14)	71	29	71	127	131	8693	1691303	3911
S(n+15)	79	22	1847	23	8599	695441	3709	390389
S(n+16)	89	727	11	67057	2297	257	191	107357
Sum	2932	3072	5611	272147	554233	1519503	5460589	3503043
S(n+17)	31	13	86	8941	2083	99349	845653	33289
S(n+18)	17	15	37	33529	27947	173861	1693	27179
S(n+19)	13	73	617	3119	67073	653	422827	613469
S(n+20)	179	43	463	7451	167683	3907	58321	15559
S(n+21)	239	61	109	1889	12421	695447	56377	2659
S(n+22)	359	733	103	479	103	743	271	4373
S(n+23)	719	367	53	181	929	23981	15101	4919
S(n+24)	6	14	29	67061	1597	1987	2551	863
S(n+25)	103	23	619	137	2221	10079	845657	28439
S(n+26)	38	67	929	11177	83843	127	338263	26
S(n+27)	241	41	26	37	111791	3719	4271	148079
S(n+28)	181	739	31	337	12899	3739	6581	1073573
S(n+29)	29	37	1861	2129	2683	139091	845659	20161
S(n+32)	22	19	19	101	137	211	1873	58031
S(n+32)	727	53	23	134129	47911	83	42283	858859
S(n+32)	13	743	233	263	2749	347729	1691321	94
S(n+32)	15	31	373	1187	10163	14797	281887	613471
Sum	2932	3072	5611	272147	554233	1519503	5460589	3503043

Table 12. Smarandache 18-18 additive relations

n	#1
S(n)	509
S(n+1)	334447
S(n+2)	34361
S(n+3)	5016707
S(n+4)	46451
S(n+5)	9629
S(n+6)	17299
S(n+7)	4049
S(n+8)	627089
S(n+9)	385901
S(n+10)	36353
S(n+11)	1721
S(n+12)	1254179
S(n+13)	32789
S(n+14)	103
S(n+15)	3307
S(n+16)	20903
S(n+17)	5016721
Sum	12842518
S(n+18)	132019
S(n+19)	7177
S(n+20)	29167
S(n+21)	263
S(n+22)	1949
S(n+23)	5016727
S(n+24)	627091
S(n+25)	1672243
S(n+26)	16183
S(n+27)	5016731
S(n+28)	59723
S(n+29)	106739
S(n+30)	147551
S(n+31)	4129
S(n+32)	743
S(n+33)	251
S(n+34)	1931
S(n+35)	1901
Sum	12842518

**Table 13. Smarandache Function
19-19 additive relationships**

n	#1 1759	#2 11709	#2 1205949
S(n)	1759	1301	21157
S(n+1)	11	1171	271
S(n+2)	587	239	1205951
S(n+3)	881	61	571
S(n+4)	43	53	172279
S(n+5)	14	5857	602977
S(n+6)	353	71	8933
S(n+7)	883	101	301489
S(n+8)	31	11717	1487
S(n+9)	17	31	15461
S(n+10)	61	11719	52433
S(n+11)	59	293	73
S(n+12)	23	3907	401987
S(n+13)	443	5861	367
S(n+14)	197	617	6449
S(n+15)	887	977	241
S(n+16)	71	67	8317
S(n+17)	37	41	602983
S(n+18)	1777	1303	57427
Sum	8134	45387	3460853
S(n+19)	127	733	3967
S(n+20)	593	317	1205969
S(n+21)	89	23	659
S(n+22)	137	11731	92767
S(n+23)	11	419	301493
S(n+24)	1783	3911	2851
S(n+25)	223	5867	191
S(n+26)	17	2347	48239
S(n+27)	47	163	461
S(n+28)	1787	97	1205977
S(n+29)	149	5869	379
S(n+30)	1789	43	401993
S(n+31)	179	587	3547
S(n+32)	199	199	172283
S(n+33)	10	103	971
S(n+34)	163	11743	6971
S(n+35)	23	367	223
S(n+36)	359	29	7309
S(n+37)	449	839	4603
Sum	8134	45387	3460853

**Table 14. Smarandache Function
20-20 additive relationships**

n	#1 97573	#2 280200	#2 456829	#3 569793	#4 861971
S(n)	263	467	7489	631	3407
S(n+1)	48787	7573	4153	284897	659
S(n+2)	1301	829	263	1373	6481
S(n+3)	12197	1213	83	461	430987
S(n+4)	97577	70051	35141	569797	1277
S(n+5)	139	56041	149	284899	107747
S(n+6)	97579	5189	91367	63311	861977
S(n+7)	41	280207	6011	37	257
S(n+8)	2957	211	89	9341	861979
S(n+9)	503	131	228419	4129	131
S(n+10)	97583	4003	12347	827	287327
S(n+11)	107	311	47	853	39181
S(n+12)	673	1229	349	37987	4513
S(n+13)	827	3547	228421	16759	73
S(n+14)	1549	271	773	81401	10141
S(n+15)	787	479	631	1319	13903
S(n+16)	4243	35027	91369	569809	41047
S(n+17)	3253	40031	5857	2999	215497
S(n+18)	7507	46703	14737	557	23297
S(n+19)	1109	280219	4079	142453	487
Sum	378982	833732	731774	2073840	2910368
S(n+20)	32531	14011	2207	569813	1087
S(n+21)	6971	93407	9137	13567	107
S(n+22)	149	140111	991	113963	8707
S(n+23)	2711	280223	3461	5479	2677
S(n+24)	5741	139	1117	63313	172399
S(n+25)	48799	1019	228427	6949	2477
S(n+26)	32533	839	229	569819	861997
S(n+27)	61	3221	57107	9497	430999
S(n+28)	191	317	5783	401	287333
S(n+29)	16267	280229	1493	439	431
S(n+30)	467	9341	311	11173	123143
S(n+31)	1877	43	431	17807	313
S(n+32)	241	1523	152287	991	2311
S(n+33)	1319	107	32633	31657	137
S(n+34)	97607	2297	1013	7213	57467
S(n+35)	83	1367	4759	433	1471
S(n+36)	97609	193	91373	769	8369
S(n+37)	227	3947	7877	56983	733
S(n+38)	32537	541	16921	569831	862009
S(n+39)	1061	857	114217	23743	86201
Sum	378982	833732	731774	2073840	2910368

Table 15. Smarandache Function 21-21 additive relationships

n	#1 1477852
S(n)	6971
S(n+1)	1439
S(n+2)	317
S(n+3)	295571
S(n+4)	46183
S(n+5)	492619
S(n+6)	38891
S(n+7)	2459
S(n+8)	24631
S(n+9)	1129
S(n+10)	971
S(n+11)	5297
S(n+12)	184733
S(n+13)	181
S(n+14)	18947
S(n+15)	34369
S(n+16)	1123
S(n+17)	16987
S(n+18)	147787
S(n+19)	1477871
S(n+20)	311
Sum	2798787
S(n+21)	4259
S(n+22)	738937
S(n+23)	563
S(n+24)	369469
S(n+25)	77783
S(n+26)	14489
S(n+27)	113683
S(n+28)	36947
S(n+29)	164209
S(n+30)	105563
S(n+31)	134353
S(n+32)	1151
S(n+33)	4049
S(n+34)	269
S(n+35)	492629
S(n+36)	251
S(n+37)	30161
S(n+38)	16421
S(n+39)	677
S(n+40)	293
S(n+41)	492631
Sum	2798787

Table 16. Smarandache Function 22-22 additive relationships

n	#1 976	#2 61156	#3 2554732	#4 4279047
S(n)	61	15289	127	1831
S(n+1)	977	2659	2554733	2131
S(n+2)	163	10193	4679	13759
S(n+3)	89	8737	853	257
S(n+4)	14	139	159671	611293
S(n+5)	109	37	1693	1303
S(n+6)	491	577	1277369	83903
S(n+7)	983	1973	6277	5309
S(n+8)	41	1699	83	77801
S(n+9)	197	941	193	373
S(n+10)	29	257	11719	4279057
S(n+11)	47	20389	50093	137
S(n+12)	19	3823	319343	11057
S(n+13)	43	61169	5741	213953
S(n+14)	11	2039	425791	80737
S(n+15)	991	83	196519	713177
S(n+16)	31	373	3967	4279063
S(n+17)	331	971	283861	534883
S(n+18)	71	419	929	491
S(n+19)	199	2447	62311	353
S(n+20)	83	2549	6653	3259
S(n+21)	997	467	2554753	281
Sum	5977	137230	7927358	10914408
S(n+22)	499	181	8573	4279069
S(n+23)	37	20393	839	25171
S(n+24)	15	23	638689	3557
S(n+25)	13	317	2554757	2729
S(n+26)	167	103	141931	2441
S(n+27)	59	61	59	1249
S(n+28)	251	239	51	171163
S(n+29)	67	4079	77417	6563
S(n+30)	503	30593	199	43223
S(n+31)	53	8741	2554763	2139539
S(n+32)	7	5099	212897	611297
S(n+33)	1009	1423	773	211
S(n+34)	101	211	7649	8089
S(n+35)	337	523	94621	2139541
S(n+36)	23	7649	159673	1426361
S(n+37)	1013	5563	2417	9467
S(n+38)	26	47	85159	1453
S(n+39)	29	12239	401	33961
S(n+40)	127	15299	1873	6803
S(n+41)	113	20399	5039	593
S(n+42)	509	827	1277387	349
S(n+43)	1019	3221	102191	1579
Sum	5977	137230	7927358	10914408

Table 17. Smarandache Function 23-23 additive relationships

n	#1 587	#2 993	#3 43637	#4 58186	#5 2471860	#6 9908628
S(n)	587	331	3967	619	123593	7717
S(n+1)	14	71	1039	1877	353123	9908629
S(n+2)	31	199	151	373	21683	643
S(n+3)	59	83	1091	58189	2471863	9743
S(n+4)	197	997	373	46	5237	1531
S(n+5)	37	499	21821	163	211	367
S(n+6)	593	37	2297	3637	1235933	857
S(n+7)	11	15	3637	58193	46639	701
S(n+8)	17	13	43	61	577	2477159
S(n+9)	149	167	157	113	2471869	89
S(n+10)	199	59	14549	14549	1637	3253
S(n+11)	23	251	31	1021	373	58631
S(n+12)	599	67	43649	4157	2971	983
S(n+13)	10	503	97	58199	85237	31657
S(n+14)	601	53	43651	97	4079	4954321
S(n+15)	43	7	1559	37	113	6619
S(n+16)	67	1009	14551	29101	56179	2477161
S(n+17)	151	101	73	223	30517	18181
S(n+18)	22	337	8731	14551	39869	150131
S(n+19)	101	23	107	1663	107473	14593
S(n+20)	607	1013	293	109	20599	1667
S(n+21)	19	26	263	58207	130099	821
S(n+22)	29	29	14	107	461	198173
Sum	4166	5890	162144	305292	7210335	20323627
S(n+23)	61	127	59	19403	823961	9908651
S(n+24)	47	113	43661	5821	617971	3343
S(n+25)	17	509	383	58211	2237	430811
S(n+26)	613	1019	929	14	1543	79
S(n+27)	307	17	2729	2531	224717	9049
S(n+28)	41	1021	71	2239	154493	1471
S(n+29)	11	73	3119	3881	117709	14767
S(n+30)	617	31	3359	383	6029	919
S(n+31)	103	12	1213	58217	18043	6143
S(n+32)	619	41	43669	313	205991	495433
S(n+33)	31	19	397	8317	4519	471841
S(n+34)	23	79	14557	71	1235947	137
S(n+35)	311	257	103	6469	337	21401
S(n+36)	89	21	367	677	1193	2281
S(n+37)	13	103	251	79	233	152441
S(n+38)	20	1031	1747	1213	67	4954333
S(n+39)	313	43	179	137	2471899	8669
S(n+40)	19	1033	211	4159	1301	607
S(n+41)	157	47	21839	1493	823967	22571
S(n+42)	37	23	1409	14557	109	330289
S(n+43)	7	37	13	58229	827	30677
S(n+44)	631	61	38	647	2861	154823
S(n+45)	79	173	21841	58231	494381	3302891
Sum	4166	5890	162144	305292	7210335	20323627

Table 18. Smarandache Function 24-24 additive relationships

n	#1 6350	#2 56317
S(n)	127	283
S(n+1)	73	971
S(n+2)	397	18773
S(n+3)	6353	12
S(n+4)	353	3313
S(n+5)	41	149
S(n+6)	227	373
S(n+7)	163	14081
S(n+8)	34	751
S(n+9)	6359	28163
S(n+10)	53	79
S(n+11)	6361	2347
S(n+12)	3181	619
S(n+13)	101	131
S(n+14)	43	569
S(n+15)	67	14083
S(n+16)	1061	56333
S(n+17)	6367	229
S(n+18)	199	593
S(n+19)	193	503
S(n+20)	14	211
S(n+21)	277	1657
S(n+22)	59	1063
S(n+23)	6373	313
Sum	38476	145599
S(n+24)	3187	547
S(n+25)	17	197
S(n+26)	797	2683
S(n+27)	911	7043
S(n+28)	1063	191
S(n+29)	6379	9391
S(n+30)	29	67
S(n+31)	709	14087
S(n+32)	3191	2087
S(n+33)	491	23
S(n+34)	19	1523
S(n+35)	1277	587
S(n+36)	103	109
S(n+37)	2129	1483
S(n+38)	1597	34
S(n+39)	6389	193
S(n+40)	71	97
S(n+41)	83	101
S(n+42)	47	56359
S(n+43)	2131	1409
S(n+44)	139	18787
S(n+45)	1279	28181
S(n+46)	41	359
S(n+47)	6397	61
Sum	38476	145599

Table 19. Smarandache Function 25-25 additive relationships

n	#1 27403	#2 36682	#3 339846
S(n)	409	18341	4357
S(n+1)	31	36683	19991
S(n+2)	29	1019	1847
S(n+3)	193	29	307
S(n+4)	27407	83	971
S(n+5)	571	1747	11719
S(n+6)	27409	2293	223
S(n+7)	2741	1931	577
S(n+8)	9137	1223	677
S(n+9)	89	36691	163
S(n+10)	347	9173	1931
S(n+11)	1523	151	1033
S(n+12)	5483	2621	239
S(n+13)	149	179	2011
S(n+14)	37	139	16993
S(n+15)	13709	36697	113287
S(n+16)	3917	311	1559
S(n+17)	457	941	339863
S(n+18)	1613	367	34
S(n+19)	13711	107	673
S(n+20)	277	2039	169933
S(n+21)	857	127	3433
S(n+22)	1097	37	84967
S(n+23)	653	2447	2281
S(n+24)	27427	18353	11329
Sum	139273	173729	790398
S(n+25)	6857	71	2111
S(n+26)	223	23	43
S(n+27)	211	36709	587
S(n+28)	27431	3671	169937
S(n+29)	127	4079	2719
S(n+30)	3919	353	1049
S(n+31)	43	36713	4787
S(n+32)	59	211	2207
S(n+33)	57	1049	409
S(n+34)	27437	137	293
S(n+35)	269	12239	19993
S(n+36)	1193	1669	1531
S(n+37)	21	503	1201
S(n+38)	3049	17	2741
S(n+39)	13721	36721	83
S(n+40)	2111	61	169943
S(n+41)	2287	12241	339887
S(n+42)	499	9181	97
S(n+43)	13723	113	106
S(n+44)	1307	6121	829
S(n+45)	73	1933	89
S(n+46)	27449	4591	199
S(n+47)	61	53	757
S(n+48)	283	3673	821
S(n+49)	6863	1597	67979
Sum	139273	173729	790398

Table 20. Smarandache Function 26-26 additive relationships

n	#1 89	#2 8850
S(n)	89	59
S(n+1)	6	167
S(n+2)	13	2213
S(n+3)	23	227
S(n+4)	31	233
S(n+5)	47	23
S(n+6)	19	41
S(n+7)	8	521
S(n+8)	97	103
S(n+9)	14	2953
S(n+10)	11	443
S(n+11)	10	8861
S(n+12)	101	211
S(n+13)	17	8863
S(n+14)	103	277
S(n+15)	13	197
S(n+16)	7	31
S(n+17)	53	8867
S(n+18)	107	739
S(n+19)	9	181
S(n+20)	109	887
S(n+21)	11	2957
S(n+22)	37	1109
S(n+23)	7	467
S(n+24)	113	29
S(n+25)	19	71
Sum	1074	40730
S(n+26)	23	317
S(n+27)	29	269
S(n+28)	13	193
S(n+29)	59	683
S(n+30)	17	37
S(n+31)	5	107
S(n+32)	22	4441
S(n+33)	61	47
S(n+34)	41	2221
S(n+35)	31	1777
S(n+36)	15	1481
S(n+37)	7	8887
S(n+38)	127	101
S(n+39)	8	2963
S(n+40)	43	127
S(n+41)	13	523
S(n+42)	131	19
S(n+43)	11	8893
S(n+44)	19	4447
S(n+45)	67	593
S(n+46)	9	139
S(n+47)	17	41
S(n+48)	137	1483
S(n+49)	23	809
S(n+50)	139	89
S(n+51)	7	43
Sum	1074	40730

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