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Tables of Genera of Groups of Linear Fractional Transformations*

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The genera of the groups $\Gamma_0(n)$, $\Gamma^*(n)$ together with certain associated number-theoretic functions are given for $1 \leq n \leq 1000$.

The 2×2 modular group Γ and its subgroups are of fundamental importance in the theory of automorphic functions (in particular the elliptic modular functions) and in the theory of Riemann surfaces. Let G be such a subgroup. Then the substitutions

$$\tau' = \frac{a\tau + b}{c\tau + d} \tag{1}$$

of G map the upper τ half-plane onto itself, and the points of this half-plane are partitioned into equivalence classes modulo G. A set of points consisting of one point from each equivalence class is termed a *fundamental set*, and if G is of finite index in Γ there is a simple way of selecting a standard fundamental set R, which is fully described in Ford's book [1] [1] or in Gunning's book [3]. The set R is commonly called a *fundamental region*. After appropriate identifications of sides and vertices are made R becomes a surface whose genus g plays a central role in the study of G.

Among the subgroups of finite index in Γ the congruence subgroups have been studied most extensively and among the congruence subgroups the (nonnormal) subgroups $\Gamma_0(n)$ are of primary importance. These are defined for every natural number n as the totality of substitutions (1) where a, b, c, d are rational integers, $ad-bc=1$, and $c\equiv 0 \pmod{n}$.

If the substitution

$$\tau' = -\frac{1}{n\tau}$$

is adjoined to $\Gamma_0(n)$ the larger group so obtained (in general not a subgroup of Γ) is donoted by $\Gamma^*(n)$. Formulas for the genera $g_0(n)$, $g^*(n)$ of $\Gamma_0(n)$, $\Gamma^*(n)$, respectively, have been given by F. Klein [6], E. Hecke [4,5], and R. Fricke [2]. Denote the number of solutions of the congruence

$$x^2 - x + 1 \equiv 0 \pmod{n},\ 0 \leq x \leq n-1 \tag{2}$$

by $\nu_1(n)$, and the number of solutions of the congruence

$$x^2 + 1 \equiv 0 \pmod{n},\ 0 \leq x \leq n-1 \tag{3}$$

by $\nu_2(n)$. Set

$$\mu(n) = n \prod_{q \mid n} \left(1 + \frac{1}{q}\right),$$

$$\sigma_0(n) = \sum_{d \mid n} \varphi\left(d, \frac{n}{d}\right) = \prod_{q^e \| n} \left(q^{\left[\frac{e}{2}\right]} + q^{\left[\frac{e-1}{2}\right]}\right),$$

where $\left(d, \frac{n}{d}\right)$ denotes the greatest common divisor of d and $\frac{n}{d}$, and φ is the Euler function. Then $\nu_1(n)$ is the number of inequivalent elliptic vertices of period 3 of the fundamental region R_n of $\Gamma_0(n)$, $\nu_2(n)$ the number of inequivalent elliptic vertices of period 2 of R_n, $\mu(n)$ the index of $\Gamma_0(n)$ in Γ, and $\sigma_0(n)$ the number of inequivalent parabolic vertices of R_n. The genus $g_0(n)$ of $\Gamma_0(n)$ is then

$$g_0(n) = 1 + \frac{\mu(n)}{12} - \frac{\nu_1(n)}{3} - \frac{\nu_2(n)}{4} - \frac{\sigma_0(n)}{2}.$$

Furthermore let $h(-4n)$ denote the number of classes of primitive positive binary quadratic forms of discriminant $-4n$, and set

$$\delta_n = \begin{cases} 2 & n \equiv 7 \pmod 8 \\ \frac{4}{3} & n \equiv 3 \pmod 8,\ n > 3 \\ 1 & \text{otherwise.} \end{cases}$$

Then the genus $g^*(n)$ of $\Gamma^*(n)$ is given by

$$g^*(n) = \frac{1}{2} g_0(n) + \frac{1}{2} - \frac{1}{4} \delta_n h(-4n).$$

In this article we give the actual numerical values of $g_0(n)$, $g^*(n)$ for $1 \leq n \leq 1000$ together with the values of the associated functions $\nu_1(n)$, $\nu_2(n)$, $\mu(n)$, $\sigma_0(n)$, $h(-4n)$. These were computed on the IBM 7090 of the NBS in a negligible amount of time. The resulting tables are of considerable interest however and should prove useful in many number-

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[1] Figures in brackets indicate the literature references at the end of this paper.

theoretic investigations, as well as in the study of the groups $\Gamma_0(n)$, $\Gamma^*(n)$.

We say some words about the computation of the tables. The functions $\nu_1(n)$, $\nu_2(n)$ were computed directly as the number of solutions of the congruences (2), (3) respectively. It is easy to give closed expressions for $\nu_1(n)$, $\nu_2(n)$ however. These are

$$\nu_1(n)=\begin{cases}0 & 2|n \text{ or } 9|n\\ \prod\limits_{q|n}\left(1+\left(\frac{-3}{q}\right)\right) & \text{otherwise,}\end{cases} \tag{4}$$

$$\nu_2(n)=\begin{cases}0 & 4|n\\ \prod\limits_{q|n}\left(1+\left(\frac{-4}{q}\right)\right) & \text{otherwise.}\end{cases} \tag{5}$$

We see that (4) and (5) imply that for $n>3$, $\nu_1(n)$ and $\nu_2(n)$ can take only 0 or powers of 2 as values. This provides an excellent check on the computation of $\nu_1(n)$, $\nu_2(n)$.

The function $\mu(n)$ is a multiplicative arithmetic function of n with easily computed values at the prime powers. In addition, if q is a prime $\mu(n)$ satisfies

$$\mu(nq)=\begin{cases}q\mu(n) & q|n\\ (q+1)\mu(n) & \text{otherwise.}\end{cases} \tag{6}$$

Relationship (6) provides an efficient and easily applied check on the computation of $\mu(n)$. Similar remarks apply to the function $\sigma_0(n)$.

The class number $h(-4n)$ was computed as the number of solutions of the system

$$\begin{cases}b^2-4ac=-4n\\ (a,b,c)=1\\ -a<b\leq a<c \text{ or } 0\leq b\leq a=c.\end{cases} \tag{7}$$

A check on the computation was provided by determining the parity of $h(-4n)$. It is not difficult to show from (7) that

$$h(-4n)\equiv U(n)+V(n) \pmod 2, \tag{8}$$

where

$$U(n)=\sum_{\substack{d|n\\ \left(d,\frac{n}{d}\right)=1\\ d^2<n}}1 \tag{9}$$

$$V(n)=\sum_{\substack{d|n\\ \left(d,\frac{d+\frac{n}{d}}{2}\right)=1\\ d^2\leq n\\ d+\frac{n}{d}\equiv 2 \pmod 4}}1. \tag{10}$$

From (9) and (10) it follows for example that for $n>1$, $n\equiv 1 \pmod 4$ $h(-4n)$ is even. For $n\equiv 3 \pmod 4$ $h(-4n)$ is even if n is not a prime power and odd if n is a prime power. Another excellent check arises from the fact that for $n\equiv 3 \pmod 8$, $n>3$, $h(-4n)$ is divisible by 3.

A different type of check is available from the relationship

$$h(-4fm^2)=h(-4f)\,m\prod_{p|m}\left\{1-\frac{1}{p}\left(\frac{-4f}{p}\right)\right\},$$

where $f>1$, $f\equiv 1, 2 \pmod 4$ and square-free.

The computation of $g_0(n)$ was checked by computing 12 $g_0(n)$ and verifying the divisibility of 12 $g_0(n)$ by 12. The computation of $g^*(n)$ was checked by the fact that always, $g^*(n)\leq \frac{1}{2}g(n)$. In addition, R. Fricke gives in [2] the first 50 or so values of $g_0(n)$, $g^*(n)$ and these agree with the values given here.

n	$\nu_1(n)$	$\nu_2(n)$	$\mu(n)$	$\sigma_0(n)$	$h(-4n)$	$g_0(n)$	$g^*(n)$
1	1	1	1	1	1	0	0
2	0	1	3	2	1	0	0
3	1	0	4	2	1	0	0
4	0	0	6	3	1	0	0
5	0	2	6	2	2	0	0
6	0	0	12	4	2	0	0
7	2	0	8	2	1	0	0
8	0	0	12	4	2	0	0
9	0	0	12	4	2	0	0
10	0	2	18	4	2	0	0
11	0	0	12	2	3	1	0
12	0	0	24	6	2	0	0
13	2	2	14	2	2	0	0
14	0	0	24	4	4	1	0
15	0	0	24	4	2	1	0
16	0	0	24	6	2	0	0
17	0	2	18	2	4	1	0
18	0	0	36	8	2	0	0
19	2	0	20	2	3	1	0
20	0	0	36	6	4	1	0
21	2	0	32	4	4	1	0
22	0	0	36	4	2	2	1
23	0	0	24	2	3	2	0
24	0	0	48	8	4	1	0
25	0	2	30	6	2	0	0
26	0	2	42	4	6	2	0
27	0	0	36	6	3	1	0
28	0	0	48	6	2	2	1
29	0	2	30	2	6	2	0
30	0	0	72	8	4	3	1
31	2	0	32	2	3	2	0
32	0	0	48	8	4	1	0
33	0	0	48	4	4	3	1
34	0	2	54	4	4	3	1
35	0	0	48	4	6	3	0
36	0	0	72	12	4	1	0
37	2	2	38	2	2	2	1
38	0	0	60	4	6	4	1
39	2	0	56	4	4	3	0
40	0	0	72	8	4	3	1
41	0	2	42	2	8	3	0
42	0	0	96	8	4	5	2
43	2	0	44	2	3	3	1
44	0	0	72	6	6	4	1
45	0	0	72	8	4	3	1
46	0	0	72	4	4	5	2
47	0	0	48	2	5	4	0
48	0	0	96	12	4	3	1
49	2	0	56	8	4	1	0
50	0	2	90	12	6	2	0
51	0	0	72	4	6	5	1
52	0	0	84	6	4	5	2
53	0	2	54	2	6	4	1
54	0	0	108	12	6	4	1
55	0	0	72	4	4	5	1

n	$\nu_1(n)$	$\nu_2(n)$	$\mu(n)$	$\sigma_0(n)$	$h(-4n)$	$g_0(n)$	$g^*(n)$
56	0	0	96	8	8	5	1
57	2	0	80	4	4	5	2
58	0	2	90	4	2	6	3
59	0	0	60	2	9	5	0
60	0	0	144	12	4	7	3
61	2	2	62	2	6	4	1
62	0	0	96	4	8	7	2
63	0	0	96	8	4	5	1
64	0	0	96	12	4	3	1
65	0	4	84	4	8	5	1
66	0	0	144	8	8	9	3
67	2	0	68	2	3	5	2
68	0	0	108	6	8	7	2
69	0	0	96	4	8	7	2
70	0	0	144	8	4	9	4
71	0	0	72	2	7	6	0
72	0	0	144	16	4	5	2
73	2	2	74	2	4	5	2
74	0	2	114	4	10	8	2
75	0	0	120	12	6	5	1
76	0	0	120	6	6	8	3
77	0	0	96	4	8	7	2
78	0	0	168	8	4	11	5
79	2	0	80	2	5	6	1
80	0	0	144	12	8	7	2
81	0	0	108	12	6	4	1
82	0	2	126	4	4	9	4
83	0	0	84	2	9	7	1
84	0	0	192	12	8	11	4
85	0	4	108	4	4	7	3
86	0	0	132	4	10	10	3
87	0	0	120	4	6	9	2
88	0	0	144	8	4	9	4
89	0	2	90	2	12	7	1
90	0	0	216	16	8	11	4
91	4	0	112	4	6	7	2
92	0	0	144	6	6	10	4
93	2	0	128	4	4	9	4
94	0	0	144	4	8	11	4
95	0	0	120	4	8	9	1
96	0	0	192	16	8	9	3
97	2	2	98	2	4	7	3
98	0	0	168	16	8	7	2
99	0	0	144	8	6	9	3
100	0	0	180	18	4	7	3
101	0	2	102	2	14	8	1
102	0	0	216	8	4	15	7
103	2	0	104	2	5	8	2
104	0	0	168	8	12	11	3
105	0	0	192	8	8	13	5
106	0	2	162	4	6	12	5
107	0	0	108	2	9	9	2
108	0	0	216	18	6	10	4
109	2	2	110	2	6	8	3
110	0	0	216	8	12	15	5
111	2	0	152	4	8	11	2
112	0	0	192	12	4	11	5
113	0	2	114	2	8	9	3
114	0	0	240	8	8	17	7
115	0	0	144	4	6	11	4
116	0	0	180	6	12	13	4
117	0	0	168	8	8	11	4
118	0	0	180	4	6	14	6
119	0	0	144	4	10	11	1
120	0	0	288	16	8	17	7
121	0	0	132	12	6	6	2
122	0	2	186	4	10	14	5
123	0	0	168	4	6	13	5
124	0	0	192	6	6	14	6
125	0	2	150	10	10	8	2
126	0	0	288	16	8	17	7
127	2	0	128	2	5	10	3
128	0	0	192	16	8	9	3
129	2	0	176	4	12	13	4
130	0	4	252	8	4	17	8
131	0	0	132	2	15	11	1
132	0	0	288	12	8	19	8
133	4	0	160	4	4	11	5
134	0	0	204	4	14	16	5
135	0	0	216	12	6	13	4

n	$\nu_1(n)$	$\nu_2(n)$	$\mu(n)$	$\sigma_0(n)$	$h(-4n)$	$g_0(n)$	$g^*(n)$
136	0	0	216	8	8	15	6
137	0	2	138	2	8	11	4
138	0	0	288	8	8	21	9
139	2	0	140	2	9	11	3
140	0	0	288	12	12	19	7
141	0	0	192	4	8	15	6
142	0	0	216	4	4	17	8
143	0	0	168	4	10	13	2
144	0	0	288	24	8	13	5
145	0	4	180	4	8	13	5
146	0	2	222	4	16	17	5
147	2	0	224	16	6	11	4
148	0	0	228	6	4	17	8
149	0	2	150	2	14	12	3
150	0	0	360	24	8	19	8
151	2	0	152	2	7	12	3
152	0	0	240	8	12	17	6
153	0	0	216	8	8	15	6
154	0	0	288	8	8	21	9
155	0	0	192	4	12	15	4
156	0	0	336	12	8	23	10
157	2	2	158	2	6	12	5
158	0	0	240	4	8	19	8
159	0	0	216	4	10	17	4
160	0	0	288	16	8	17	7
161	0	0	192	4	16	15	4
162	0	0	324	24	6	16	7
163	2	0	164	2	3	13	6
164	0	0	252	6	16	19	6
165	0	0	288	8	8	21	9
166	0	0	252	4	10	20	8
167	0	0	168	2	11	14	2
168	0	0	384	16	8	25	11
169	2	2	182	14	6	8	3
170	0	4	324	8	12	23	9
171	0	0	240	8	12	17	5
172	0	0	264	6	6	20	9
173	0	2	174	2	14	14	4
174	0	0	360	8	12	27	11
175	0	0	240	12	6	15	5
176	0	0	288	12	12	19	7
177	0	0	240	4	4	19	9
178	0	2	270	4	8	21	9
179	0	0	180	2	15	15	3
180	0	0	432	24	8	25	11
181	2	2	182	2	10	14	5
182	0	0	336	8	12	25	10
183	2	0	248	4	8	19	6
184	0	0	288	8	8	21	9
185	0	4	228	4	16	17	5
186	0	0	384	8	12	29	12
187	0	0	216	4	6	17	7
188	0	0	288	6	10	22	9
189	0	0	288	12	12	19	7
190	0	0	360	8	4	27	13
191	0	0	192	2	13	16	2
192	0	0	384	24	8	21	9
193	2	2	194	2	4	15	7
194	0	2	294	4	20	23	7
195	0	0	336	8	12	25	9
196	0	0	336	24	8	17	7
197	0	2	198	2	10	16	6
198	0	0	432	16	8	29	13
199	2	0	200	2	9	16	4
200	0	0	360	24	12	19	7
201	2	0	272	4	12	21	8
202	0	2	306	4	6	24	11
203	0	0	240	4	12	19	6
204	0	0	432	12	12	31	13
205	0	4	252	4	8	19	8
206	0	0	312	4	20	25	8
207	0	0	288	8	6	21	8
208	0	0	336	12	8	23	10
209	0	0	240	4	20	19	5
210	0	0	576	16	8	41	19
211	2	0	212	2	9	17	6
212	0	0	324	6	12	25	10
213	0	0	288	4	8	23	10
214	0	0	324	4	6	26	12
215	0	0	264	4	14	21	4

n	$\nu_1(n)$	$\nu_2(n)$	$\mu(n)$	$\sigma_0(n)$	$h(-4n)$	$g_0(n)$	$g^*(n)$
216	0	0	432	24	12	25	10
217	4	0	256	4	8	19	8
218	0	2	330	4	10	26	11
219	2	0	296	4	12	23	8
220	0	0	432	12	8	31	14
221	0	4	252	4	16	19	6
222	0	0	456	8	12	35	15
223	2	0	224	2	7	18	6
224	0	0	384	16	16	25	9
225	0	0	360	24	8	19	8
226	0	2	342	4	8	27	12
227	0	0	228	2	15	19	5
228	0	0	480	12	8	35	16
229	2	2	230	2	10	18	7
230	0	0	432	8	20	33	12
231	0	0	384	8	12	29	9
232	0	0	360	8	4	27	13
233	0	2	234	2	12	19	7
234	0	0	504	16	12	35	15
235	0	0	288	4	6	23	10
236	0	0	360	6	18	28	10
237	2	0	320	4	12	25	10
238	0	0	432	8	8	33	15
239	0	0	240	2	15	20	3
240	0	0	576	24	8	37	17
241	2	2	242	2	12	19	7
242	0	0	396	24	10	22	9
243	0	0	324	18	9	19	7
244	0	0	372	6	12	29	12
245	0	0	336	16	12	21	8
246	0	0	504	8	12	39	17
247	4	0	280	4	6	21	8
248	0	0	384	8	16	29	11
249	0	0	336	4	12	27	11
250	0	2	450	20	10	28	12
251	0	0	252	2	21	21	4
252	0	0	576	24	8	37	17
253	0	0	288	4	4	23	11
254	0	0	384	4	16	31	12
255	0	0	432	8	12	33	11
256	0	0	384	24	8	21	9
257	0	2	258	2	16	21	7
258	0	0	528	8	8	41	19
259	4	0	304	4	12	23	8
260	0	0	504	12	16	37	15
261	0	0	360	8	12	27	11
262	0	0	396	4	6	32	15
263	0	0	264	2	13	22	5
264	0	0	576	16	16	41	17
265	0	4	324	4	8	25	11
266	0	0	480	8	20	37	14
267	0	0	360	4	6	29	13
268	0	0	408	6	6	32	15
269	0	2	270	2	22	22	6
270	0	0	648	24	12	43	19
271	2	0	272	2	11	22	6
272	0	0	432	12	16	31	12
273	4	0	448	8	8	33	15
274	0	2	414	4	12	33	14
275	0	0	360	12	12	25	9
276	0	0	576	12	16	43	18
277	2	2	278	2	6	22	10
278	0	0	420	4	14	34	14
279	0	0	384	8	12	29	9
280	0	0	576	16	8	41	19
281	0	2	282	2	20	23	7
282	0	0	576	8	8	45	21
283	2	0	284	2	9	23	9
284	0	0	432	6	14	34	14
285	0	0	480	8	16	37	15
286	0	0	504	8	12	39	17
287	0	0	336	4	14	27	7
288	0	0	576	32	8	33	15
289	0	2	306	18	8	17	7
290	0	4	540	8	20	41	16
291	2	0	392	4	12	31	12
292	0	0	444	6	8	35	16
293	0	2	294	2	18	24	8
294	0	0	672	32	12	41	18
295	0	0	360	4	8	29	11
296	0	0	456	8	20	35	13
297	0	0	432	12	12	31	13
298	0	2	450	4	6	36	17
299	0	0	336	4	24	27	6
300	0	0	720	36	12	43	19

n	$\nu_1(n)$	$\nu_2(n)$	$\mu(n)$	$\sigma_0(n)$	$h(-4n)$	$g_0(n)$	$g^*(n)$
301	4	0	352	4	8	27	12
302	0	0	456	4	12	37	16
303	0	0	408	4	10	33	12
304	0	0	480	12	12	35	15
305	0	4	372	4	16	29	11
306	0	0	648	16	16	47	20
307	2	0	308	2	9	25	10
308	0	0	576	12	16	43	18
309	2	0	416	4	12	33	14
310	0	0	576	8	8	45	21
311	0	0	312	2	19	26	4
312	0	0	672	16	8	49	23
313	2	2	314	2	8	25	11
314	0	2	474	4	26	38	13
315	0	0	576	16	12	41	17
316	0	0	480	6	10	38	17
317	0	2	318	2	10	26	11
318	0	0	648	8	12	51	23
319	0	0	360	4	10	29	10
320	0	0	576	24	16	37	15
321	0	0	432	4	20	35	13
322	0	0	576	8	8	45	21
323	0	0	360	4	12	29	11
324	0	0	648	36	12	37	16
325	0	4	420	12	12	29	12
326	0	0	492	4	22	40	15
327	2	0	440	4	12	35	12
328	0	0	504	8	8	39	18
329	0	0	384	4	24	31	10
330	0	0	864	16	8	65	31
331	2	0	332	2	9	27	11
332	0	0	504	6	18	40	16
333	0	0	456	8	8	35	16
334	0	0	504	4	12	41	18
335	0	0	408	4	18	33	8
336	0	0	768	24	16	53	23
337	2	2	338	2	8	27	12
338	0	2	546	28	14	32	13
339	0	0	456	4	18	37	13
340	0	0	648	12	8	49	23
341	0	0	384	4	28	31	9
342	0	0	720	16	12	53	24
343	2	0	392	14	7	26	10
344	0	0	528	8	20	41	16
345	0	0	576	8	8	45	21
346	0	2	522	4	10	42	19
347	0	0	348	2	15	29	10
348	0	0	720	12	12	55	25
349	2	2	350	2	14	28	11
350	0	0	720	24	16	49	21
351	0	0	504	12	12	37	13
352	0	0	576	16	8	41	19
353	0	2	354	2	16	29	11
354	0	0	720	8	16	57	25
355	0	0	432	4	12	35	14
356	0	0	540	6	24	43	16
357	0	0	576	8	8	45	21
358	0	0	540	4	6	44	21
359	0	0	360	2	19	30	6
360	0	0	864	32	16	57	25
361	2	0	380	20	10	22	9
362	0	2	546	4	18	44	18
363	0	0	528	24	12	33	13
364	0	0	672	12	12	51	23
365	0	4	444	4	20	35	13
366	0	0	744	8	12	59	27
367	2	0	368	2	9	30	11
368	0	0	576	12	12	43	19
369	0	0	504	8	16	39	16
370	0	4	684	8	12	53	24
371	0	0	432	4	24	35	10
372	0	0	768	12	8	59	28
373	2	2	374	2	10	30	13
374	0	0	648	8	28	51	19
375	0	0	600	20	10	41	16
376	0	0	576	8	16	45	19
377	0	4	420	4	16	33	13
378	0	0	864	24	12	61	28
379	2	0	380	2	9	31	13
380	0	0	720	12	16	55	24
381	2	0	512	4	20	41	16
382	0	0	576	4	8	47	22
383	0	0	384	2	17	32	8
384	0	0	768	32	16	49	21
385	0	0	576	8	8	45	21

n	$\nu_1(n)$	$\nu_2(n)$	$\mu(n)$	$\sigma_0(n)$	$h(-4n)$	$g_0(n)$	$g^*(n)$
386	0	2	582	4	20	47	19
387	0	0	528	8	12	41	17
388	0	0	588	6	8	47	22
389	0	2	390	2	22	32	11
390	0	0	1008	16	16	77	35
391	0	0	432	4	14	35	11
392	0	0	672	32	16	41	17
393	0	0	528	4	12	43	19
394	0	2	594	4	10	48	22
395	0	0	480	4	24	39	12
396	0	0	864	24	12	61	28
397	2	2	398	2	6	32	15
398	0	0	600	4	20	49	20
399	4	0	640	8	16	49	17
400	0	0	720	36	8	43	20
401	0	2	402	2	20	33	12
402	0	0	816	8	16	65	29
403	4	0	448	4	6	35	16
404	0	0	612	6	28	49	18
405	0	0	648	24	12	43	19
406	0	0	720	8	16	57	25
407	0	0	456	4	16	37	11
408	0	0	864	16	8	65	31
409	2	2	410	2	16	33	13
410	0	4	756	8	16	59	26
411	0	0	552	4	18	45	17
412	0	0	624	6	10	50	23
413	0	0	480	4	20	39	15
414	0	0	864	16	16	65	29
415	0	0	504	4	10	41	16
416	0	0	672	16	24	49	19
417	2	0	560	4	12	45	20
418	0	0	720	8	8	57	27
419	0	0	420	2	27	35	9
420	0	0	1152	24	16	85	39
421	2	2	422	2	10	34	15
422	0	0	636	4	10	52	24
423	0	0	576	8	10	45	18
424	0	0	648	8	12	51	23
425	0	4	540	12	24	39	14
426	0	0	864	8	24	69	29
427	4	0	496	4	6	39	18
428	0	0	648	6	18	52	22
429	0	0	672	8	16	53	23
430	0	0	792	8	12	63	29
431	0	0	432	2	21	36	8
432	0	0	864	36	12	55	25
433	2	2	434	2	12	35	15
434	0	0	768	8	24	61	25
435	0	0	720	8	12	57	25
436	0	0	660	6	12	53	24
437	0	0	480	4	20	39	15
438	0	0	888	8	8	71	34
439	2	0	440	2	15	36	11
440	0	0	864	16	24	65	27
441	0	0	672	32	16	41	17
442	0	4	756	8	8	59	28
443	0	0	444	2	15	37	14
444	0	0	912	12	16	71	32
445	0	4	540	4	8	43	20
446	0	0	672	4	32	55	20
447	0	0	600	4	14	49	18
448	0	0	768	24	8	53	25
449	0	2	450	2	20	37	14
450	0	0	1080	48	12	67	31
451	0	0	504	4	18	41	15
452	0	0	684	6	16	55	24
453	2	0	608	4	12	49	22
454	0	0	684	4	14	56	25
455	0	0	672	8	20	53	17
456	0	0	960	16	16	73	33
457	2	2	458	2	8	37	17
458	0	2	690	4	26	56	22
459	0	0	648	12	18	49	19
460	0	0	864	12	12	67	31
461	0	2	462	2	30	38	12
462	0	0	1152	16	8	89	43
463	2	0	464	2	7	38	16
464	0	0	720	12	24	55	22
465	0	0	768	8	16	61	27
466	0	2	702	4	8	57	27
467	0	0	468	2	21	39	13
468	0	0	1008	24	16	73	33
469	4	0	544	4	16	43	18
470	0	0	864	8	20	69	30

n	$\nu_1(n)$	$\nu_2(n)$	$\mu(n)$	$\sigma_0(n)$	$h(-4n)$	$g_0(n)$	$g^*(n)$
471	2	0	632	4	16	51	18
472	0	0	720	8	12	57	26
473	0	0	528	4	12	43	19
474	0	0	960	8	20	77	34
475	0	0	600	12	12	45	19
476	0	0	864	12	20	67	29
477	0	0	648	8	12	51	23
478	0	0	720	4	8	59	28
479	0	0	480	2	25	49	8
480	0	0	1152	32	16	81	37
481	4	4	532	4	16	41	17
482	0	2	726	4	20	59	25
483	0	0	768	8	12	61	27
484	0	0	792	36	12	49	22
485	0	4	588	4	20	47	19
486	0	0	972	36	18	64	28
487	2	0	488	2	7	49	17
488	0	0	744	8	20	59	25
489	2	0	656	4	20	53	22
490	0	0	1008	32	12	69	32
491	0	0	492	2	27	41	12
492	0	0	1008	12	12	79	37
493	0	4	540	4	12	43	19
494	0	0	840	8	28	67	27
495	0	0	864	16	16	65	25
496	0	0	768	12	12	59	27
497	0	0	576	4	24	47	18
498	0	0	1008	8	8	81	39
499	2	0	500	2	9	41	18
500	0	0	900	30	20	61	26
501	0	0	672	4	16	55	24
502	0	0	756	4	14	62	28
503	0	0	504	2	21	42	11
504	0	0	1152	32	16	81	37
505	0	4	612	4	8	49	23
506	0	0	864	8	28	69	28
507	2	0	728	28	12	47	20
508	0	0	768	6	10	62	29
509	0	2	510	2	30	42	14
510	0	0	1296	16	16	101	47
511	4	0	592	4	14	47	17
512	0	0	768	32	16	49	21
513	0	0	720	12	12	55	25
514	0	2	774	4	16	63	28
515	0	0	624	4	18	51	20
516	0	0	1056	12	24	83	36
517	0	0	576	4	12	47	21
518	0	0	912	8	16	73	33
519	0	0	696	4	18	57	20
520	0	0	1008	16	8	77	37
521	0	2	522	2	32	43	14
522	0	0	1080	16	8	83	40
523	2	0	524	2	15	43	17
524	0	0	792	6	30	64	25
525	0	0	960	24	16	69	31
526	0	0	792	4	12	65	30
527	0	0	576	4	18	47	15
528	0	0	1152	24	16	85	39
529	0	0	552	24	12	35	15
530	0	4	972	8	28	77	32
531	0	0	720	8	18	57	23
532	0	0	960	12	8	75	36
533	0	4	588	4	12	47	21
534	0	0	1080	8	20	87	39
535	0	0	648	4	14	53	20
536	0	0	816	8	28	65	26
537	0	0	720	4	12	59	27
538	0	2	810	4	10	66	31
539	0	0	672	16	24	49	17
540	0	0	1296	36	12	91	43
541	2	2	542	2	10	44	20
542	0	0	816	4	24	67	28
543	2	0	723	4	12	59	24
544	0	0	864	16	16	65	29
545	0	4	660	4	32	53	19
546	0	0	1344	16	24	105	47
547	2	0	543	2	9	45	20
548	0	0	828	6	16	67	30
549	0	0	744	8	24	59	24
550	0	0	1030	24	12	79	37
551	0	0	600	4	26	49	12
552	0	0	1152	16	16	89	41
553	4	0	640	4	8	51	24
554	0	2	834	4	22	68	29
555	0	0	912	8	12	73	33

n	$\nu_1(n)$	$\nu_2(n)$	$\mu(n)$	$\sigma_0(n)$	$h(-4n)$	$g_0(n)$	$g^*(n)$
556	0	0	840	6	18	68	30
557	0	2	558	2	18	46	19
558	0	0	1152	16	16	89	41
559	4	0	616	4	16	49	17
560	0	0	1152	24	24	85	37
561	0	0	864	8	16	69	31
562	0	2	846	4	8	69	33
563	0	0	564	2	27	47	15
564	0	0	1152	12	16	91	42
565	0	4	684	4	12	55	25
566	0	0	852	4	30	70	28
567	0	0	864	24	12	61	25
568	0	0	864	8	8	69	33
569	0	2	570	2	32	47	16
570	0	0	1440	16	16	113	53
571	2	0	572	2	15	47	19
572	0	0	1008	12	20	79	35
573	0	0	768	4	16	63	28
574	0	0	1008	8	16	81	37
575	0	0	720	12	18	55	19
576	0	0	1152	48	16	73	33
577	2	2	578	2	8	47	22
578	0	2	918	36	16	59	26
579	2	0	776	4	24	63	24
580	0	0	1080	12	16	85	39
581	0	0	672	4	28	55	21
582	0	0	1176	8	16	95	44
583	0	0	648	4	8	53	23
584	0	0	888	8	32	71	28
585	0	0	1008	16	16	77	35
586	0	2	882	4	18	72	32
587	0	0	588	2	21	49	18
588	0	0	1344	48	12	89	42
589	4	0	640	4	16	51	22
590	0	0	1080	8	20	87	39
591	0	0	792	4	22	65	22
592	0	0	912	12	8	71	34
593	0	2	594	2	24	49	19
594	0	0	1296	24	24	97	43
595	0	0	864	8	12	69	31
596	0	0	900	6	28	73	30
597	2	0	800	4	12	65	30
598	0	0	1008	8	8	81	39
599	0	0	600	2	25	50	13
600	0	0	1440	48	16	97	45
601	2	2	602	2	20	49	20
602	0	0	1056	8	24	85	37
603	0	0	816	8	12	65	29
604	0	0	912	6	14	74	34
605	0	0	792	24	24	55	22
606	0	0	1224	8	12	99	47
607	2	0	608	2	13	50	19
608	0	0	960	16	24	73	31
609	0	0	960	8	16	77	35
610	0	4	1116	8	12	89	42
611	0	0	672	4	30	55	18
612	0	0	1296	24	16	97	45
613	2	2	614	2	10	50	23
614	0	0	924	4	34	76	30
615	0	0	1008	8	20	81	31
616	0	0	1152	16	16	89	41
617	0	2	618	2	12	51	23
618	0	0	1248	8	12	101	48
619	2	0	620	2	15	51	21
620	0	0	1152	12	24	91	40
621	0	0	864	12	24	67	28
622	0	0	936	4	12	77	36
623	0	0	720	4	22	59	19
624	0	0	1344	24	16	101	47
625	0	2	750	30	10	48	22
626	0	2	942	4	36	77	30
627	0	0	960	8	12	77	35
628	0	0	948	6	12	77	36
629	0	4	684	4	36	55	19
630	0	0	1728	32	16	129	61
631	2	0	632	2	13	52	20
632	0	0	960	8	16	77	35
633	2	0	848	4	20	69	30
634	0	2	954	4	14	78	36
635	0	0	768	4	30	63	22
636	0	0	1296	12	20	103	47
637	4	0	784	16	12	57	26
638	0	0	1080	8	20	87	39
639	0	0	864	8	14	69	28
640	0	0	1152	32	16	81	37

n	$\nu_1(n)$	$\nu_2(n)$	$\mu(n)$	$\sigma_0(n)$	$h(-4n)$	$g_0(n)$	$g^*(n)$
641	0	2	642	2	28	53	20
642	0	0	1296	8	16	105	49
643	2	0	644	2	9	53	24
644	0	0	1152	12	32	91	38
645	0	0	1056	8	16	85	39
646	0	0	1080	8	16	87	40
647	0	0	648	2	23	54	16
648	0	0	1296	48	12	85	40
649	0	0	720	4	20	59	25
650	0	4	1260	24	24	93	41
651	4	0	1024	8	24	81	33
652	0	0	984	6	6	80	39
653	0	2	654	2	14	54	24
654	0	0	1320	8	28	107	47
655	0	0	792	4	12	65	27
656	0	0	1008	12	32	79	32
657	0	0	888	8	16	71	32
658	0	0	1152	8	8	93	45
659	0	0	660	2	33	55	17
660	0	0	1728	24	16	133	63
661	2	2	662	2	18	54	23
662	0	0	996	4	22	82	36
663	0	0	1008	8	16	81	33
664	0	0	1008	8	20	81	36
665	0	0	960	8	24	77	33
666	0	0	1368	16	20	107	49
667	0	0	720	4	12	59	26
668	0	0	1008	6	22	82	36
669	2	0	896	4	12	73	34
670	0	0	1224	8	12	99	47
671	0	0	744	4	30	61	16
672	0	0	1536	32	16	113	53
673	2	2	674	2	12	55	25
674	0	2	1014	4	24	83	36
675	0	0	1080	36	18	73	31
676	0	0	1092	42	12	71	33
677	0	2	678	2	30	56	21
678	0	0	1368	8	20	111	51
679	4	0	784	4	18	63	23
680	0	0	1296	16	24	101	45
681	0	0	912	4	20	75	33
682	0	0	1152	8	12	93	44
683	0	0	684	2	15	57	24
684	0	0	1440	24	24	109	49
685	0	4	828	4	12	67	31
686	0	0	1176	28	28	85	36
687	2	0	920	4	12	75	32
688	0	0	1056	12	12	83	39
689	0	4	756	4	40	61	21
690	0	0	1728	16	16	137	65
691	2	0	692	2	15	57	24
692	0	0	1044	6	28	85	36
693	0	0	1152	16	16	89	41
694	0	0	1044	4	10	86	41
695	0	0	840	4	24	69	23
696	0	0	1440	16	24	113	51
697	0	4	756	4	8	61	29
698	0	2	1050	4	26	86	37
699	0	0	936	4	30	77	29
700	0	0	1440	36	12	103	49
701	0	2	702	2	34	58	21
702	0	0	1512	24	12	115	55
703	4	0	760	4	14	61	24
704	0	0	1152	24	24	85	37
705	0	0	1152	8	24	93	41
706	0	2	1062	4	24	87	38
707	0	0	816	4	18	67	28
708	0	0	1440	12	8	115	56
709	2	2	710	2	10	58	27
710	0	0	1296	8	32	105	45
711	0	0	960	8	20	77	29
712	0	0	1080	8	16	87	40
713	0	0	768	4	24	63	26
714	0	0	1728	16	24	137	63
715	0	0	1008	8	12	81	37
716	0	0	1080	6	30	88	37
717	0	0	960	4	16	79	36
718	0	0	1080	4	12	89	42
719	0	0	720	2	31	60	15
720	0	0	1728	48	16	121	57
721	4	0	832	4	16	67	30
722	0	0	1140	40	18	76	34
723	2	0	968	4	12	79	36
724	0	0	1092	6	20	89	40
725	0	4	900	12	24	69	29

n	$\nu_1(n)$	$\nu_2(n)$	$\mu(n)$	$\sigma_0(n)$	$h(-4n)$	$g_0(n)$	$g^*(n)$
726	0	0	1584	48	20	109	50
727	2	0	728	2	13	60	24
728	0	0	1344	16	24	105	47
729	0	0	972	36	18	64	28
730	0	4	1332	8	12	107	51
731	0	0	792	4	36	65	21
732	0	0	1488	12	16	119	56
733	2	2	734	2	14	60	27
734	0	0	1104	4	40	91	36
735	0	0	1344	32	16	97	41
736	0	0	1152	16	16	89	41
737	0	0	816	4	20	67	29
738	0	0	1512	16	16	119	56
739	2	0	740	2	15	61	26
740	0	0	1368	12	32	109	47
741	4	0	1120	8	24	89	39
742	0	0	1296	8	8	105	51
743	0	0	744	2	21	62	21
744	0	0	1536	16	24	121	55
745	0	4	900	4	16	73	33
746	0	2	1122	4	26	92	40
747	0	0	1008	8	18	81	35
748	0	0	1296	12	12	103	49
749	0	0	864	4	32	71	28
750	0	0	1800	40	20	131	61
751	2	0	752	2	15	62	24
752	0	0	1152	12	20	91	41
753	0	0	1008	4	12	83	39
754	0	4	1260	8	20	101	46
755	0	0	912	4	36	75	26
756	0	0	1728	36	24	127	58
757	2	2	758	2	10	62	29
758	0	0	1140	4	22	94	42
759	0	0	1152	8	24	93	35
760	0	0	1440	16	8	113	55
761	0	2	762	2	40	63	22
762	0	0	1536	8	12	125	60
763	4	0	880	4	12	71	32
764	0	0	1152	6	26	94	41
765	0	0	1296	16	16	101	47
766	0	0	1152	4	24	95	42
767	0	0	840	4	22	69	24
768	0	0	1536	48	16	105	49
769	2	2	770	2	20	63	27
770	0	0	1728	16	32	137	61
771	0	0	1032	4	18	85	37
772	0	0	1164	6	8	95	46
773	0	2	774	2	26	64	26
774	0	0	1584	16	20	125	58
775	0	0	960	12	12	75	32
776	0	0	1176	8	40	95	38
777	4	0	1216	8	16	97	45
778	0	2	1170	4	14	96	45
779	0	0	840	4	30	69	25
780	0	0	2016	24	24	157	73
781	0	0	864	4	20	71	31
782	0	0	1296	8	24	105	47
783	0	0	1080	12	18	85	34
784	0	0	1344	48	16	89	41
785	0	4	948	4	16	77	35
786	0	0	1584	8	16	129	61
787	2	0	788	2	15	65	28
788	0	0	1188	6	20	97	44
789	0	0	1056	4	32	87	36
790	0	0	1440	8	16	117	55
791	0	0	912	4	32	75	22
792	0	0	1728	32	16	129	61
793	4	4	868	4	8	69	33
794	0	2	1194	4	42	98	39
795	0	0	1296	8	12	105	49
796	0	0	1200	6	18	98	45
797	0	2	798	2	30	66	26
798	0	0	1920	16	16	153	73
799	0	0	864	4	16	71	28
800	0	0	1440	48	24	97	43
801	0	0	1080	8	24	87	38
802	0	2	1206	4	12	99	47
803	0	0	888	4	30	73	27
804	0	0	1632	12	24	131	60
805	0	0	1152	8	16	93	43
806	0	0	1344	8	28	109	48
807	0	0	1080	4	14	89	38
808	0	0	1224	8	12	99	47
809	0	2	810	2	32	67	26
810	0	0	1944	48	24	139	64

n	$\nu_1(n)$	$\nu_2(n)$	$\mu(n)$	$\sigma_0(n)$	$h(-4n)$	$g_0(n)$	$g^*(n)$
811	2	0	812	2	21	67	27
812	0	0	1440	12	24	115	52
813	2	0	1088	4	12	89	42
814	0	0	1368	8	12	111	53
815	0	0	984	4	30	81	26
816	0	0	1728	24	24	133	61
817	4	0	880	4	12	71	33
818	0	2	1230	4	28	101	44
819	0	0	1344	16	24	105	45
820	0	0	1512	12	16	121	57
821	0	2	822	2	30	68	27
822	0	0	1656	8	20	135	63
823	2	0	824	2	9	68	30
824	0	0	1248	8	40	101	41
825	0	0	1440	24	24	109	49
826	0	0	1440	8	12	117	56
827	0	0	828	2	21	69	28
828	0	0	1728	24	12	133	64
829	2	2	830	2	22	68	29
830	0	0	1512	8	20	123	57
831	2	0	1112	4	28	91	32
832	0	0	1344	24	16	101	47
833	0	0	1008	16	24	77	33
834	0	0	1680	8	16	137	65
835	0	0	1008	4	18	83	36
836	0	0	1440	12	40	115	48
837	0	0	1152	12	12	91	43
838	0	0	1260	4	14	104	49
839	0	0	840	2	33	70	19
840	0	0	2304	32	16	177	85
841	0	2	870	30	14	58	26
842	0	2	1266	4	26	104	46
843	0	0	1128	4	18	93	41
844	0	0	1272	6	18	104	48
845	0	4	1092	28	28	77	32
846	0	0	1728	16	32	137	61
847	0	0	1056	24	10	77	34
848	0	0	1296	12	24	103	46
849	2	0	1136	4	28	93	40
850	0	4	1620	24	16	123	58
851	0	0	912	4	30	75	28
852	0	0	1728	12	16	139	66
853	2	2	854	2	10	70	33
854	0	0	1488	8	44	121	50
855	0	0	1440	16	16	113	49
856	0	0	1296	8	12	105	50
857	0	2	858	2	32	71	28
858	0	0	2016	16	16	161	77
859	2	0	860	2	21	71	29
860	0	0	1584	12	28	127	57
861	0	0	1344	8	24	109	49
862	0	0	1296	4	8	107	52
863	0	0	864	2	21	72	26
864	0	0	1728	48	24	121	55
865	0	4	1044	4	16	85	39
866	0	2	1302	4	44	107	43
867	0	0	1224	36	18	85	37
868	0	0	1536	12	16	123	58
869	0	0	960	4	32	79	32
870	0	0	2160	16	16	173	83
871	4	0	952	4	22	77	28
872	0	0	1320	8	20	107	49
873	0	0	1176	8	16	95	44
874	0	0	1440	8	20	117	54
875	0	0	1200	20	30	91	36
876	0	0	1776	12	24	143	66
877	2	2	878	2	10	72	34
878	0	0	1320	4	20	109	50
879	0	0	1176	4	22	97	38
880	0	0	1728	24	16	133	63
881	0	2	882	2	40	73	27
882	0	0	2016	64	16	137	65
883	2	0	884	2	9	73	34
884	0	0	1512	12	32	121	53
885	0	0	1440	8	24	117	53
886	0	0	1332	4	18	110	51
887	0	0	888	2	29	74	23
888	0	0	1824	16	24	145	67
889	4	0	1024	4	16	83	38
890	0	4	1620	8	24	131	60
891	0	0	1296	24	18	97	43
892	0	0	1344	6	14	110	52
893	0	0	960	4	28	79	33
894	0	0	1800	8	28	147	67
895	0	0	1080	4	16	89	37

n	$\nu_1(n)$	$\nu_2(n)$	$\mu_0(n)$	$\sigma_0(n)$	$h(-4n)$	$g_0(n)$	$g^*(n)$
896	0	0	1536	32	32	113	49
897	0	0	1344	8	16	109	51
898	0	2	1350	4	12	111	53
899	0	0	960	4	42	79	26
900	0	0	2160	72	16	145	69
901	0	4	972	4	24	79	34
902	0	0	1512	8	28	123	55
903	4	0	1408	8	16	113	49
904	0	0	1368	8	16	111	52
905	0	4	1092	4	24	89	39
906	0	0	1824	8	28	149	68
907	2	0	908	2	9	75	35
908	0	0	1368	6	30	112	49
909	0	0	1224	8	28	99	43
910	0	0	2016	16	16	161	77
911	0	0	912	2	31	76	23
912	0	0	1920	24	16	149	71
913	0	0	1008	4	12	83	39
914	0	2	1374	4	36	113	48
915	0	0	1488	8	24	121	53
916	0	0	1380	6	20	113	52
917	0	0	1056	4	20	87	39
918	0	0	1944	24	12	151	73
919	2	0	920	2	19	76	29
920	0	0	1728	16	40	137	59
921	2	0	1232	4	20	101	46
922	0	2	1386	4	18	114	53
923	0	0	1008	4	30	83	32
924	0	0	2304	24	24	181	85
925	0	4	1140	12	12	89	42
926	0	0	1392	4	40	115	48
927	0	0	1248	8	20	101	41
928	0	0	1440	16	8	113	55
929	0	2	930	2	36	77	30
930	0	0	2304	16	24	185	87
931	4	0	1120	16	18	85	37
932	0	0	1404	6	24	115	52
933	0	0	1248	4	16	103	48
934	0	0	1404	4	26	116	52
935	0	0	1296	8	28	105	39
936	0	0	2016	32	24	153	71
937	2	2	938	2	20	77	34
938	0	0	1632	8	16	133	63
939	2	0	1256	4	24	103	44
940	0	0	1728	12	12	139	67
941	0	2	942	2	46	78	28
942	0	0	1896	8	12	155	75
943	0	0	1008	4	16	83	34
944	0	0	1440	12	36	115	49
945	0	0	1728	24	24	133	61
946	0	0	1584	8	16	129	61
947	0	0	948	2	15	79	35
948	0	0	1920	12	24	155	72
949	4	4	1036	4	12	83	39
950	0	0	1800	24	36	139	61
951	0	0	1272	4	26	105	40
952	0	0	1728	16	16	137	65
953	0	2	954	2	32	79	32
954	0	0	1944	16	24	155	72
955	0	0	1152	4	12	95	44
956	0	0	1440	6	30	118	52
957	0	0	1440	8	16	117	55
958	0	0	1440	4	16	119	56
959	0	0	1104	4	36	91	28
960	0	0	2304	48	16	169	81

n	$\nu_1(n)$	$\nu_2(n)$	$\mu_0(n)$	$\sigma_0(n)$	$h(-4n)$	$g_0(n)$	$g^*(n)$
961	2	0	992	32	16	67	30
962	0	4	1596	8	28	129	58
963	0	0	1296	8	18	105	47
964	0	0	1452	6	24	119	54
965	0	4	1164	4	44	95	37
966	0	0	2304	16	24	185	87
967	2	0	968	2	11	80	35
968	0	0	1584	48	20	109	50
969	0	0	1440	8	24	117	53
970	0	4	1764	8	12	143	69
971	0	0	972	2	45	81	26
972	0	0	1944	54	18	136	64
973	4	0	1120	4	12	91	43
974	0	0	1464	4	36	121	52
975	0	0	1680	24	16	129	57
976	0	0	1488	12	24	119	54
977	0	2	978	2	20	81	36
978	0	0	1968	8	24	161	75
979	0	0	1080	4	24	89	37
980	0	0	2016	48	24	145	67
981	0	0	1320	8	24	107	48
982	0	0	1476	4	10	122	59
983	0	0	984	2	27	82	28
984	0	0	2016	16	24	161	75
985	0	4	1188	4	24	97	43
986	0	4	1620	8	44	131	55
987	0	0	1536	8	24	125	55
988	0	0	1680	12	12	135	65
989	0	0	1056	4	36	87	35
990	0	0	2592	32	24	201	95
991	2	0	992	2	17	82	33
992	0	0	1536	16	32	121	53
993	2	0	1328	4	12	109	52
994	0	0	1728	8	16	141	67
995	0	0	1200	4	24	99	42
996	0	0	2016	12	24	163	76
997	2	2	998	2	14	82	38
998	0	0	1500	4	26	124	56
999	0	0	1368	12	24	109	43
1000	0	0	1800	40	20	131	61

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