```
pp[4]
```

0

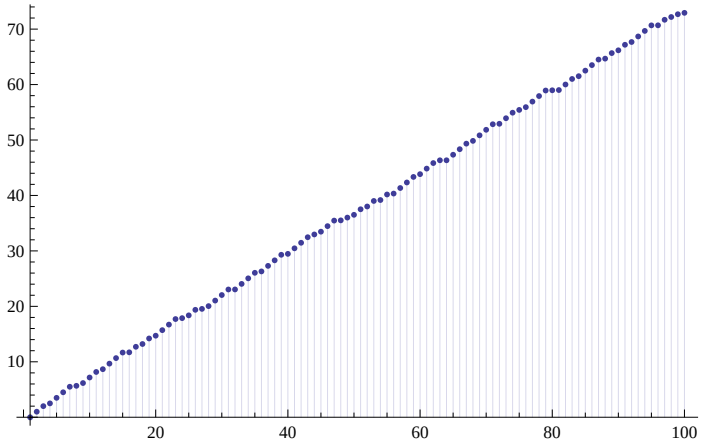
```
pp[3]
```

1

```
PP[100, 1, 1]
```

$$\frac{52\,513}{720}$$

```
DiscretePlot[ PP[n, 1, 1], {n, 1, 100}]
```




```
ppAlt[n_, z_] := Product[z^p[[2]] / (p[[2]]!), {p, FI[n]}];
FI[n_] := FactorInteger[n]; FI[1] := {}
pp[n_] := If[PrimeQ[n], 1, 0]
PP[n_, k_, t_] := PP[n, k, t] = Sum[ t pp[j] (1 / (k!) + PP[Floor[n / j], k + 1, t]), {j, 2, n}]
PS[n_, k_] := PP[n, 1, k] - PP[n - 1, 1, k]
Table[{ n = m, PS[n, 1], PS[n, 2], PS[n, 3], PS[n, 4], ppAlt[n, 1],
    ppAlt[n, 2], ppAlt[n, 3], ppAlt[n, 4]}, {m, 2, 100}] // TableForm
```

2	1	2	3	4	i	2	3	4
3	1	2	3	4	i	2	3	4
4	$\frac{1}{2}$	2	$\frac{9}{2}$	8	$-\frac{1}{2}$	2	$\frac{9}{2}$	8
5	1	2	3	4	i	2	3	4
6	1	4	9	16	-1	4	9	16
7	1	2	3	4	i	2	3	4
8	$\frac{1}{6}$	$\frac{4}{3}$	$\frac{9}{2}$	$\frac{32}{3}$	$-\frac{i}{6}$	$\frac{4}{3}$	$\frac{9}{2}$	$\frac{32}{3}$
9	$\frac{1}{2}$	2	$\frac{9}{2}$	8	$-\frac{1}{2}$	2	$\frac{9}{2}$	8
10	1	4	9	16	-1	4	9	16
11	1	2	3	4	i	2	3	4
12	$\frac{1}{2}$	4	$\frac{27}{2}$	32	$-\frac{i}{2}$	4	$\frac{27}{2}$	32
13	1	2	3	4	i	2	3	4
14	1	4	9	16	-1	4	9	16
15	1	4	9	16	-1	4	9	16
16	$\frac{1}{24}$	$\frac{2}{3}$	$\frac{27}{8}$	$\frac{32}{3}$	$\frac{1}{24}$	$\frac{2}{3}$	$\frac{27}{8}$	$\frac{32}{3}$
17	1	2	3	4	i	2	3	4

18	$\frac{1}{2}$	4	$\frac{27}{2}$	32	$-\frac{i}{2}$	4	$\frac{27}{2}$	32
19	1	2	3	4	i	2	3	4
20	$\frac{1}{2}$	4	$\frac{27}{2}$	32	$-\frac{i}{2}$	4	$\frac{27}{2}$	32
21	1	4	9	16	-1	4	9	16
22	1	4	9	16	-1	4	9	16
23	1	2	3	4	i	2	3	4
24	$\frac{1}{6}$	$\frac{8}{3}$	$\frac{27}{2}$	$\frac{128}{3}$	$\frac{1}{6}$	$\frac{8}{3}$	$\frac{27}{2}$	$\frac{128}{3}$
25	$\frac{1}{2}$	2	$\frac{9}{2}$	8	$-\frac{1}{2}$	2	$\frac{9}{2}$	8
26	1	4	9	16	-1	4	9	16
27	$\frac{1}{6}$	$\frac{4}{3}$	$\frac{9}{2}$	$\frac{32}{3}$	$-\frac{i}{6}$	$\frac{4}{3}$	$\frac{9}{2}$	$\frac{32}{3}$
28	$\frac{1}{2}$	4	$\frac{27}{2}$	32	$-\frac{i}{2}$	4	$\frac{27}{2}$	32
29	1	2	3	4	i	2	3	4
30	1	8	27	64	$-i$	8	27	64
31	1	2	3	4	i	2	3	4
32	$\frac{1}{120}$	$\frac{4}{15}$	$\frac{81}{40}$	$\frac{128}{15}$	$\frac{i}{120}$	$\frac{4}{15}$	$\frac{81}{40}$	$\frac{128}{15}$
33	1	4	9	16	-1	4	9	16
34	1	4	9	16	-1	4	9	16
35	1	4	9	16	-1	4	9	16
36	$\frac{1}{4}$	4	$\frac{81}{4}$	64	$\frac{1}{4}$	4	$\frac{81}{4}$	64
37	1	2	3	4	i	2	3	4
38	1	4	9	16	-1	4	9	16
39	1	4	9	16	-1	4	9	16
40	$\frac{1}{6}$	$\frac{8}{3}$	$\frac{27}{2}$	$\frac{128}{3}$	$\frac{1}{6}$	$\frac{8}{3}$	$\frac{27}{2}$	$\frac{128}{3}$
41	1	2	3	4	i	2	3	4
42	1	8	27	64	$-i$	8	27	64
43	1	2	3	4	i	2	3	4
44	$\frac{1}{2}$	4	$\frac{27}{2}$	32	$-\frac{i}{2}$	4	$\frac{27}{2}$	32
45	$\frac{1}{2}$	4	$\frac{27}{2}$	32	$-\frac{i}{2}$	4	$\frac{27}{2}$	32
46	1	4	9	16	-1	4	9	16
47	1	2	3	4	i	2	3	4
48	$\frac{1}{24}$	$\frac{4}{3}$	$\frac{81}{8}$	$\frac{128}{3}$	$\frac{i}{24}$	$\frac{4}{3}$	$\frac{81}{8}$	$\frac{128}{3}$
49	$\frac{1}{2}$	2	$\frac{9}{2}$	8	$-\frac{1}{2}$	2	$\frac{9}{2}$	8
50	$\frac{1}{2}$	4	$\frac{27}{2}$	32	$-\frac{i}{2}$	4	$\frac{27}{2}$	32
51	1	4	9	16	-1	4	9	16
52	$\frac{1}{2}$	4	$\frac{27}{2}$	32	$-\frac{i}{2}$	4	$\frac{27}{2}$	32
53	1	2	3	4	i	2	3	4
54	$\frac{1}{6}$	$\frac{8}{3}$	$\frac{27}{2}$	$\frac{128}{3}$	$\frac{1}{6}$	$\frac{8}{3}$	$\frac{27}{2}$	$\frac{128}{3}$
55	1	4	9	16	-1	4	9	16
56	$\frac{1}{6}$	$\frac{8}{3}$	$\frac{27}{2}$	$\frac{128}{3}$	$\frac{1}{6}$	$\frac{8}{3}$	$\frac{27}{2}$	$\frac{128}{3}$
57	1	4	9	16	-1	4	9	16
58	1	4	9	16	-1	4	9	16
59	1	2	3	4	i	2	3	4
60	$\frac{1}{2}$	8	$\frac{81}{2}$	128	$\frac{1}{2}$	8	$\frac{81}{2}$	128
61	1	2	3	4	i	2	3	4
62	1	4	9	16	-1	4	9	16
63	$\frac{1}{2}$	4	$\frac{27}{2}$	32	$-\frac{i}{2}$	4	$\frac{27}{2}$	32
64	$\frac{1}{720}$	$\frac{4}{45}$	$\frac{81}{80}$	$\frac{256}{45}$	$-\frac{1}{720}$	$\frac{4}{45}$	$\frac{81}{80}$	$\frac{256}{45}$

65	1	4	9	16	−1	4	9	16
66	1	8	27	64	−i	8	27	64
67	1	2	3	4	i	2	3	4
68	$\frac{1}{2}$	4	$\frac{27}{2}$	32	$-\frac{i}{2}$	4	$\frac{27}{2}$	32
69	1	4	9	16	−1	4	9	16
70	1	8	27	64	−i	8	27	64
71	1	2	3	4	i	2	3	4
72	$\frac{1}{12}$	$\frac{8}{3}$	$\frac{81}{4}$	$\frac{256}{3}$	$\frac{i}{12}$	$\frac{8}{3}$	$\frac{81}{4}$	$\frac{256}{3}$
73	1	2	3	4	i	2	3	4
74	1	4	9	16	−1	4	9	16
75	$\frac{1}{2}$	4	$\frac{27}{2}$	32	$-\frac{i}{2}$	4	$\frac{27}{2}$	32
76	$\frac{1}{2}$	4	$\frac{27}{2}$	32	$-\frac{i}{2}$	4	$\frac{27}{2}$	32
77	1	4	9	16	−1	4	9	16
78	1	8	27	64	−i	8	27	64
79	1	2	3	4	i	2	3	4
80	$\frac{1}{24}$	$\frac{4}{3}$	$\frac{81}{8}$	$\frac{128}{3}$	$\frac{i}{24}$	$\frac{4}{3}$	$\frac{81}{8}$	$\frac{128}{3}$
81	$\frac{1}{24}$	$\frac{2}{3}$	$\frac{27}{8}$	$\frac{32}{3}$	$\frac{1}{24}$	$\frac{2}{3}$	$\frac{27}{8}$	$\frac{32}{3}$
82	1	4	9	16	−1	4	9	16
83	1	2	3	4	i	2	3	4
84	$\frac{1}{2}$	8	$\frac{81}{2}$	128	$\frac{1}{2}$	8	$\frac{81}{2}$	128
85	1	4	9	16	−1	4	9	16
86	1	4	9	16	−1	4	9	16
87	1	4	9	16	−1	4	9	16
88	$\frac{1}{6}$	$\frac{8}{3}$	$\frac{27}{2}$	$\frac{128}{3}$	$\frac{1}{6}$	$\frac{8}{3}$	$\frac{27}{2}$	$\frac{128}{3}$
89	1	2	3	4	i	2	3	4
90	$\frac{1}{2}$	8	$\frac{81}{2}$	128	$\frac{1}{2}$	8	$\frac{81}{2}$	128
91	1	4	9	16	−1	4	9	16
92	$\frac{1}{2}$	4	$\frac{27}{2}$	32	$-\frac{i}{2}$	4	$\frac{27}{2}$	32
93	1	4	9	16	−1	4	9	16
94	1	4	9	16	−1	4	9	16
95	1	4	9	16	−1	4	9	16
96	$\frac{1}{120}$	$\frac{8}{15}$	$\frac{243}{40}$	$\frac{512}{15}$	$-\frac{1}{120}$	$\frac{8}{15}$	$\frac{243}{40}$	$\frac{512}{15}$
97	1	2	3	4	i	2	3	4
98	$\frac{1}{2}$	4	$\frac{27}{2}$	32	$-\frac{i}{2}$	4	$\frac{27}{2}$	32
99	$\frac{1}{2}$	4	$\frac{27}{2}$	32	$-\frac{i}{2}$	4	$\frac{27}{2}$	32
100	$\frac{1}{4}$	4	$\frac{81}{4}$	64	$\frac{1}{4}$	4	$\frac{81}{4}$	64

```
512 * 128
```

65 536

```
8!
```

40 320

```
(z^aa) / (aa!)
```

$$\frac{z^{aa}}{aa!}$$

```
Table[{n = m, ppAlt[n, 1], ppAlt[n, -1], ppAlt[n, I], ppAlt[n, -I]}, {m, 2, 100}] //
 TableForm
```

2	1	−1	i	−i
3	1	−1	i	−i
4	$\frac{1}{2}$	$\frac{1}{2}$	$-\frac{1}{2}$	$-\frac{1}{2}$

5	1	-1	i	$-\mathrm{i}$
6	1	1	-1	-1
7	1	-1	i	$-\mathrm{i}$
8	$\frac{1}{6}$	$-\frac{1}{6}$	$-\frac{\mathrm{i}}{6}$	$\frac{\mathrm{i}}{6}$
9	$\frac{1}{2}$	$\frac{1}{2}$	$-\frac{1}{2}$	$-\frac{1}{2}$
10	1	1	-1	-1
11	1	-1	i	$-\mathrm{i}$
12	$\frac{1}{2}$	$-\frac{1}{2}$	$-\frac{\mathrm{i}}{2}$	$\frac{\mathrm{i}}{2}$
13	1	-1	i	$-\mathrm{i}$
14	1	1	-1	-1
15	1	1	-1	-1
16	$\frac{1}{24}$	$\frac{1}{24}$	$\frac{1}{24}$	$\frac{1}{24}$
17	1	-1	i	$-\mathrm{i}$
18	$\frac{1}{2}$	$-\frac{1}{2}$	$-\frac{\mathrm{i}}{2}$	$\frac{\mathrm{i}}{2}$
19	1	-1	i	$-\mathrm{i}$
20	$\frac{1}{2}$	$-\frac{1}{2}$	$-\frac{\mathrm{i}}{2}$	$\frac{\mathrm{i}}{2}$
21	1	1	-1	-1
22	1	1	-1	-1
23	1	-1	i	$-\mathrm{i}$
24	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$
25	$\frac{1}{2}$	$\frac{1}{2}$	$-\frac{1}{2}$	$-\frac{1}{2}$
26	1	1	-1	-1
27	$\frac{1}{6}$	$-\frac{1}{6}$	$-\frac{\mathrm{i}}{6}$	$\frac{\mathrm{i}}{6}$
28	$\frac{1}{2}$	$-\frac{1}{2}$	$-\frac{\mathrm{i}}{2}$	$\frac{\mathrm{i}}{2}$
29	1	-1	i	$-\mathrm{i}$
30	1	-1	$-\mathrm{i}$	i
31	1	-1	i	$-\mathrm{i}$
32	$\frac{1}{120}$	$-\frac{1}{120}$	$\frac{\mathrm{i}}{120}$	$-\frac{\mathrm{i}}{120}$
33	1	1	-1	-1
34	1	1	-1	-1
35	1	1	-1	-1
36	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$
37	1	-1	i	$-\mathrm{i}$
38	1	1	-1	-1
39	1	1	-1	-1
40	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$
41	1	-1	i	$-\mathrm{i}$
42	1	-1	$-\mathrm{i}$	i
43	1	-1	i	$-\mathrm{i}$
44	$\frac{1}{2}$	$-\frac{1}{2}$	$-\frac{\mathrm{i}}{2}$	$\frac{\mathrm{i}}{2}$
45	$\frac{1}{2}$	$-\frac{1}{2}$	$-\frac{\mathrm{i}}{2}$	$\frac{\mathrm{i}}{2}$
46	1	1	-1	-1
47	1	-1	i	$-\mathrm{i}$
48	$\frac{1}{24}$	$-\frac{1}{24}$	$\frac{\mathrm{i}}{24}$	$-\frac{\mathrm{i}}{24}$
49	$\frac{1}{2}$	$\frac{1}{2}$	$-\frac{1}{2}$	$-\frac{1}{2}$
50	$\frac{1}{2}$	$-\frac{1}{2}$	$-\frac{\mathrm{i}}{2}$	$\frac{\mathrm{i}}{2}$
51	1	1	-1	-1
52	$\frac{1}{2}$	$-\frac{1}{2}$	$-\frac{\mathrm{i}}{2}$	$\frac{\mathrm{i}}{2}$

53	1	-1	i	$-i$
54	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$
55	1	1	-1	-1
56	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$
57	1	1	-1	-1
58	1	1	-1	-1
59	1	-1	i	$-i$
60	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
61	1	-1	i	$-i$
62	1	1	-1	-1
63	$\frac{1}{2}$	$-\frac{1}{2}$	$-\frac{i}{2}$	$\frac{i}{2}$
64	$\frac{1}{720}$	$\frac{1}{720}$	$-\frac{1}{720}$	$-\frac{1}{720}$
65	1	1	-1	-1
66	1	-1	$-i$	i
67	1	-1	i	$-i$
68	$\frac{1}{2}$	$-\frac{1}{2}$	$-\frac{i}{2}$	$\frac{i}{2}$
69	1	1	-1	-1
70	1	-1	$-i$	i
71	1	-1	i	$-i$
72	$\frac{1}{12}$	$-\frac{1}{12}$	$\frac{i}{12}$	$-\frac{i}{12}$
73	1	-1	i	$-i$
74	1	1	-1	-1
75	$\frac{1}{2}$	$-\frac{1}{2}$	$-\frac{i}{2}$	$\frac{i}{2}$
76	$\frac{1}{2}$	$-\frac{1}{2}$	$-\frac{i}{2}$	$\frac{i}{2}$
77	1	1	-1	-1
78	1	-1	$-i$	i
79	1	-1	i	$-i$
80	$\frac{1}{24}$	$-\frac{1}{24}$	$\frac{i}{24}$	$-\frac{i}{24}$
81	$\frac{1}{24}$	$\frac{1}{24}$	$\frac{1}{24}$	$\frac{1}{24}$
82	1	1	-1	-1
83	1	-1	i	$-i$
84	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
85	1	1	-1	-1
86	1	1	-1	-1
87	1	1	-1	-1
88	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$
89	1	-1	i	$-i$
90	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
91	1	1	-1	-1
92	$\frac{1}{2}$	$-\frac{1}{2}$	$-\frac{i}{2}$	$\frac{i}{2}$
93	1	1	-1	-1
94	1	1	-1	-1
95	1	1	-1	-1
96	$\frac{1}{120}$	$\frac{1}{120}$	$-\frac{1}{120}$	$-\frac{1}{120}$
97	1	-1	i	$-i$
98	$\frac{1}{2}$	$-\frac{1}{2}$	$-\frac{i}{2}$	$\frac{i}{2}$
99	$\frac{1}{2}$	$-\frac{1}{2}$	$-\frac{i}{2}$	$\frac{i}{2}$
100	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$

```
Table[{n = m, ppAlt[n, (2^(-1 / 2)) + (2^(-1 / 2) I)],
   ppAlt[n, -(2^(-1 / 2)) + (2^(-1 / 2) I)], ppAlt[n, -(2^(-1 / 2)) - (2^(-1 / 2) I)],
   ppAlt[n, (2^(-1 / 2)) - (2^(-1 / 2) I)]}, {m, 2, 100}] // TableForm
```

2	$\frac{1+i}{\sqrt{2}}$	$-\frac{1-i}{\sqrt{2}}$	$-\frac{1+i}{\sqrt{2}}$	$\frac{1-i}{\sqrt{2}}$
3	$\frac{1+i}{\sqrt{2}}$	$-\frac{1-i}{\sqrt{2}}$	$-\frac{1+i}{\sqrt{2}}$	$\frac{1-i}{\sqrt{2}}$
4	$\frac{i}{2}$	$-\frac{i}{2}$	$\frac{i}{2}$	$-\frac{i}{2}$
5	$\frac{1+i}{\sqrt{2}}$	$-\frac{1-i}{\sqrt{2}}$	$-\frac{1+i}{\sqrt{2}}$	$\frac{1-i}{\sqrt{2}}$
6	i	$-i$	i	$-i$
7	$\frac{1+i}{\sqrt{2}}$	$-\frac{1-i}{\sqrt{2}}$	$-\frac{1+i}{\sqrt{2}}$	$\frac{1-i}{\sqrt{2}}$
8	$-\frac{\frac{1}{6}-\frac{i}{6}}{\sqrt{2}}$	$\frac{\frac{1}{6}+\frac{i}{6}}{\sqrt{2}}$	$\frac{\frac{1}{6}-\frac{i}{6}}{\sqrt{2}}$	$-\frac{\frac{1}{6}+\frac{i}{6}}{\sqrt{2}}$
9	$\frac{i}{2}$	$-\frac{i}{2}$	$\frac{i}{2}$	$-\frac{i}{2}$
10	i	$-i$	i	$-i$
11	$\frac{1+i}{\sqrt{2}}$	$-\frac{1-i}{\sqrt{2}}$	$-\frac{1+i}{\sqrt{2}}$	$\frac{1-i}{\sqrt{2}}$
12	$-\frac{\frac{1}{2}-\frac{i}{2}}{\sqrt{2}}$	$\frac{\frac{1}{2}+\frac{i}{2}}{\sqrt{2}}$	$\frac{\frac{1}{2}-\frac{i}{2}}{\sqrt{2}}$	$-\frac{\frac{1}{2}+\frac{i}{2}}{\sqrt{2}}$
13	$\frac{1+i}{\sqrt{2}}$	$-\frac{1-i}{\sqrt{2}}$	$-\frac{1+i}{\sqrt{2}}$	$\frac{1-i}{\sqrt{2}}$
14	i	$-i$	i	$-i$
15	i	$-i$	i	$-i$
16	$-\frac{1}{24}$	$-\frac{1}{24}$	$-\frac{1}{24}$	$-\frac{1}{24}$
17	$\frac{1+i}{\sqrt{2}}$	$-\frac{1-i}{\sqrt{2}}$	$-\frac{1+i}{\sqrt{2}}$	$\frac{1-i}{\sqrt{2}}$
18	$-\frac{\frac{1}{2}-\frac{i}{2}}{\sqrt{2}}$	$\frac{\frac{1}{2}+\frac{i}{2}}{\sqrt{2}}$	$\frac{\frac{1}{2}-\frac{i}{2}}{\sqrt{2}}$	$-\frac{\frac{1}{2}+\frac{i}{2}}{\sqrt{2}}$
19	$\frac{1+i}{\sqrt{2}}$	$-\frac{1-i}{\sqrt{2}}$	$-\frac{1+i}{\sqrt{2}}$	$\frac{1-i}{\sqrt{2}}$
20	$-\frac{\frac{1}{2}-\frac{i}{2}}{\sqrt{2}}$	$\frac{\frac{1}{2}+\frac{i}{2}}{\sqrt{2}}$	$\frac{\frac{1}{2}-\frac{i}{2}}{\sqrt{2}}$	$-\frac{\frac{1}{2}+\frac{i}{2}}{\sqrt{2}}$
21	i	$-i$	i	$-i$
22	i	$-i$	i	$-i$
23	$\frac{1+i}{\sqrt{2}}$	$-\frac{1-i}{\sqrt{2}}$	$-\frac{1+i}{\sqrt{2}}$	$\frac{1-i}{\sqrt{2}}$
24	$-\frac{1}{6}$	$-\frac{1}{6}$	$-\frac{1}{6}$	$-\frac{1}{6}$
25	$\frac{i}{2}$	$-\frac{i}{2}$	$\frac{i}{2}$	$-\frac{i}{2}$
26	i	$-i$	i	$-i$
27	$-\frac{\frac{1}{6}-\frac{i}{6}}{\sqrt{2}}$	$\frac{\frac{1}{6}+\frac{i}{6}}{\sqrt{2}}$	$\frac{\frac{1}{6}-\frac{i}{6}}{\sqrt{2}}$	$-\frac{\frac{1}{6}+\frac{i}{6}}{\sqrt{2}}$
28	$-\frac{\frac{1}{2}-\frac{i}{2}}{\sqrt{2}}$	$\frac{\frac{1}{2}+\frac{i}{2}}{\sqrt{2}}$	$\frac{\frac{1}{2}-\frac{i}{2}}{\sqrt{2}}$	$-\frac{\frac{1}{2}+\frac{i}{2}}{\sqrt{2}}$
29	$\frac{1+i}{\sqrt{2}}$	$-\frac{1-i}{\sqrt{2}}$	$-\frac{1+i}{\sqrt{2}}$	$\frac{1-i}{\sqrt{2}}$
30	$-\frac{1-i}{\sqrt{2}}$	$\frac{1+i}{\sqrt{2}}$	$\frac{1-i}{\sqrt{2}}$	$-\frac{1+i}{\sqrt{2}}$
31	$\frac{1+i}{\sqrt{2}}$	$-\frac{1-i}{\sqrt{2}}$	$-\frac{1+i}{\sqrt{2}}$	$\frac{1-i}{\sqrt{2}}$
32	$-\frac{\frac{1}{120}+\frac{i}{120}}{\sqrt{2}}$	$\frac{\frac{1}{120}-\frac{i}{120}}{\sqrt{2}}$	$\frac{\frac{1}{120}+\frac{i}{120}}{\sqrt{2}}$	$-\frac{\frac{1}{120}-\frac{i}{120}}{\sqrt{2}}$
33	i	$-i$	i	$-i$
34	i	$-i$	i	$-i$
35	i	$-i$	i	$-i$

36	$-\frac{1}{4}$	$-\frac{1}{4}$	$-\frac{1}{4}$	$-\frac{1}{4}$
37	$\frac{1+i}{\sqrt{2}}$	$-\frac{1-i}{\sqrt{2}}$	$-\frac{1+i}{\sqrt{2}}$	$\frac{1-i}{\sqrt{2}}$
38	i	$-i$	i	$-i$
39	i	$-i$	i	$-i$
40	$-\frac{1}{6}$	$-\frac{1}{6}$	$-\frac{1}{6}$	$-\frac{1}{6}$
41	$\frac{1+i}{\sqrt{2}}$	$-\frac{1-i}{\sqrt{2}}$	$-\frac{1+i}{\sqrt{2}}$	$\frac{1-i}{\sqrt{2}}$
42	$-\frac{1-i}{\sqrt{2}}$	$\frac{1+i}{\sqrt{2}}$	$\frac{1-i}{\sqrt{2}}$	$-\frac{1+i}{\sqrt{2}}$
43	$\frac{1+i}{\sqrt{2}}$	$-\frac{1-i}{\sqrt{2}}$	$-\frac{1+i}{\sqrt{2}}$	$\frac{1-i}{\sqrt{2}}$
44	$-\frac{\frac{1}{2}-\frac{i}{2}}{\sqrt{2}}$	$\frac{\frac{1}{2}+\frac{i}{2}}{\sqrt{2}}$	$\frac{\frac{1}{2}-\frac{i}{2}}{\sqrt{2}}$	$-\frac{\frac{1}{2}+\frac{i}{2}}{\sqrt{2}}$
45	$-\frac{\frac{1}{2}-\frac{i}{2}}{\sqrt{2}}$	$\frac{\frac{1}{2}+\frac{i}{2}}{\sqrt{2}}$	$\frac{\frac{1}{2}-\frac{i}{2}}{\sqrt{2}}$	$-\frac{\frac{1}{2}+\frac{i}{2}}{\sqrt{2}}$
46	i	$-i$	i	$-i$
47	$\frac{1+i}{\sqrt{2}}$	$-\frac{1-i}{\sqrt{2}}$	$-\frac{1+i}{\sqrt{2}}$	$\frac{1-i}{\sqrt{2}}$
48	$-\frac{\frac{1}{24}+\frac{i}{24}}{\sqrt{2}}$	$\frac{\frac{1}{24}-\frac{i}{24}}{\sqrt{2}}$	$\frac{\frac{1}{24}+\frac{i}{24}}{\sqrt{2}}$	$-\frac{\frac{1}{24}-\frac{i}{24}}{\sqrt{2}}$
49	$\frac{i}{2}$	$-\frac{i}{2}$	$\frac{i}{2}$	$-\frac{i}{2}$
50	$-\frac{\frac{1}{2}-\frac{i}{2}}{\sqrt{2}}$	$\frac{\frac{1}{2}+\frac{i}{2}}{\sqrt{2}}$	$\frac{\frac{1}{2}-\frac{i}{2}}{\sqrt{2}}$	$-\frac{\frac{1}{2}+\frac{i}{2}}{\sqrt{2}}$
51	i	$-i$	i	$-i$
52	$-\frac{\frac{1}{2}-\frac{i}{2}}{\sqrt{2}}$	$\frac{\frac{1}{2}+\frac{i}{2}}{\sqrt{2}}$	$\frac{\frac{1}{2}-\frac{i}{2}}{\sqrt{2}}$	$-\frac{\frac{1}{2}+\frac{i}{2}}{\sqrt{2}}$
53	$\frac{1+i}{\sqrt{2}}$	$-\frac{1-i}{\sqrt{2}}$	$-\frac{1+i}{\sqrt{2}}$	$\frac{1-i}{\sqrt{2}}$
54	$-\frac{1}{6}$	$-\frac{1}{6}$	$-\frac{1}{6}$	$-\frac{1}{6}$
55	i	$-i$	i	$-i$
56	$-\frac{1}{6}$	$-\frac{1}{6}$	$-\frac{1}{6}$	$-\frac{1}{6}$
57	i	$-i$	i	$-i$
58	i	$-i$	i	$-i$
59	$\frac{1+i}{\sqrt{2}}$	$-\frac{1-i}{\sqrt{2}}$	$-\frac{1+i}{\sqrt{2}}$	$\frac{1-i}{\sqrt{2}}$
60	$-\frac{1}{2}$	$-\frac{1}{2}$	$-\frac{1}{2}$	$-\frac{1}{2}$
61	$\frac{1+i}{\sqrt{2}}$	$-\frac{1-i}{\sqrt{2}}$	$-\frac{1+i}{\sqrt{2}}$	$\frac{1-i}{\sqrt{2}}$
62	i	$-i$	i	$-i$
63	$-\frac{\frac{1}{2}-\frac{i}{2}}{\sqrt{2}}$	$\frac{\frac{1}{2}+\frac{i}{2}}{\sqrt{2}}$	$\frac{\frac{1}{2}-\frac{i}{2}}{\sqrt{2}}$	$-\frac{\frac{1}{2}+\frac{i}{2}}{\sqrt{2}}$
64	$-\frac{i}{720}$	$\frac{i}{720}$	$-\frac{i}{720}$	$\frac{i}{720}$
65	i	$-i$	i	$-i$
66	$-\frac{1-i}{\sqrt{2}}$	$\frac{1+i}{\sqrt{2}}$	$\frac{1-i}{\sqrt{2}}$	$-\frac{1+i}{\sqrt{2}}$
67	$\frac{1+i}{\sqrt{2}}$	$-\frac{1-i}{\sqrt{2}}$	$-\frac{1+i}{\sqrt{2}}$	$\frac{1-i}{\sqrt{2}}$
68	$-\frac{\frac{1}{2}-\frac{i}{2}}{\sqrt{2}}$	$\frac{\frac{1}{2}+\frac{i}{2}}{\sqrt{2}}$	$\frac{\frac{1}{2}-\frac{i}{2}}{\sqrt{2}}$	$-\frac{\frac{1}{2}+\frac{i}{2}}{\sqrt{2}}$
69	i	$-i$	i	$-i$
70	$-\frac{1-i}{\sqrt{2}}$	$\frac{1+i}{\sqrt{2}}$	$\frac{1-i}{\sqrt{2}}$	$-\frac{1+i}{\sqrt{2}}$
71	$\frac{1+i}{\sqrt{2}}$	$-\frac{1-i}{\sqrt{2}}$	$-\frac{1+i}{\sqrt{2}}$	$\frac{1-i}{\sqrt{2}}$

72	$-\frac{\frac{1}{12}+\frac{i}{12}}{\sqrt{2}}$	$\frac{\frac{1}{12}-\frac{i}{12}}{\sqrt{2}}$	$\frac{\frac{1}{12}+\frac{i}{12}}{\sqrt{2}}$	$-\frac{\frac{1}{12}-\frac{i}{12}}{\sqrt{2}}$
73	$\frac{1+i}{\sqrt{2}}$	$-\frac{1-i}{\sqrt{2}}$	$-\frac{1+i}{\sqrt{2}}$	$\frac{1-i}{\sqrt{2}}$
74	i	$-i$	i	$-i$
75	$-\frac{\frac{1}{2}-\frac{i}{2}}{\sqrt{2}}$	$\frac{\frac{1}{2}+\frac{i}{2}}{\sqrt{2}}$	$\frac{\frac{1}{2}-\frac{i}{2}}{\sqrt{2}}$	$-\frac{\frac{1}{2}+\frac{i}{2}}{\sqrt{2}}$
76	$-\frac{\frac{1}{2}-\frac{i}{2}}{\sqrt{2}}$	$\frac{\frac{1}{2}+\frac{i}{2}}{\sqrt{2}}$	$\frac{\frac{1}{2}-\frac{i}{2}}{\sqrt{2}}$	$-\frac{\frac{1}{2}+\frac{i}{2}}{\sqrt{2}}$
77	i	$-i$	i	$-i$
78	$-\frac{1-i}{\sqrt{2}}$	$\frac{1+i}{\sqrt{2}}$	$\frac{1-i}{\sqrt{2}}$	$-\frac{1+i}{\sqrt{2}}$
79	$\frac{1+i}{\sqrt{2}}$	$-\frac{1-i}{\sqrt{2}}$	$-\frac{1+i}{\sqrt{2}}$	$\frac{1-i}{\sqrt{2}}$
80	$-\frac{\frac{1}{24}+\frac{i}{24}}{\sqrt{2}}$	$\frac{\frac{1}{24}-\frac{i}{24}}{\sqrt{2}}$	$\frac{\frac{1}{24}+\frac{i}{24}}{\sqrt{2}}$	$-\frac{\frac{1}{24}-\frac{i}{24}}{\sqrt{2}}$
81	$-\frac{1}{24}$	$-\frac{1}{24}$	$-\frac{1}{24}$	$-\frac{1}{24}$
82	i	$-i$	i	$-i$
83	$\frac{1+i}{\sqrt{2}}$	$-\frac{1-i}{\sqrt{2}}$	$-\frac{1+i}{\sqrt{2}}$	$\frac{1-i}{\sqrt{2}}$
84	$-\frac{1}{2}$	$-\frac{1}{2}$	$-\frac{1}{2}$	$-\frac{1}{2}$
85	i	$-i$	i	$-i$
86	i	$-i$	i	$-i$
87	i	$-i$	i	$-i$
88	$-\frac{1}{6}$	$-\frac{1}{6}$	$-\frac{1}{6}$	$-\frac{1}{6}$
89	$\frac{1+i}{\sqrt{2}}$	$-\frac{1-i}{\sqrt{2}}$	$-\frac{1+i}{\sqrt{2}}$	$\frac{1-i}{\sqrt{2}}$
90	$-\frac{1}{2}$	$-\frac{1}{2}$	$-\frac{1}{2}$	$-\frac{1}{2}$
91	i	$-i$	i	$-i$
92	$-\frac{\frac{1}{2}-\frac{i}{2}}{\sqrt{2}}$	$\frac{\frac{1}{2}+\frac{i}{2}}{\sqrt{2}}$	$\frac{\frac{1}{2}-\frac{i}{2}}{\sqrt{2}}$	$-\frac{\frac{1}{2}+\frac{i}{2}}{\sqrt{2}}$
93	i	$-i$	i	$-i$
94	i	$-i$	i	$-i$
95	i	$-i$	i	$-i$
96	$-\frac{i}{120}$	$\frac{i}{120}$	$-\frac{i}{120}$	$\frac{i}{120}$
97	$\frac{1+i}{\sqrt{2}}$	$-\frac{1-i}{\sqrt{2}}$	$-\frac{1+i}{\sqrt{2}}$	$\frac{1-i}{\sqrt{2}}$
98	$-\frac{\frac{1}{2}-\frac{i}{2}}{\sqrt{2}}$	$\frac{\frac{1}{2}+\frac{i}{2}}{\sqrt{2}}$	$\frac{\frac{1}{2}-\frac{i}{2}}{\sqrt{2}}$	$-\frac{\frac{1}{2}+\frac{i}{2}}{\sqrt{2}}$
99	$-\frac{\frac{1}{2}-\frac{i}{2}}{\sqrt{2}}$	$\frac{\frac{1}{2}+\frac{i}{2}}{\sqrt{2}}$	$\frac{\frac{1}{2}-\frac{i}{2}}{\sqrt{2}}$	$-\frac{\frac{1}{2}+\frac{i}{2}}{\sqrt{2}}$
100	$-\frac{1}{4}$	$-\frac{1}{4}$	$-\frac{1}{4}$	$-\frac{1}{4}$

```
N[Cos[Pi / 4]]
```

0.707107

```
N[1 / Sqrt[2]]
```

0.707107

```
N[2^(-1 / 2)]
```

0.707107

```
liouville[n_, z_] := Product[(-1)^p[[2]] Pochhammer[z, a = p[[2]]] / a!, {p, FI[n]}];
FI[n_] := FactorInteger[n]; FI[1] := {}
Liou2[n_, k_] := Sum[(-1)^(k - j) Binomial[k, j] liouville[n, j], {j, 0, k}]
LiouLinnik[n_] := Sum[(-1)^(k + 1) / k Liou2[n, k], {k, 1, Log[2, n]}]
Table[{n, liouville[n, 1], LiouLinnik[n]}, {n, 2, 100}] // TableForm
```

2	−1	−1
3	−1	−1
4	1	$\frac{1}{2}$
5	−1	−1
6	1	0
7	−1	−1
8	−1	$-\frac{1}{3}$
9	1	$\frac{1}{2}$
10	1	0
11	−1	−1
12	−1	0
13	−1	−1
14	1	0
15	1	0
16	1	$\frac{1}{4}$
17	−1	−1
18	−1	0
19	−1	−1
20	−1	0
21	1	0
22	1	0
23	−1	−1
24	1	0
25	1	$\frac{1}{2}$
26	1	0
27	−1	$-\frac{1}{3}$
28	−1	0
29	−1	−1
30	−1	0
31	−1	−1
32	−1	$-\frac{1}{5}$
33	1	0
34	1	0
35	1	0
36	1	0
37	−1	−1
38	1	0
39	1	0
40	1	0
41	−1	−1
42	−1	0
43	−1	−1
44	−1	0
45	−1	0
46	1	0
47	−1	−1

48	−1	0
49	1	$\frac{1}{2}$
50	−1	0
51	1	0
52	−1	0
53	−1	−1
54	1	0
55	1	0
56	1	0
57	1	0
58	1	0
59	−1	−1
60	1	0
61	−1	−1
62	1	0
63	−1	0
64	1	$\frac{1}{6}$
65	1	0
66	−1	0
67	−1	−1
68	−1	0
69	1	0
70	−1	0
71	−1	−1
72	−1	0
73	−1	−1
74	1	0
75	−1	0
76	−1	0
77	1	0
78	−1	0
79	−1	−1
80	−1	0
81	1	$\frac{1}{4}$
82	1	0
83	−1	−1
84	1	0
85	1	0
86	1	0
87	1	0
88	1	0
89	−1	−1
90	1	0
91	1	0
92	−1	0
93	1	0
94	1	0
95	1	0
96	1	0
97	−1	−1
98	−1	0
99	−1	0
100	1	0

```
liouville[n_, z_] := Product[(-1)^p[[2]] Pochhammer[z, a = p[[2]]] / a!, {p, FI[n]}];
FI[n_] := FactorInteger[n]; FI[1] := {}
Liou2[n_, k_] := Sum[(-1)^(k - j) Binomial[k, j] liouville[n, j], {j, 0, k}]
LiouLinnik[n_] := Sum[(-1)^(k + 1) / k Liou2[n, k], {k, 1, Log[2, n]}]
Table[{n, liouville[n, 1], LiouLinnik[n]}, {n, 2, 100}] // TableForm
```

```
(*totient*)
PrimeK[n_] := FullSimplify[MangoldtLambda[n] / Log[n]]
d[n_, k_] := d[n, k] = Sum[d[j, k - 1] d[n / j, 1], {j, Divisors[n]}];
d[n_, 1] := EulerPhi[n]; d[n_, 0] := 0; d[1, 0] := 1
d2[n_, k_] := Sum[(-1)^(k - j) Binomial[k, j] d[n, j], {j, 0, k}]
Linnik[n_] := Linnik[n] = Sum[(-1)^(k + 1) / k d2[n, k], {k, 1, Log[2, n]}]
Table[{n, (n - 1) PrimeK[n], Linnik[n]}, {n, 2, 100}] // TableForm
```

2	1	1
3	2	2
4	$\frac{3}{2}$	$\frac{3}{2}$
5	4	4
6	0	0
7	6	6
8	$\frac{7}{3}$	$\frac{7}{3}$
9	4	4
10	0	0
11	10	10
12	0	0
13	12	12
14	0	0
15	0	0
16	$\frac{15}{4}$	$\frac{15}{4}$
17	16	16
18	0	0
19	18	18
20	0	0
21	0	0
22	0	0
23	22	22
24	0	0
25	12	12
26	0	0
27	$\frac{26}{3}$	$\frac{26}{3}$
28	0	0
29	28	28
30	0	0
31	30	30
32	$\frac{31}{5}$	$\frac{31}{5}$
33	0	0
34	0	0
35	0	0
36	0	0
37	36	36
38	0	0
39	0	0

40	0	0
41	40	40
42	0	0
43	42	42
44	0	0
45	0	0
46	0	0
47	46	46
48	0	0
49	24	24
50	0	0
51	0	0
52	0	0
53	52	52
54	0	0
55	0	0
56	0	0
57	0	0
58	0	0
59	58	58
60	0	0
61	60	60
62	0	0
63	0	0
64	$\frac{21}{2}$	$\frac{21}{2}$
65	0	0
66	0	0
67	66	66
68	0	0
69	0	0
70	0	0
71	70	70
72	0	0
73	72	72
74	0	0
75	0	0
76	0	0
77	0	0
78	0	0
79	78	78
80	0	0
81	20	20
82	0	0
83	82	82
84	0	0
85	0	0
86	0	0
87	0	0
88	0	0
89	88	88
90	0	0
91	0	0
92	0	0
93	0	0
94	0	0
95	0	0

```
96    0    0
97    96   96
98    0    0
99    0    0
100   0    0
```

```
(*totient*)
PrimeK[n_] := FullSimplify[MangoldtLambda[n] / Log[n]]
d[n_, k_] := d[n, k] = Sum[d[j, k - 1] d[n / j, 1], {j, Divisors[n]}];
d[n_, 1] := EulerPhi[n]; d[n_, 0] := 0; d[1, 0] := 1
d2[n_, k_] := Sum[(-1)^(k - j) Binomial[k, j] d[n, j], {j, 0, k}]
Linnik[n_] := Linnik[n] = Sum[(-1)^(k + 1) / k d2[n, k], {k, 1, Log[2, n]}]
Table[{n, (n - 1) PrimeK[n], Linnik[n]}, {n, 2, 100}] // TableForm
```

```
ClearAll["Global`*"]
PrimeK[n_] := FullSimplify[MangoldtLambda[n] / Log[n]]
d[n_, k_] := Sum[d[j, k - 1] d[n / j, 1], {j, Divisors[n]}];
d[n_, 1] := Abs[MoebiusMu[n]]; d[n_, 0] := 0; d[1, 0] := 1
d2[n_, k_] := Sum[(-1)^(k - j) Binomial[k, j] d[n, j], {j, 0, k}]
Linnik[n_] := Sum[(-1)^(k + 1) / k d2[n, k], {k, 1, Log[2, n]}]
Table[{n, -PrimeK[n] LiouvilleLambda[n], Linnik[n]}, {n, 2, 100}] // TableForm
```

2	1	1
3	1	1
4	$-\frac{1}{2}$	$-\frac{1}{2}$
5	1	1
6	0	0
7	1	1
8	$\frac{1}{3}$	$\frac{1}{3}$
9	$-\frac{1}{2}$	$-\frac{1}{2}$
10	0	0
11	1	1
12	0	0
13	1	1
14	0	0
15	0	0
16	$-\frac{1}{4}$	$-\frac{1}{4}$
17	1	1
18	0	0
19	1	1
20	0	0
21	0	0
22	0	0
23	1	1
24	0	0
25	$-\frac{1}{2}$	$-\frac{1}{2}$
26	0	0
27	$\frac{1}{3}$	$\frac{1}{3}$
28	0	0
29	1	1
30	0	0

31	1	1
32	$\frac{1}{5}$	$\frac{1}{5}$
33	0	0
34	0	0
35	0	0
36	0	0
37	1	1
38	0	0
39	0	0
40	0	0
41	1	1
42	0	0
43	1	1
44	0	0
45	0	0
46	0	0
47	1	1
48	0	0
49	$-\frac{1}{2}$	$-\frac{1}{2}$
50	0	0
51	0	0
52	0	0
53	1	1
54	0	0
55	0	0
56	0	0
57	0	0
58	0	0
59	1	1
60	0	0
61	1	1
62	0	0
63	0	0
64	$-\frac{1}{6}$	$-\frac{1}{6}$
65	0	0
66	0	0
67	1	1
68	0	0
69	0	0
70	0	0
71	1	1
72	0	0
73	1	1
74	0	0
75	0	0
76	0	0
77	0	0
78	0	0
79	1	1
80	0	0
81	$-\frac{1}{4}$	$-\frac{1}{4}$
82	0	0
83	1	1
84	0	0

```
85    0    0
86    0    0
87    0    0
88    0    0
89    1    1
90    0    0
91    0    0
92    0    0
93    0    0
94    0    0
95    0    0
96    0    0
97    1    1
98    0    0
99    0    0
100   0    0
```

```
f[x_] := N[x[10]]
```

```
f[Cos]
```

```
-0.839072
```

```
ClearAll["Global`*"]
PrimeK[n_] := FullSimplify[MangoldtLambda[n] / Log[n]]
d[f_, n_, k_] := Sum[d[f, j, k - 1] d[f, n / j, 1], {j, Divisors[n]}];
d[f_, n_, 1] := f[n]; d[f_, n_, 0] := 0; d[f_, 1, 0] := 1
d2[f_, n_, k_] := Sum[(-1)^(k - j) Binomial[k, j] d[f, n, j], {j, 0, k}]
Linnik[f_, n_] := Sum[(-1)^(k + 1) / k d2[f, n, k], {k, 1, Log[2, n]}]
MuSquared[n_] := MoebiusMu[n]^2
Divisor1[n_] := DivisorSigma[1, n]
PrimeExp[n_, z_] := Product[z^p[[2]] / (p[[2]]!), {p, FI[n]}];
FI[n_] := FactorInteger[n]; FI[1] := {}
PrimeExp1[n_] := PrimeExp[n, 1]
Table[{n,
   Linnik[MoebiusMu, n], -PrimeK[n], "  ",
   Linnik[LiouvilleLambda, n], PrimeK[n] LiouvilleLambda[n], "  ",
   Linnik[MuSquared, n], -PrimeK[n] LiouvilleLambda[n], "  ",
    Linnik[Divisor1, n], PrimeK[n] (n + 1), "  ",
    Linnik[EulerPhi, n], PrimeK[n] (n - 1), "  ",
    Linnik[PrimeExp1, n], If[PrimeQ[n], 1, 0], "  "
  }, {n, 2, 100}] // TableForm
```

2	-1	-1	-1	-1	1	1	3	3	1	1
3	-1	-1	-1	-1	1	1	4	4	2	2
4	$-\frac{1}{2}$	$-\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$-\frac{1}{2}$	$-\frac{1}{2}$	$\frac{5}{2}$	$\frac{5}{2}$	$\frac{3}{2}$	$\frac{3}{2}$
5	-1	-1	-1	-1	1	1	6	6	4	4
6	0	0	0	0	0	0	0	0	0	0
7	-1	-1	-1	-1	1	1	8	8	6	6
8	$-\frac{1}{3}$	$-\frac{1}{3}$	$-\frac{1}{3}$	$-\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$	3	3	$\frac{7}{3}$	$\frac{7}{3}$
9	$-\frac{1}{2}$	$-\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$-\frac{1}{2}$	$-\frac{1}{2}$	5	5	4	4
10	0	0	0	0	0	0	0	0	0	0
11	-1	-1	-1	-1	1	1	12	12	10	10
12	0	0	0	0	0	0	0	0	0	0

13	-1	-1	-1	-1	1	1	14	14	12	12
14	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0
16	$-\frac{1}{4}$	$-\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$-\frac{1}{4}$	$-\frac{1}{4}$	$\frac{17}{4}$	$\frac{17}{4}$	$\frac{15}{4}$	$\frac{15}{4}$
17	-1	-1	-1	-1	1	1	18	18	16	16
18	0	0	0	0	0	0	0	0	0	0
19	-1	-1	-1	-1	1	1	20	20	18	18
20	0	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0
23	-1	-1	-1	-1	1	1	24	24	22	22
24	0	0	0	0	0	0	0	0	0	0
25	$-\frac{1}{2}$	$-\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$-\frac{1}{2}$	$-\frac{1}{2}$	13	13	12	12
26	0	0	0	0	0	0	0	0	0	0
27	$-\frac{1}{3}$	$-\frac{1}{3}$	$-\frac{1}{3}$	$-\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{3}$	$\frac{28}{3}$	$\frac{28}{3}$	$\frac{26}{3}$	$\frac{26}{3}$
28	0	0	0	0	0	0	0	0	0	0
29	-1	-1	-1	-1	1	1	30	30	28	28
30	0	0	0	0	0	0	0	0	0	0
31	-1	-1	-1	-1	1	1	32	32	30	30
32	$-\frac{1}{5}$	$-\frac{1}{5}$	$-\frac{1}{5}$	$-\frac{1}{5}$	$\frac{1}{5}$	$\frac{1}{5}$	$\frac{33}{5}$	$\frac{33}{5}$	$\frac{31}{5}$	$\frac{31}{5}$
33	0	0	0	0	0	0	0	0	0	0
34	0	0	0	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0	0	0
37	-1	-1	-1	-1	1	1	38	38	36	36
38	0	0	0	0	0	0	0	0	0	0
39	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0
41	-1	-1	-1	-1	1	1	42	42	40	40
42	0	0	0	0	0	0	0	0	0	0
43	-1	-1	-1	-1	1	1	44	44	42	42
44	0	0	0	0	0	0	0	0	0	0
45	0	0	0	0	0	0	0	0	0	0
46	0	0	0	0	0	0	0	0	0	0
47	-1	-1	-1	-1	1	1	48	48	46	46
48	0	0	0	0	0	0	0	0	0	0
49	$-\frac{1}{2}$	$-\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$-\frac{1}{2}$	$-\frac{1}{2}$	25	25	24	24
50	0	0	0	0	0	0	0	0	0	0
51	0	0	0	0	0	0	0	0	0	0
52	0	0	0	0	0	0	0	0	0	0
53	-1	-1	-1	-1	1	1	54	54	52	52
54	0	0	0	0	0	0	0	0	0	0
55	0	0	0	0	0	0	0	0	0	0
56	0	0	0	0	0	0	0	0	0	0
57	0	0	0	0	0	0	0	0	0	0
58	0	0	0	0	0	0	0	0	0	0
59	-1	-1	-1	-1	1	1	60	60	58	58
60	0	0	0	0	0	0	0	0	0	0
61	-1	-1	-1	-1	1	1	62	62	60	60
62	0	0	0	0	0	0	0	0	0	0
63	0	0	0	0	0	0	0	0	0	0
64	$-\frac{1}{6}$	$-\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$-\frac{1}{6}$	$-\frac{1}{6}$	$\frac{65}{6}$	$\frac{65}{6}$	$\frac{21}{2}$	$\frac{21}{2}$
65	0	0	0	0	0	0	0	0	0	0

66	0	0	0	0	0	0	0	0	0	0
67	−1	−1	−1	−1	1	1	68	68	66	66
68	0	0	0	0	0	0	0	0	0	0
69	0	0	0	0	0	0	0	0	0	0
70	0	0	0	0	0	0	0	0	0	0
71	−1	−1	−1	−1	1	1	72	72	70	70
72	0	0	0	0	0	0	0	0	0	0
73	−1	−1	−1	−1	1	1	74	74	72	72
74	0	0	0	0	0	0	0	0	0	0
75	0	0	0	0	0	0	0	0	0	0
76	0	0	0	0	0	0	0	0	0	0
77	0	0	0	0	0	0	0	0	0	0
78	0	0	0	0	0	0	0	0	0	0
79	−1	−1	−1	−1	1	1	80	80	78	78
80	0	0	0	0	0	0	0	0	0	0
81	$-\frac{1}{4}$	$-\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$-\frac{1}{4}$	$-\frac{1}{4}$	$\frac{41}{2}$	$\frac{41}{2}$	20	20
82	0	0	0	0	0	0	0	0	0	0
83	−1	−1	−1	−1	1	1	84	84	82	82
84	0	0	0	0	0	0	0	0	0	0
85	0	0	0	0	0	0	0	0	0	0
86	0	0	0	0	0	0	0	0	0	0
87	0	0	0	0	0	0	0	0	0	0
88	0	0	0	0	0	0	0	0	0	0
89	−1	−1	−1	−1	1	1	90	90	88	88
90	0	0	0	0	0	0	0	0	0	0
91	0	0	0	0	0	0	0	0	0	0
92	0	0	0	0	0	0	0	0	0	0
93	0	0	0	0	0	0	0	0	0	0
94	0	0	0	0	0	0	0	0	0	0
95	0	0	0	0	0	0	0	0	0	0
96	0	0	0	0	0	0	0	0	0	0
97	−1	−1	−1	−1	1	1	98	98	96	96
98	0	0	0	0	0	0	0	0	0	0
99	0	0	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0	0