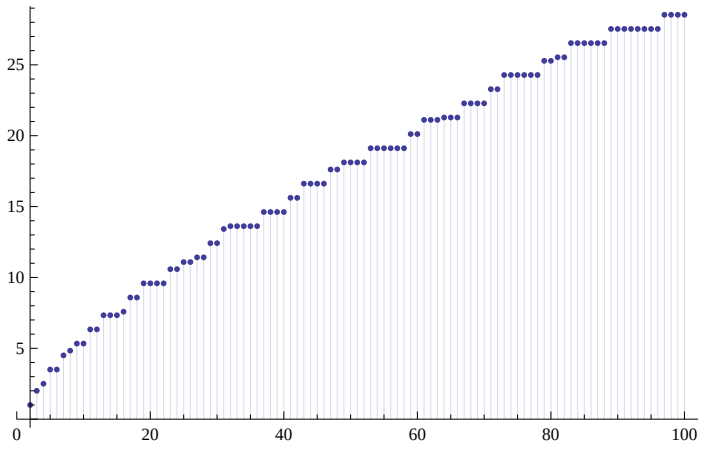
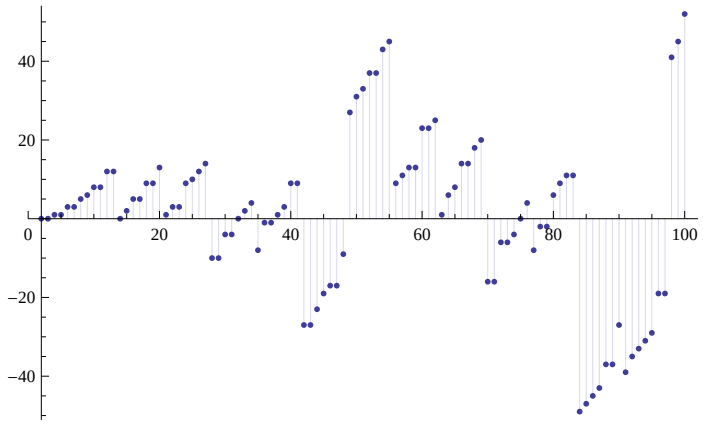
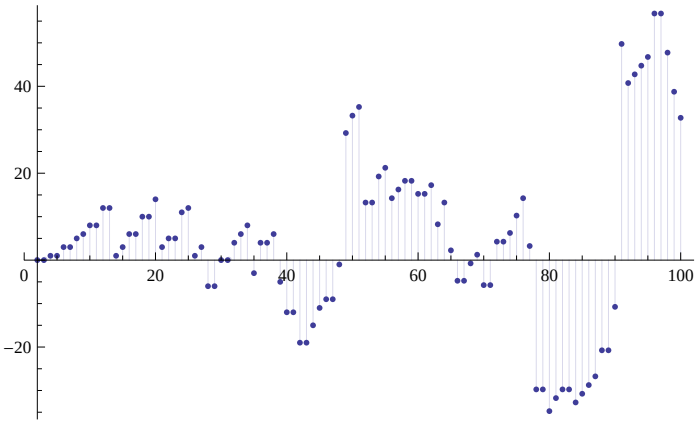
```
ClearAll["Global`*"]

ST[vv_, n_] := Mod[n, vv] - Mod[(n - 1), vv]

LAdd[vv_, n_] := Sum[ vv^k / k, {k, 1, Log[vv, n]}]
E1[vv_, n_, 0] := 1
E1[vv_, n_, k_] := E1[vv, n, k] = Sum[ ST[vv, j] E1[vv, Floor[n / j], k - 1], {j, 1, n}]
E2[vv_, n_, k_] := E2[vv, n, k] = Sum[ (-1)^(k - j) Binomial[k, j] E1[vv, n, j], {j, 0, k}]
e2[vv_, n_, k_] := e2[vv, n, k] = E2[vv, n, k] - E2[vv, n - 1, k]
P2[vv_, n_] := Sum[ (-1)^(k + 1) / k E2[vv, n, k], {k, 1, Log[2, n]}]
p2[vv_, n_] := n + Sum[ (-1)^(k + 1) / k e2[vv, n, k], {k, 1, Log[2, n]}]
P2a[n_] := P2a[n] = Sum[ p2[j, j], {j, 2, n}]
md[x_, y_] := y / 2 - y / Pi Sum[ Sin[ 2 Pi k x / y ] / k, {k, 1, 200}]
md2[x_, y_] := (y / 2 - y / Pi Sum[ Sin[ 2 Pi k x / y ] / k, {k, 1, 200}]) -
  (y / 2 - y / Pi Sum[ Sin[ 2 Pi k (x - 1) / y ] / k, {k, 1, 200}])
md3[x_, y_] := (y / 2 - y / Pi Sum[ Sin[ 2 Pi k x / y ] / k, {k, 1, 1000}]) -
  (y / 2 - y / Pi Sum[ Sin[ 2 Pi k (x - 1) / y ] / k, {k, 1, 1000}])

DiscretePlot[P2[5, n] + LAdd[5, n], {n, 2, 100}]
```



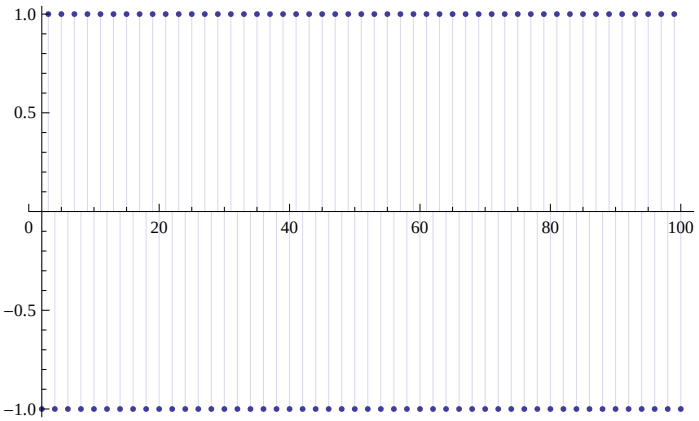

```
DiscretePlot[{E2[7, n, 2]}, {n, 2, 100}]
```



```
DiscretePlot[{E2[13 / 2, n, 2]}, {n, 2, 100}]
```



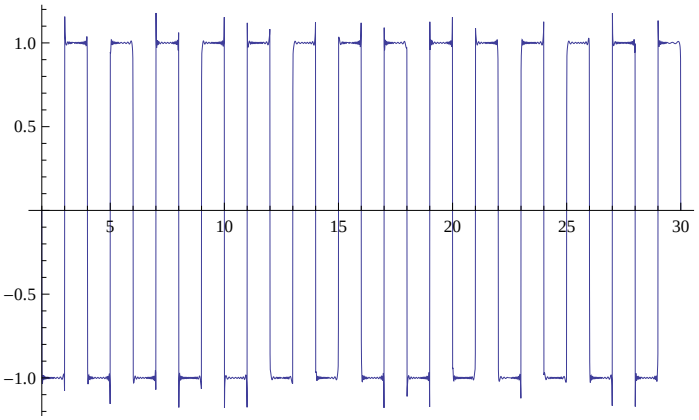

```
DiscretePlot[{E2[2, n, 1] - E2[2, n - 1, 1]}, {n, 2, 100}]
```



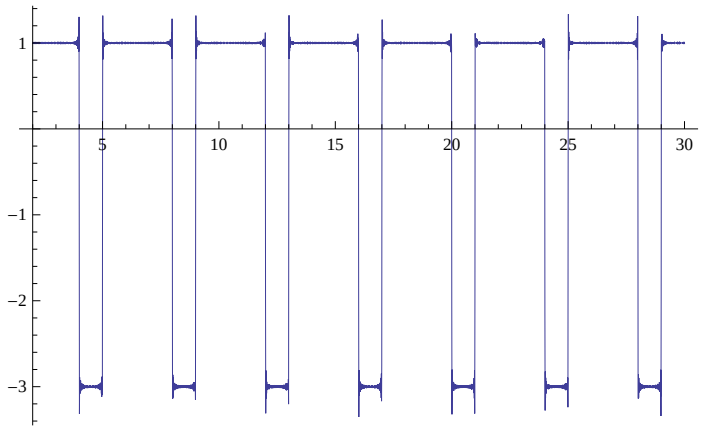

```
N[md2[100, 6]]
```

```
0.997257
```

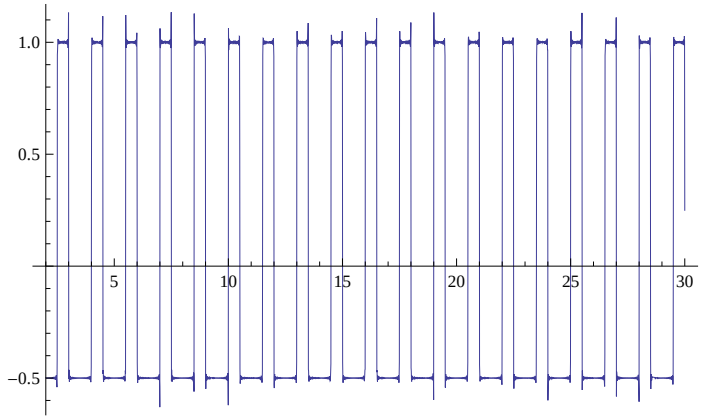
```
Plot[ md2[n, 2], {n, 2, 30}]
```



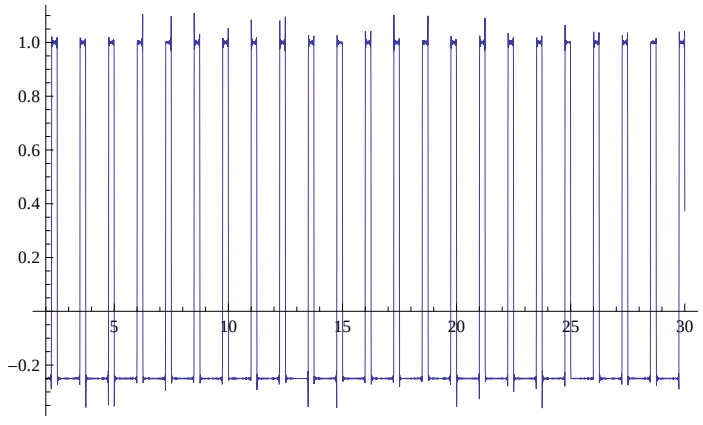
```
Plot[ md2[n, 4], {n, 2, 30}]
```



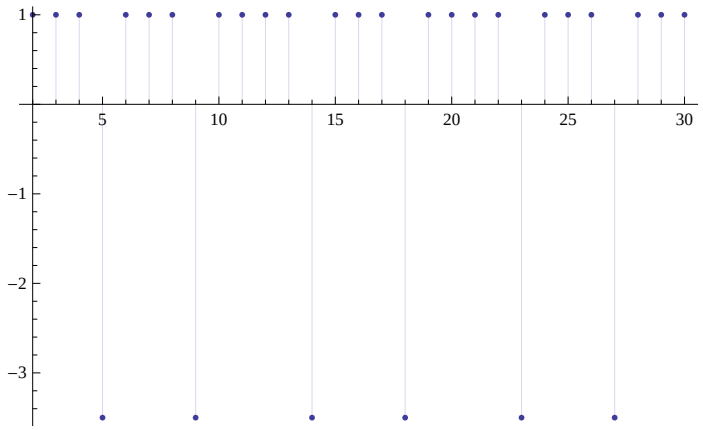

```
Plot[ md2[n, 3 / 2], {n, 2, 30}]
```



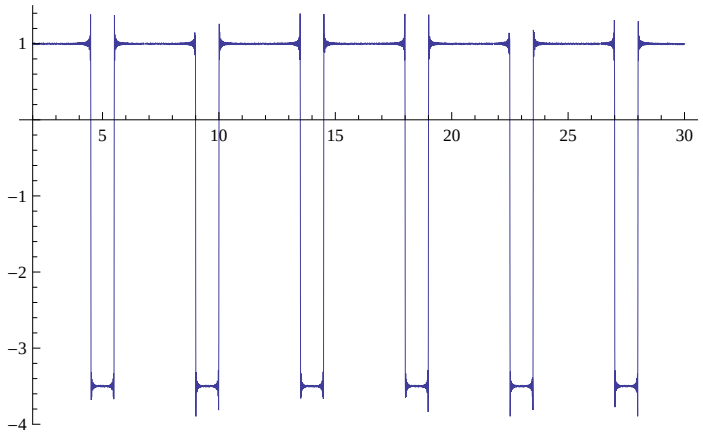

```
Plot[ md2[n, 5 / 4], {n, 2, 30}]
```



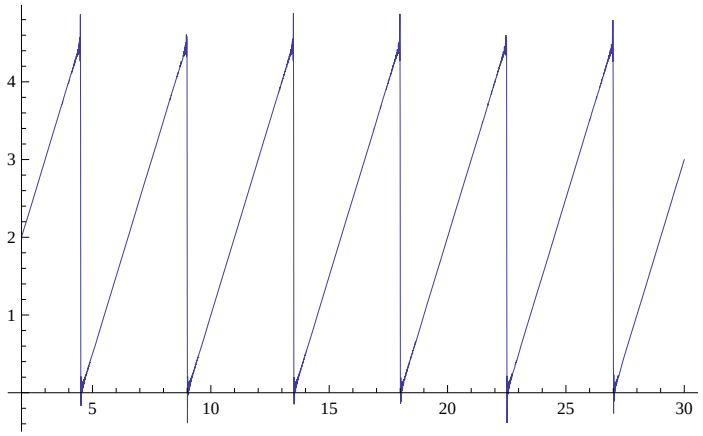
```
DiscretePlot[{E2[9 / 2, n, 1] - E2[9 / 2, n - 1, 1]}, {n, 2, 30}]
```



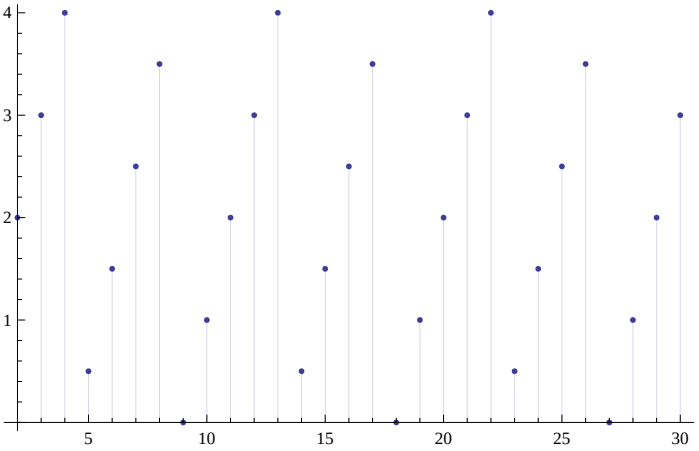

```
Plot[ md2[n, 9 / 2], {n, 2, 30}]
```



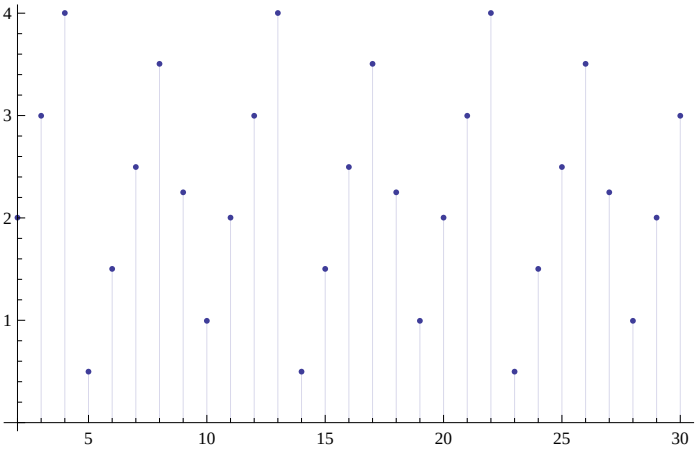

```
Plot[ md[n, 9 / 2], {n, 2, 30}]
```



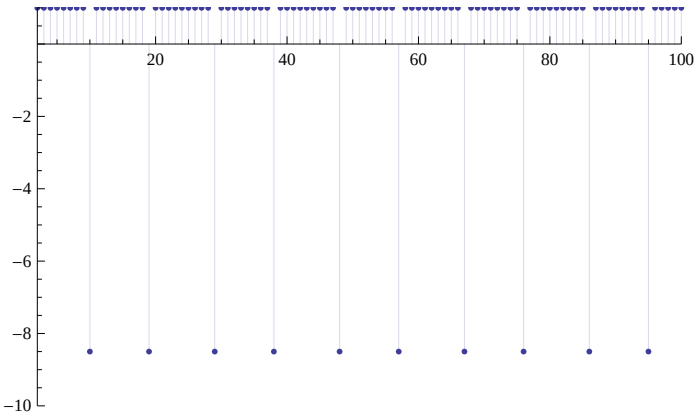
```
DiscretePlot[Mod[n, 9 / 2], {n, 2, 30}]
```



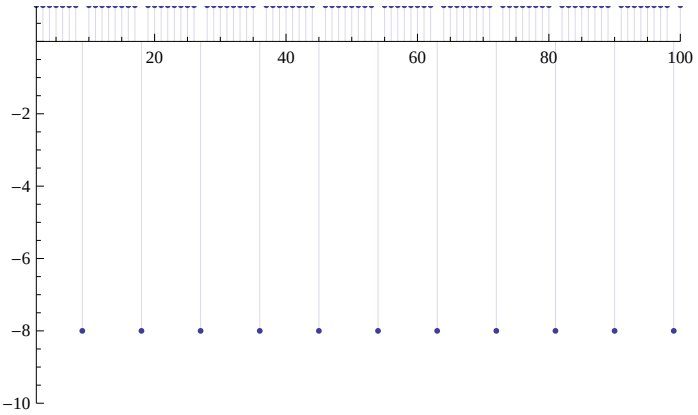

```
DiscretePlot[ md[n, 9 / 2], {n, 2, 30}]
```



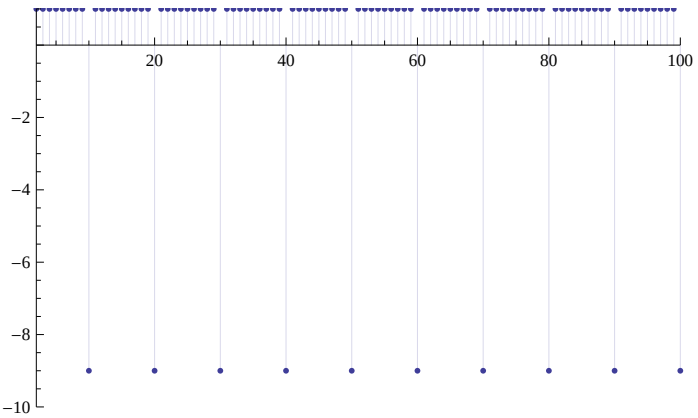

```
DiscretePlot[ST[9.5, n], {n, 2, 100}, PlotRange → {{2, 100}, {-10, 1}}]
```



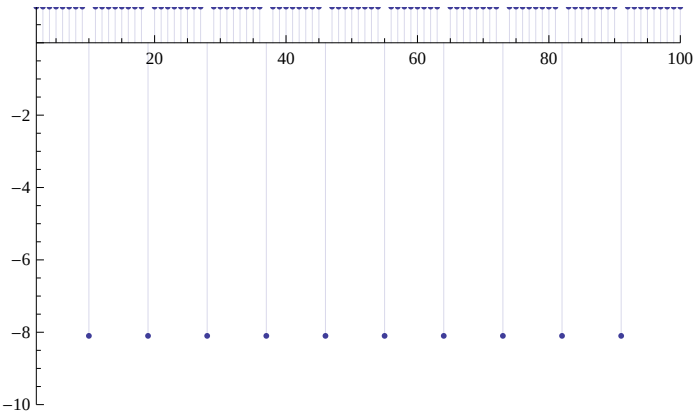
```
DiscretePlot[ST[9, n], {n, 2, 100}, PlotRange → {{2, 100}, {-10, 1}}]
```



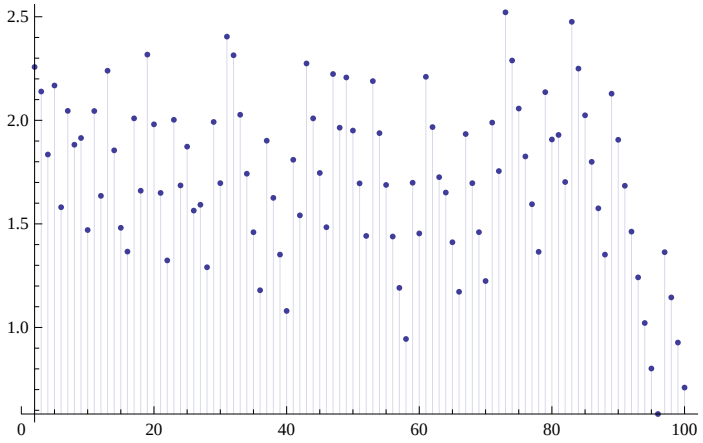

```
DiscretePlot[ST[10, n], {n, 2, 100}, PlotRange → {{2, 100}, {-10, 1}}]
```




```
DiscretePlot[ST[9.1, n], {n, 2, 100}, PlotRange → {{2, 100}, {-10, 1}}]
```



```
DiscretePlot[P2[2, n] + LAdd[2, n] - LAdd[1.00001, n] + LAdd[1.000001, 1.4513692], {n, 2, 100}]
```




```
LogIntegral[1.000001]
```

```
-13.2383
```

```
LAdd[1.000001, 80] - LAdd[1.000001, 1.4513692]
```

$25.6786 - 2.49006 \times 10^{-10}\ i$

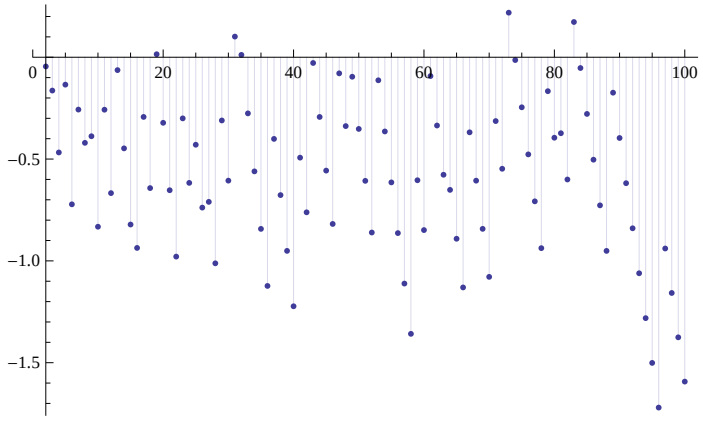
```
N[LogIntegral[80]]
```

```
25.6786
```

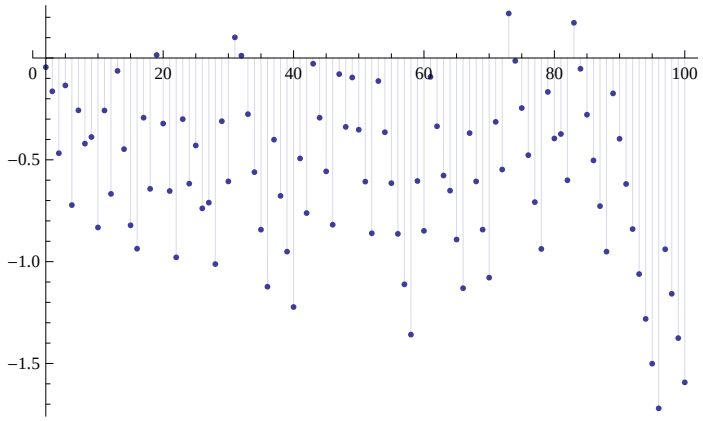
```
LAdd[1.000001, 1.4513692]
```

```
13.8155
```

```
DiscretePlot[P2[2, n] + LAdd[2, n] - LogIntegral[n], {n, 2, 100}]
```



```
DiscretePlot[P2[2, n] + LAdd[2, n] - LAdd[1.00001, n] + LAdd[1.00001, 1.4513692], {n, 2, 100}]
```




```
s1[n_] := Sum[Co[k], {k, 1, n}]
s2[n_] := Sum[ST[5 / 2, k], {k, 1, n}]
```

```
s1[100]
```

```
0
```

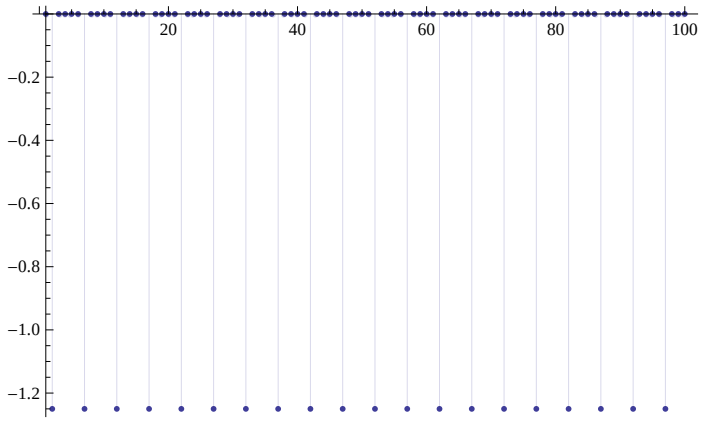
```
s2[100]
```

```
0
```

```
Co[2]
```

$$-\frac{1}{4}$$

```
DiscretePlot[{s1[n] - s2[n]}, {n, 1, 100}]
```




```
DiscretePlot[{s2[n]}, {n, 1, 100}]
```

```
s1[1]
```

```
1
```

```
Table[{n, s1[n], s2[n]}, {n, 1, 40}] // TableForm
```

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

```
ST[5 / 2, 1]
```

```
1
```

```
S
```

```
ST[5 / 2, 2]
```

```
1
```

```
ST[5 / 2, 3]
```

$$-\frac{3}{2}$$

```
ST[5 / 2, 4]
```

```
1
```

```
ST[5 / 2, 5]
```

$$-\frac{3}{2}$$

```
p2[2, 2]
```

```
-1
```

```
p2[3, 3]
```

```
-2
```

```
p2[4, 4]
```

$$-\frac{7}{2}$$

```
p2[5, 5]
```

```
-4
```

```
p2[6, 6]
```

```
-6
```

```
p2[7, 7]
```

```
-6
```

```
p2[8, 8]
```

$$-\frac{23}{3}$$

```
p2[9, 9]
```

$$-\frac{17}{2}$$

```
p2[10, 10]
```

```
-10
```

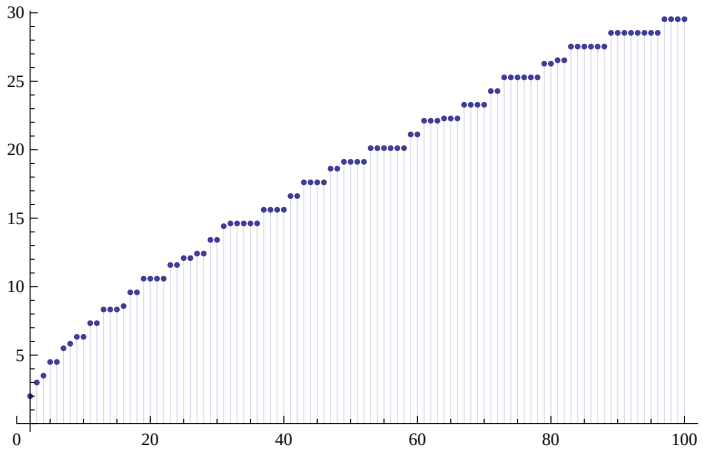
```
P2a[100]
```

$$-\frac{75\,307}{15}$$

```
ex[n_] := n (n + 1) / 2
```

```
5050
```

```
DiscretePlot[P2a[n], {n, 2, 100}]
```




```
p2[2]
```

```
Table[{n, p2[n, n]}, {n, 2, 100}] // TableForm
```

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

35	0
36	0
37	1
38	0
39	0
40	0
41	1
42	0
43	1
44	0
45	0
46	0
47	1
48	0
49	$\frac{1}{2}$
50	0
51	0
52	0
53	1
54	0
55	0
56	0
57	0
58	0
59	1
60	0
61	1
62	0
63	0
64	$\frac{1}{6}$
65	0
66	0
67	1
68	0
69	0
70	0
71	1
72	0
73	1
74	0
75	0
76	0
77	0
78	0
79	1
80	0
81	$\frac{1}{4}$
82	0
83	1
84	0
85	0
86	0
87	0
88	0
89	1

```
90     0
91     0
92     0
93     0
94     0
95     0
96     0
97     1
98     0
99     0
100    0
```