```
CC[n_] := CC[n] = Sum[ -CC[k] / (n + 1 - k), {k, 0, n - 1}]
CC[0] := -1

N[CC[100]]
```

0.000297476

```
CCD[n_] := CCD[n] = N[Sum[ -CCD[k] / (n + 1 - k), {k, 0, n - 1}]]
CCD[0] := -1

CCD[10 000]
```

9.81686×10^{-7}

```
Sum[ CCD[n], {n, 0, 10 000}]
```

-0.100193

```
t[n_, a_] := Mod[n, a] - Mod[n - 1, a]
Sum[ (-1)^(n + 1) CCD[n], {n, 0, 33 000}]
```

$Aborted

```
1 / N[Log[2]]
```

1.4427

```
Sum[ t[n, 2] CCD[n], {n, 0, 40 000}]
```

1.44269

```
N[Sum[t[n, 3] CCD[n], {n, 0, 33 000}]]
```

2.5286

```
1 / 4.60382802549499`

E^0.21721054619378033`
```

1.24261

```
N[5 / 4]
```

1.25

```
1 / 5.625286327281075`

E^0.1777687288823465`
```

1.19455

```
N[6 / 5]
```

1.2

```
3.5741384586587377` / 1.442694921145897`
```

2.4774

```
N[Log[2]]
```

0.693147

```
N[Log[4]]
```

```
1.38629
```

```
1 / -1.0986122886681098`
```

```
-0.910239
```

```
Table[{s, N[s / (s - 1)], E^(1 / (N[Sum[t[n, s] CCD[n], {n, 0, 40 000}]]))}, {s, 2, 20}] //
 TableForm
```

2	2.	2.
3	1.5	1.48509
4	1.33333	1.32285
5	1.25	1.24261
6	1.2	1.19455
7	1.16667	1.16249
8	1.14286	1.13955
9	1.125	1.12231
10	1.11111	1.10889
11	1.1	1.09812
12	1.09091	1.08931
13	1.08333	1.08195
14	1.07692	1.07571
15	1.07143	1.07036
16	1.06667	1.06572
17	1.0625	1.06165
18	1.05882	1.05806
19	1.05556	1.05486
20	1.05263	1.052

```
Table[{s, N[1 / Log[s / (s - 1)]], N[Sum[t[n, s] CCD[n], {n, 0, 40 000}]]}, {s, 2, 20}] //
 TableForm
```

2	1.4427	1.44269
3	2.4663	2.52861
4	3.47606	3.57414
5	4.48142	4.60383
6	5.48481	5.62529
7	6.48716	6.6418
8	7.48888	7.65505
9	8.49019	8.66602
10	9.49122	9.6753
11	10.4921	10.6833
12	11.4927	11.6903
13	12.4933	12.6965
14	13.4938	13.7021
15	14.4943	14.7071
16	15.4946	15.7116
17	16.4949	16.7158
18	17.4952	17.7196
19	18.4955	18.7231
20	19.4957	19.7264

```
Table[{s, N[1 / (Log[s] - Log[s - 1])], N[Sum[t[n, s] CCD[n], {n, 0, 33 000}]]}, {s, 2, 20}] //
 TableForm
```

2	1.4427	1.44269
3	2.4663	2.5286
4	3.47606	3.57414
5	4.48142	4.60383
6	5.48481	5.62529
7	6.48716	6.6418
8	7.48888	7.65505
9	8.49019	8.66602
10	9.49122	9.6753
11	10.4921	10.6833
12	11.4927	11.6903
13	12.4933	12.6965
14	13.4938	13.7021
15	14.4943	14.7071
16	15.4946	15.7116
17	16.4949	16.7158
18	17.4952	17.7196
19	18.4955	18.7231
20	19.4957	19.7264

```
Table[{s, aa = N[1 / (Log[s] - Log[s - 1])], bb = N[Sum[t[n, s] CCD[n], {n, 0, 40 000}]], aa - bb},
  {s, 200 000, 200 010}] // TableForm
```

200 000	199 999.	200 000.	-0.411821
200 001	200 001.	200 001.	-0.411803
200 002	200 001.	200 002.	-0.411846
200 003	200 003.	200 003.	-0.411808
200 004	200 003.	200 004.	-0.411831
200 005	200 005.	200 005.	-0.411773
200 006	200 005.	200 006.	-0.411848
200 007	200 006.	200 007.	-0.411841
200 008	200 007.	200 008.	-0.411824
200 009	200 009.	200 009.	-0.411797
200 010	200 009.	200 010.	-0.411832

```
N[Log[20 009]]
```

```
9.90394
```

```
FullSimplify[1 / (Log[a] - Log[a - 1])]
```

$$\frac{1}{-\text{Log}[-1+a]+\text{Log}[a]}$$

$$\frac{1}{-\text{Log}[-1+a]+\text{Log}[a]}$$

$$\frac{1}{-\text{Log}[-1+a]+\text{Log}[a]}$$

```
N[E^-3]
```

0.0497871

```
N[E^3]
```

```
1 / 20.085536923187668`
```

0.0497871

```
S1[n_] := (1 / (Log[n] - Log[n - 1]))
```

```
S2[n_] := (Log[n - 1] - Log[n])
```

```
N[S1[100]]
```

99.4992

```
N[S2[100]]
```

```
-1 / -0.010050335853502013`
```

99.4992

```
1 / Integrate[ 1 / t, {t, x - 1, x}]
```

$$\text{ConditionalExpression}\left[\frac{1}{-\text{Log}[-1+x]+\text{Log}[x]},\ \text{Re}[x]\geq 1\right]$$

```
Limit[(x^n - 1) / n, {n → 0}]
```

$$\{\text{Log}[x]\}$$

```
Limit[(x^n - 1) / n - ((x - 1)^n - 1) / n, {n → 0}]
```

$$\{-\text{Log}[-1+x]+\text{Log}[x]\}$$

```
Limit[n / (x^n - (x - 1)^n), {n → 0}]
```

$$\left\{\frac{1}{-\text{Log}[-1+x]+\text{Log}[x]}\right\}$$

```
Limit[1 / ( HarmonicNumber[7 n] - HarmonicNumber[6 n]), {n → Infinity}]
```

$$\left\{\frac{1}{\text{Log}\left[\frac{7}{6}\right]}\right\}$$

1.4427

```
N[Log[1 / 2]]
```

-0.693147

```
sc := CoefficientList[Series[x / Log[1 + x], {x, 0, 600}], x]
```

```
sc[[3]]
```

$$-\frac{1}{12}$$

```
N[Sum[ Log[5 / 4]^k sc[[k]], {k, 1, 599}]]
```

```
0.247205
```

```
Series[1 / (Log[x] - Log[x - 1]), {x, 0, 20}]
```

```
Sum[ 1 / (3 n + 1) + 1 / (3 n + 2) - 2 / (3 n + 3), {n, 0, Infinity}]
```

```
Log[3]
```

```
Sum[ 1 / (2 n + 1) - 1 / (2 n + 2), {n, 0, Infinity}]
```

```
Log[2]
```

```
Sum[ (1 / (6 n + 1) + 1 / (6 n + 2) - 2 / (6 n + 3) + 1 / (6 n + 4) + 1 / (6 n + 5) - 2 / (6 n + 6)),
 {n, 0, Infinity}]
```

```
Log[3]
```

```
Sum[(1 / (6 n + 1) - 1 / (6 n + 2) + 1 / (6 n + 3) - 1 / (6 n + 4) + 1 / (6 n + 5) - 1 / (6 n + 6)),
 {n, 0, Infinity}]
```

```
Log[2]
```

```
Sum[ (1 / (6 n + 1) + 1 / (6 n + 2) - 2 / (6 n + 3) + 1 / (6 n + 4) + 1 / (6 n + 5) - 2 / (6 n + 6)) -
   (1 / (6 n + 1) - 1 / (6 n + 2) + 1 / (6 n + 3) - 1 / (6 n + 4) + 1 / (6 n + 5) - 1 / (6 n + 6)), {n,
   0, Infinity}]
```

$$\text{Log}\left[\frac{3}{2}\right]$$

```
(1 / (6 n + 1) + 1 / (6 n + 2) - 2 / (6 n + 3) + 1 / (6 n + 4) + 1 / (6 n + 5) - 2 / (6 n + 6)) -
 (1 / (6 n + 1) - 1 / (6 n + 2) + 1 / (6 n + 3) - 1 / (6 n + 4) + 1 / (6 n + 5) - 1 / (6 n + 6))
```

$$\frac{2}{2+6n}-\frac{3}{3+6n}+\frac{2}{4+6n}-\frac{1}{6+6n}$$

```
Sum[ 2 / (2 + 6 n) - 3 / (3 + 6 n) + 2 / (4 + 6 n) - 1 / (6 + 6 n), {n, 0, Infinity}]
```

$$\text{Log}\left[\frac{3}{2}\right]$$

```
Limit[1 / (n (Log[n] - Log[n - 1])), {n → Infinity}]
```

```
{1}
```

```
Limit[1 / (n Log[n] - (n - 1) Log[n - 1]), {n → Infinity}]
```

```
{0}
```

```
N[s - 1 / (Log[s] - Log[s - 1])] /. s → -4000000
```

```
0.493268 + 0. i
```