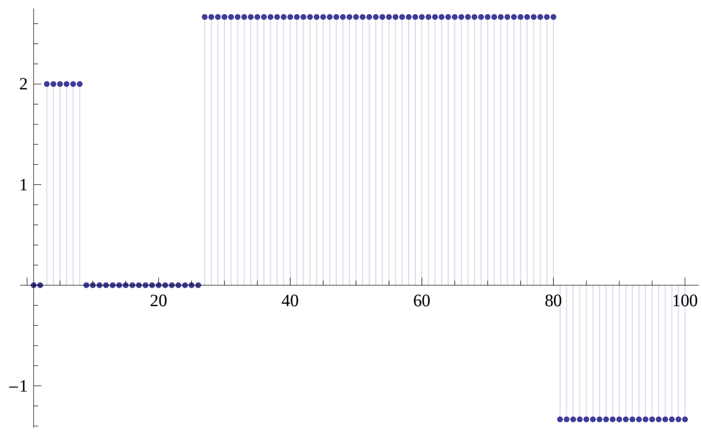
```
GCD[1000, 26]
```

```
2
```

```
Clear[gg, pp]
gg[n_, d_, k_] := gg[n, d, k] = Sum[ GCD[j, d] (1 / k - gg[Floor[n / j], d, k + 1]), {j, 2, n}]
pp[n_, k_] := pp[n, k] = Sum[1 / k - pp[Floor[n / j], k + 1], {j, 2, n}]
```

```
DiscretePlot[gg[n, 3, 1] - pp[n, 1], {n, 1, 100}]
```




```
Table[gg[n, 3, 1] - pp[n, 1], {n, 1, 100}]
```

```
{0, 0, 2, 2, 2, 2, 2, 2, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 8/3, 8/3, 8/3, 8/3, 8/3, 8/3,
 8/3, 8/3, 8/3, 8/3, 8/3, 8/3, 8/3, 8/3, 8/3, 8/3, 8/3, 8/3, 8/3, 8/3, 8/3, 8/3, 8/3, 8/3, 8/3, 8/3, 8/3, 8/3, 8/3, 8/3, 8/3,
 8/3, 8/3, 8/3, 8/3, 8/3, 8/3, 8/3, 8/3, 8/3, 8/3, 8/3, 8/3, 8/3, 8/3, 8/3, 8/3, 8/3, 8/3, 8/3, 8/3, 8/3, 8/3, 8/3, -4/3, -4/3,
 -4/3, -4/3, -4/3, -4/3, -4/3, -4/3, -4/3, -4/3, -4/3, -4/3, -4/3, -4/3, -4/3, -4/3, -4/3, -4/3, -4/3, -4/3}
```

```
Sum[ GCD[j, k], {j, 1, 100}, {k, 1, 100 / j}]
```

```
725
```

```
Clear[g1]
g1[n_, k_] := g1[n, k] = Sum[ GCD[a, b] g1[Floor[n / (a b)], k - 1], {a, 1, n}, {b, 1, n / a}]
g1[n_, 0] := UnitStep[n - 1]
g2[n_, k_] := Sum[ (-1) ^ (k - j) Binomial[k, j] g1[n, j], {j, 0, k}]
lg[n_] := Sum[ (-1) ^ (k + 1) / k g2[n, k], {k, 1, Log2@n}]
kk[n_] := kk[n] = FullSimplify[MangoldtLambda[n] / Log[n]]
pr[n_, s_] := Sum[ kk[j] j^s, {j, 2, n}]
ts[n_] := 2 pr[n, 0] + pr[n^(1 / 2), 1] - pr[n^(1 / 2), 0]
```

```
Table[{n, lg[2^n] - lg[2^n - 1], lg[3^n] - lg[3^n - 1],
   lg[5^n] - lg[5^n - 1], lg[7^n] - lg[7^n - 1]}, {n, 1, 6}] // TableForm
```

```
$Aborted
```

```
Table[{2^n, lg[2^n] - lg[2^n - 1] - 2 kk[2^n]}, {n, 1, 10}] // TableForm
```

2	0
4	1
8	0
16	$\frac{3}{2}$
32	0
64	$\frac{7}{3}$
128	0
256	$\frac{15}{4}$
512	0
1024	$\frac{31}{5}$

```
Table[{3^n, lg[3^n] - lg[3^n - 1] - 2 kk[2^n]}, {n, 1, 7}] // TableForm
```

3	0
9	2
27	0
81	4
243	0
729	$\frac{26}{3}$
2187	0

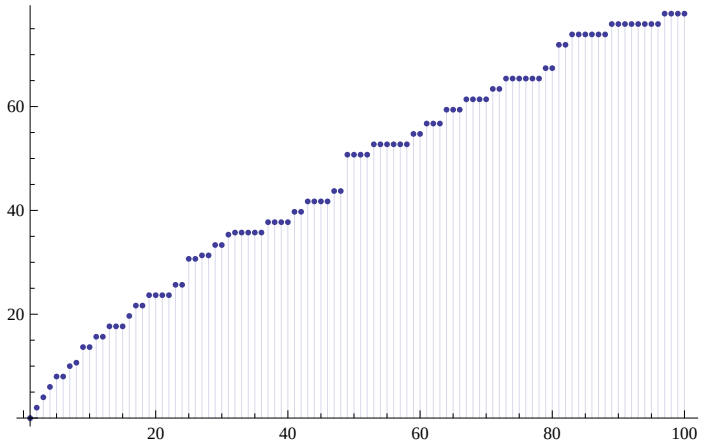
```
Table[{5^n, lg[5^n] - lg[5^n - 1]}, {n, 1, 6}] // TableForm
```

5	2
25	5
125	$\frac{2}{3}$
625	$\frac{25}{2}$
3125	$\frac{2}{5}$
15 625	$\frac{125}{3}$

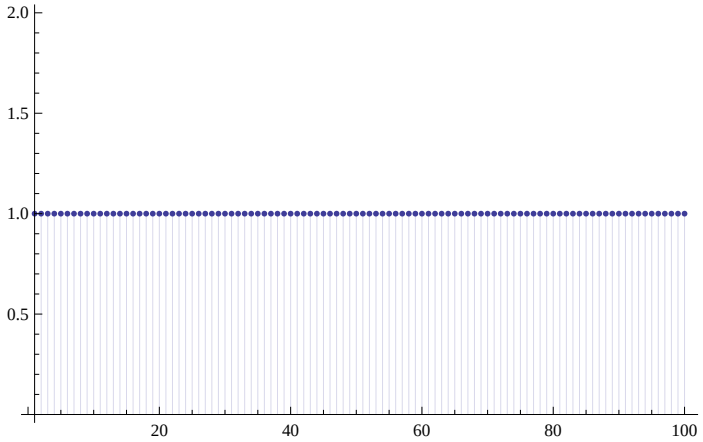
```
Table[{7^n, lg[7^n] - lg[7^n - 1]}, {n, 1, 4}] // TableForm
```

7	2
49	7
343	$\frac{2}{3}$
2401	$\frac{49}{2}$

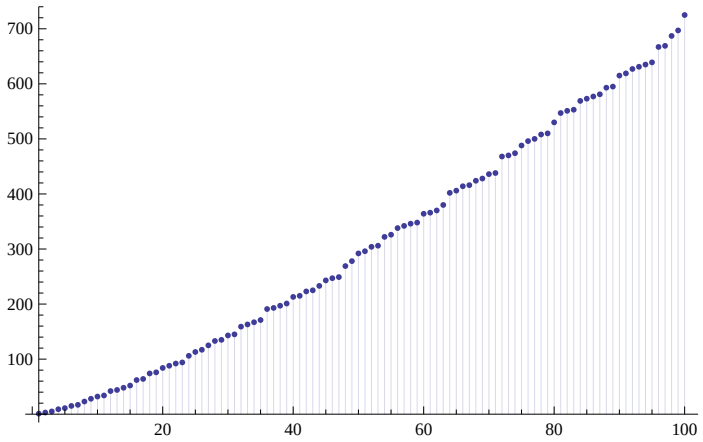
```
DiscretePlot[ts[n], {n, 1, 100}]
```




```
DiscretePlot[lg[n] - ts[n] + 1, {n, 1, 100}]
```

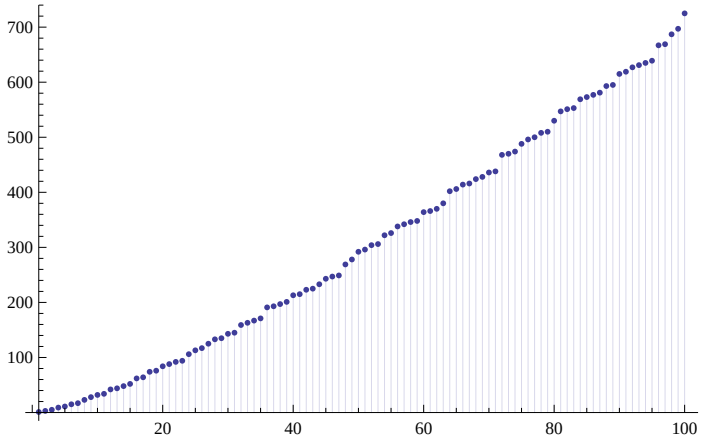



```
DiscretePlot[ g1[n, 1], {n, 1, 100}]
```

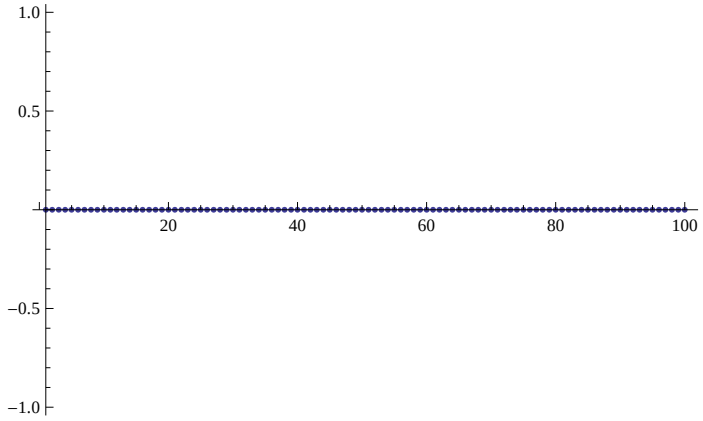


```
gh[n_] := Sum[ 1 × 1 l MoebiusMu[m], {j, 1, n},
  {k, 1, n / j}, {l, 1, (n / ( j k))^(1 / 2)}, {m, 1, (n / (j k l^2))^(1 / 2)}]
bin[z_, k_] := Product[z - j, {j, 0, k - 1}] / k!
FI[n_] := FactorInteger[n]; FI[1] := {}
dz[n_, z_] := dz[n, z] = Product[(-1)^p[[2]] Binomial[-z, p[[2]]], {p, FI[n]}]
gh2[n_] := Sum[ dz[j, 2] l MoebiusMu[m],
  {j, 1, n}, {l, 1, (n / ( j))^(1 / 2)}, {m, 1, (n / (j l^2))^(1 / 2)}]
gh3[n_] := Sum[ Abs[MoebiusMu[j]] l , {j, 1, n}, {k, 1, n / j}, {l, 1, (n / ( j k))^(1 / 2)}]
gh4[n_] := Sum[ dz[j, 2] EulerPhi[l] , {j, 1, n}, {l, 1, (n / ( j))^(1 / 2)}]
gh5[n_] := Sum[ dz[j, 2] EulerPhi[l] , {l, 1, n^(1 / 2)}, {j, 1, n / l^2}]
```

```
DiscretePlot[ gh4[n], {n, 1, 100}]
```

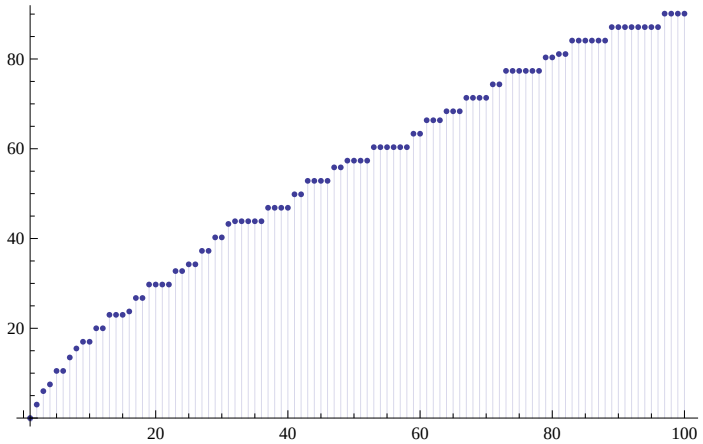



```
DiscretePlot[g1[n, 1] - gh[n], {n, 1, 100}]
```

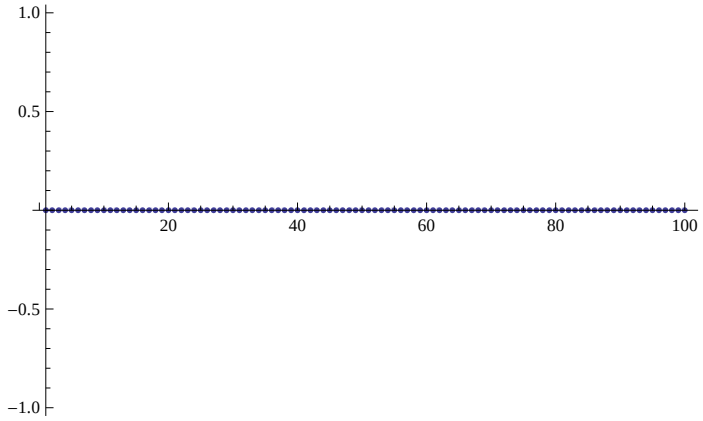



```
Clear[g1]
g1[n_, k_] := g1[n, k] =
  Sum[ GCD[a, b, c] g1[Floor[n / (a b c)], k - 1], {a, 1, n}, {b, 1, n / a}, {c, 1, n / (a b)}]
g1[n_, 0] := UnitStep[n - 1]
g2[n_, k_] := Sum[ (-1)^(k - j) Binomial[k, j] g1[n, j], {j, 0, k}]
lg[n_] := Sum[ (-1)^(k + 1) / k g2[n, k], {k, 1, Log2@n}]
kk[n_] := kk[n] = FullSimplify[MangoldtLambda[n] / Log[n]]
pr[n_, s_] := Sum[ kk[j] j^s, {j, 2, n}]
ts[n_] := 3 pr[n, 0] + pr[n^(1 / 3), 1] - pr[n^(1 / 3), 0]
```

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

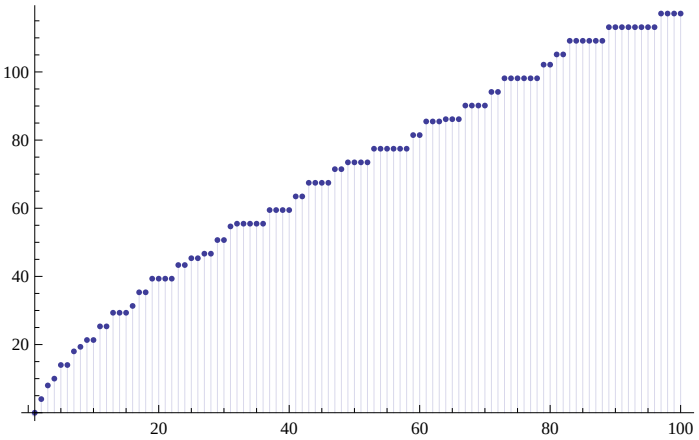



```
DiscretePlot[lg[n] - ts[n], {n, 1, 100}]
```

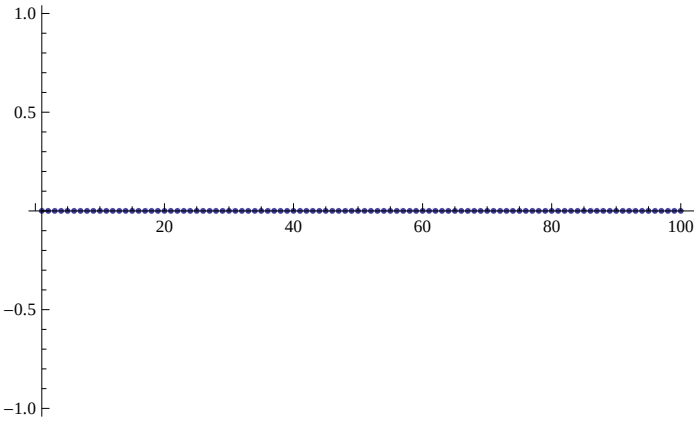



```
Clear[g1]
g1[n_, k_] := g1[n, k] = Sum[ GCD[a, b, c, d] g1[Floor[n / (a b c d)], k - 1],
    {a, 1, n}, {b, 1, n / a}, {c, 1, n / (a b)}, {d, 1, n / (a b c)}]
g1[n_, 0] := UnitStep[n - 1]
g2[n_, k_] := Sum[ (-1)^(k - j) Binomial[k, j] g1[n, j], {j, 0, k}]
lg[n_] := Sum[ (-1)^(k + 1) / k g2[n, k], {k, 1, Log2@n}]
kk[n_] := kk[n] = FullSimplify[MangoldtLambda[n] / Log[n]]
pr[n_, s_] := Sum[ kk[j] j^s, {j, 2, n}]
ts[n_] := 4 pr[n, 0] + pr[n^(1 / 4), 1] - pr[n^(1 / 4), 0]
```

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




```
DiscretePlot[ lg[n] - ts[n], {n, 1, 100}]
```




```
gg[n_] := Sum[ GCD[j, n], {j, 1, n}]
gb[n_] := Sum[ gg[j], {j, 1, n}]
ga[n_] := Sum[ j k MoebiusMu[l], {j, 1, n}, {k, 1, n / j}, {l, 1, n / (j k)}]
gc[n_] := Sum[ j EulerPhi[k], {j, 1, n}, {k, 1, n / j}]
```

```
gb[100]
```

18 065

```
ga[100]
```

18 065

```
gc[100]
```

18 065