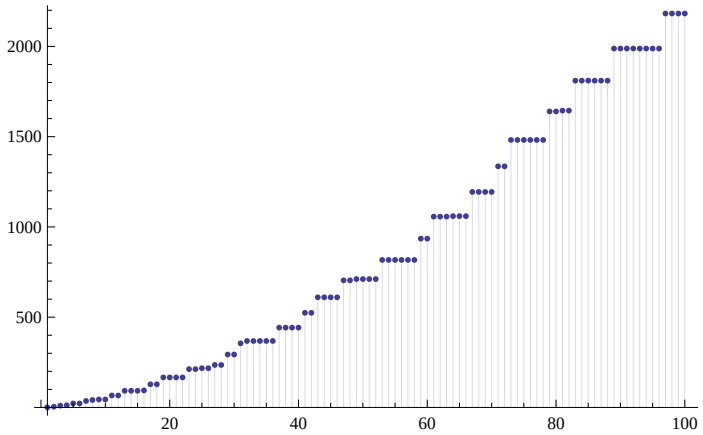
```
Clear[g1]
g1[n_, k_] := g1[n, k] = Sum[ LCM[a, b] g1[Floor[n / (a b)], k - 1], {a, 1, n}, {b, 1, n / a}]
g1[n_, 0] := UnitStep[n - 1]
g2[n_, k_] := Sum[ (-1)^(k - j) Binomial[k, j] g1[n, j], {j, 0, k}]
lg[n_] := Sum[ (-1)^(k + 1) / k g2[n, k], {k, 1, Log2@n}]
kk[n_] := kk[n] = FullSimplify[MangoldtLambda[n] / Log[n]]
pr[n_, s_] := Sum[ kk[j] j^s, {j, 2, n}]
ts[n_] := 2 pr[n, 1]
ts2[n_] := 2 pr[n, 1] + pr[Floor[n^(1 / 2)], 1] - pr[Floor[n^(1 / 2)], 2]


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




```
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, 5}] // TableForm
```

1	4	6	10	14
2	2	3	5	7
3	$\frac{16}{3}$	18	$\frac{250}{3}$	$\frac{686}{3}$
4	2	$\frac{9}{2}$	$\frac{25}{2}$	$\frac{49}{2}$
5	$\frac{64}{5}$	$\frac{486}{5}$	1250	$\frac{33\,614}{5}$

```
2 × 5^3 / 3
```

$$\frac{250}{3}$$

```
2 × 7^3 / 3
```

$$\frac{686}{3}$$

```
2 × 3^3 / 3
```

$$18$$

```
2 × 2^3 / 3
```

$$\frac{16}{3}$$

```
2 × 7^5 / 5
```

$$\frac{33\,614}{5}$$

```
2 × 5^5 / 5
```

```
1250
```

```
Table[{n, lg[2^n] - lg[2^n - 1] - 2 × 2^n kk[2^n],
    lg[3^n] - lg[3^n - 1] - 2 × 3^n kk[3^n]}, {n, 1, 8}] // TableForm
```

1	0	0
2	−2	−6
3	0	0
4	−6	−36
5	0	0
6	$-\frac{56}{3}$	−234
7	0	0
8	−60	−1620

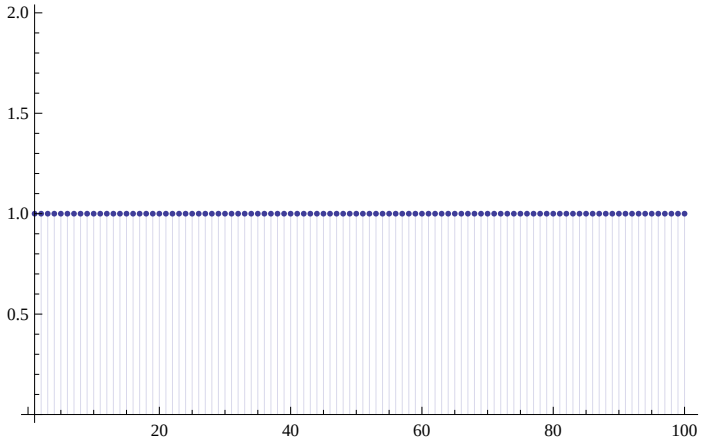
```
2 × 3^7 / 7
```

$$\frac{4374}{7}$$

```
2 × 2^7 / 7
```

$$\frac{256}{7}$$

```
DiscretePlot[ lg[n] - ts2[n] + 1, {n, 1, 100}]
```




```
Table[ 2 kk[2^k] 2^k, {k, 1, 6}]
```

$$\left\{4,\ 4,\ \frac{16}{3},\ 8,\ \frac{64}{5},\ \frac{64}{3}\right\}$$

```
2, 12, 56, 240
```

```
6, 72, 702, 6480
```

```
1 × 2, 3 × 4, 7 × 8, 15 × 16
```

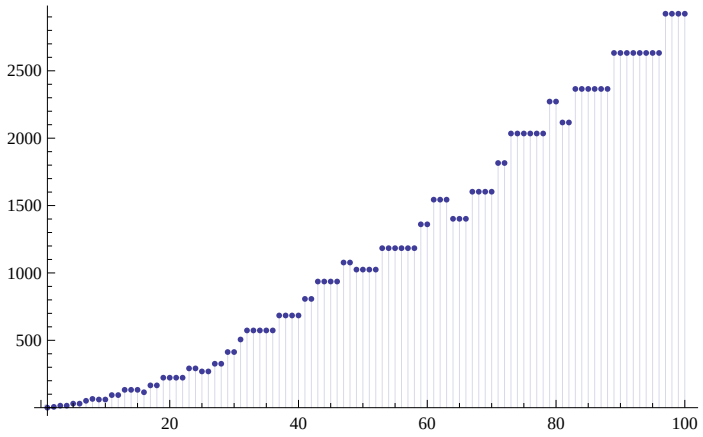
```
2 × 3, 8 × 9, 26 × 27, 80 × 81
```

```
2^2 - 2, 4^2 - 4, 8^2 - 8, 16^2 - 16
```

```
3^2 - 3, 9^2 - 9, 27^2 - 27, 81^2 - 81
```

```
Clear[g1]
g1[n_, k_] := g1[n, k] =
  Sum[ LCM[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, 1] + pr[n^(1 / 3), 1] - pr[n^(1 / 3), 2]
```

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




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