

```

num[c_] := Numerator[c]; den[c_] := Denominator[c]
alpha[n_, c_] := den[c] (Floor[n / den[c]] - Floor[(n - 1) / den[c]]) -
  num[c] (Floor[n / num[c]] - Floor[(n - 1) / num[c]])
L2[n_, 1, c_] := L2[n, 1, c] = (1 / den[c])
  Sum[alpha[j, c] Log[j / den[c]], {j, den[c] + 1, den[c] n}]; L2[n_, 0, c_] := 0
L2[n_, k_, c_] := L2[n, k, c] = (1 / den[c])
  Sum[If[alpha[j, c] == 0, 0, alpha[j, c] L2[den[c] n / j, k - 1, c]], {j, den[c] + 1, den[c] n}]
bin[z_, k_] := Product[z - j, {j, 0, k - 1}] / k!
L1[n_, z_, c_] := Sum[bin[z, k] L2[n, k, c], {k, 0, Floor[Log[c, n]]}]
zeros[n_, c_] := List@@Roots[L1[n, z, c] - 1 == 0, z][[All, 2]]
L1Alt[n_, z_, c_] := 1 - Product[1 - z / r, {r, zeros[n, c]}]
L1m[n_, c_] := 1 - Product[1 + r^-1, {r, zeros[n, c]}]

```

```
Expand[N[L1[100, z, 4 / 3]]]
```

```

1. - 3.84024 z + 6.34645 z^2 - 6.32933 z^3 + 2.83562 z^4 + 0.0783242 z^5 + 0.14543 z^6 - 0.150889 z^7 +
  0.0386438 z^8 - 0.00777589 z^9 + 0.00118332 z^10 - 0.000115508 z^11 + 7.29511 × 10^-6 z^12 -
  2.95732 × 10^-7 z^13 + 8.80027 × 10^-9 z^14 - 1.81087 × 10^-10 z^15 + 1.37187 × 10^-12 z^16

```

```
N[Log[2, 100]]
```

```
6.64386
```

```
N[Log[4 / 3, 100]]
```

```
N[L1Alt[100, -1, 3 / 2]]
```

```
9.95352 - 6.57473 × 10^-16 i
```

```
N[L1[100, -1, 3 / 2]]
```

```
9.95352
```

```
N[L1m[100, 3 / 2]]
```

```
9.95352 - 6.57473 × 10^-16 i
```

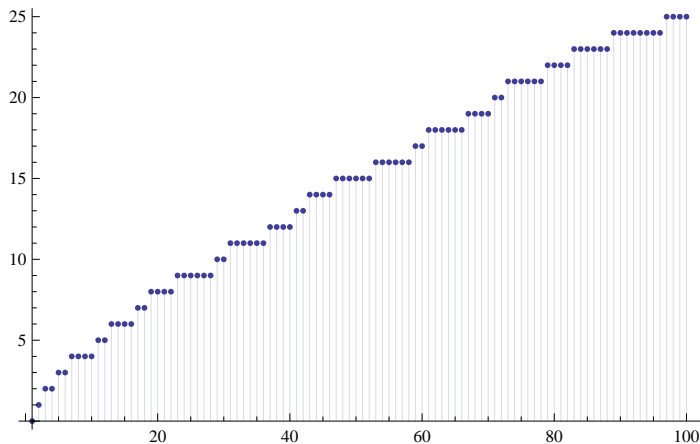
```
p[n_, j_, k_] := If[n < j, 0, 1 / k - p[n / j, 2, k + 1] + p[n, j + 1, k]]
```

```
pi[n_] := Sum[MoebiusMu[j] j^-1 p[n^ (1 / j), 2, 1], {j, 1, Log[2, n]}]
```

```
pi[100]
```

```
25
```

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



```
(-1)^k Binomial[-1, k] /. k -> 3
```

```
1
```

```
DiscretePlot[ FullSimplify[D[ L1[ n, z, 3], {z, 2}]], {n, 2, 70}] // TableForm
```

