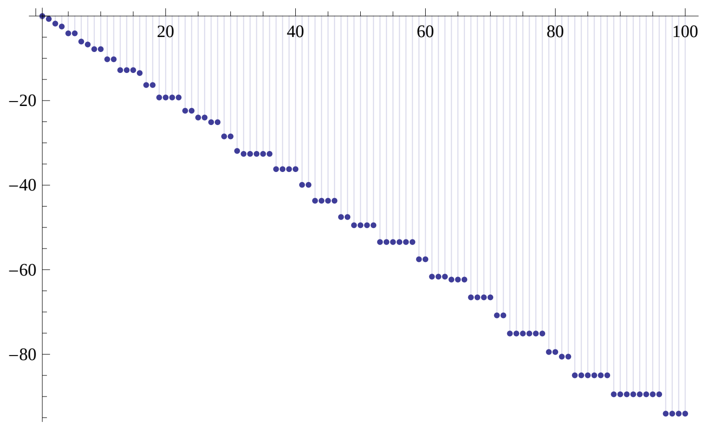
```
L2[n_, 1, b_] := L2[n, 1, b] = Sum[Log[j], {j, 2, n}] - b Sum[Log[j b], {j, 1, n / b}]
L2[n_, k_, b_] := Sum[L2[n / j, k - 1, b], {j, 2, n}] - b Sum[L2[n / (j b), k - 1, b], {j, 1, n}]
L1[n_, z_, b_] := Sum[ Binomial[z, k] L2[n, k, b], {k, 0, Log[If[b < 2, b, 2], n]}]
sa[n_, c_] := Sum[c^k Log[c], {k, 1, Log[c, n]}]
```

```
DiscretePlot[L1[n, -1, 2] - sa[n, 2], {n, 1, 100}]
```




```
bin[z_, k_] := Product[z - j, {j, 0, k - 1}] / k!
D1xD[n_, s_, k_, x_] := D1xD[n, s, k, x] =
  Sum[(j + 1)^-s D1xD[n / (j + 1), s, k - 1, x] - x (j x)^-s D1xD[n / (x j), s, k - 1, x], {j, 1, n}]
D1xD[n_, s_, 0, x_] := UnitStep[n - 1]
DxD[n_, s_, z_, x_] :=
 Sum[bin[z, k] D1xD[n, s, k, x], {k, 0, If[x < 2, Log[x, n], Log[2, n]]}]
```

```
N[D[FullSimplify@D1xD[100, s, 2, 2], s] /. s → 0]
```

```
-12.8961
```

```
-2 N@L2[100, 2, 2]
```

```
-12.8961
```

```
D[Expand@N[D[DxD[100, s, z, 2], s] /. s → 0], z] /. z → 0
```

```
-6.70877
```

```
N@L1[100, -1, 2]
```

```
-6.70877
```