```
num[c_] := Numerator[c]; den[c_] := Denominator[c]
alpha[n_, 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]])
F[n_, 0, s_, c_] := 1
F[n_, 1, s_, c_] := If[n < s, 0, (den[c] Floor[n / den[c]] - num[c] Floor[n / num[c]]) -
    (den[c] Floor[(s - 1) / den[c]] - num[c] Floor[(s - 1) / num[c]])]
F[n_, k_, s_, c_] := F[n, k, s, c] = Sum[If[alpha[m, c] == 0, 0, Binomial[k, j] alpha[m, c]^j
      F[Floor[n / (m^j)], k - j, m + 1, c]], {j, 1, k}, {m, s, Floor[n^(1 / k)]}]
E2Alt[n_, k_, c_] := den[c]^-k F[n den[c]^k, k, den[c] + 1, c]
E2[n_, k_, c_] :=
 E2[n, k, c] = (1 / den[c]) Sum[If[alpha[j, c] == 0, 0, alpha[j, c] E2[(den[c] n) / j, k - 1, c]],
    {j, den[c] + 1, den[c] n}]; E2[n_, 0, c_] := 1
E1[n_, z_, c_] := Sum[Binomial[z, k] E2[n, k, c], {k, 0, Floor[Log[If[c < 2, c, 2], n]]}]
e1[n_, z_, c_] := E1[n, z, c] - E1[n - 1, z, c]
L2[n_, k_, c_] := L2[n, k, c] = (1 / den[c])
   Sum[If[alpha[j, c] == 0, 0, alpha[j, c] Log[j / den[c]] E2Alt[den[c] n / j, k - 1, c]],
    {j, den[c] + 1, den[c] n}]; L2[n_, 0, c_] := 0
bin[z_, k_] := Product[z - j, {j, 0, k - 1}] / k!
L1[n_, z_, c_] :=
 L1[n, z, c] = Sum[bin[z, k] L2[n, k, c], {k, 0, Floor[Log[If[c < 2, c, 2], n]]}]
zeros[n_, c_] := List @@ NRoots[L1[n, z, c] == -1, z][[All, 2]]


N[Sum[(-1)^r (D[L1[10, z, 7 / 6], {z, r}] /. z → 0) / r!, {r, 1, 20}]]
```

```
0.427892
```

```
N[L1[10, -1, 7 / 6]]
```

```
0.427892
```

```
Expand[N[L1[10, z, 7 / 6]] / z]
```

```
0.315512 + 0.862271 z + 0.156478 z^2 + 0.00829985 z^3 - 0.0399902 z^4 -
 0.0103356 z^5 + 0.00105802 z^6 + 0.000504077 z^7 - 0.000183671 z^8 + 0.0000242985 z^9 -
 1.78755 × 10^-6 z^10 + 7.3468 × 10^-8 z^11 - 1.57627 × 10^-9 z^12 + 1.53035 × 10^-11 z^13
```

```
N[L1[10., 1, 7 / 6]]
```

```
2.29364
```

```
zeros[12, 7 / 6]
```

```
{-0.537378 - 0.723865 i, -0.537378 + 0.723865 i, -0.5321 - 1.88551 i,
 -0.5321 + 1.88551 i, -0.450928 - 6.47852 i, -0.450928 + 6.47852 i, 2.34642,
 2.94885, 3.17454 - 6.40601 i, 3.17454 + 6.40601 i, 13.5296, 16.0051 - 24.3495 i,
 16.0051 + 24.3495 i, 19.3134 - 12.3873 i, 19.3134 + 12.3873 i, 40.9441}
```

```
-1 + Product[1 + 1 / r, {r, zeros[12, 7 / 6]}]
```

```
1.4024 + 0. i
```

```
N[L1[12, -1, 7 / 6]]
```

```
1.4024
```