

$$-\ln(1-x) = \int_0^x \frac{1}{1-r} dr = \sum_{n=1}^{\infty} \frac{x^n}{n}$$

$$\begin{aligned} \ln 2 &= -\ln\left(1 - \frac{1}{2}\right) = \sum_{n=1}^{\infty} \frac{1}{2^n n} \\ &= \frac{1}{2} + \frac{1}{2^2(2)} + \frac{1}{2^3(3)} + \cdots \end{aligned}$$

$$\ln 2 = \frac{1}{2} + \frac{1}{2^2(2)} + \frac{1}{2^3(3)} + \cdots$$

N	$\ln 2$	$\sum_{n=1}^N \frac{1}{2^n n}$
1	.6931471806	.5000000000
2	.6931471806	.6250000000
3	.6931471806	.6666666667
4	.6931471806	.6822916667
5	.6931471806	.6885416667
6	.6931471806	.6911458333
7	.6931471806	.6922619048
8	.6931471806	.6927501860
9	.6931471806	.6929671999
10	.6931471806	.6930648562
11	.6931471806	.6931092454
12	.6931471806	.6931295904
13	.6931471806	.6931389804
14	.6931471806	.6931433401
15	.6931471806	.6931453746
16	.6931471806	.6931463283
17	.6931471806	.6931467771
18	.6931471806	.6931469890
19	.6931471806	.6931470894
20	.6931471806	.6931471371