forthright48

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Harmonic Number

The n_{th} harmonic is the sum of the reciprocals of the first n natural numbers:
$H_n = 1 + \frac{1}{2} + \frac{1}{3} + \ldots + \frac{1}{n}$.

The associated harmonic series grows without limit, albeit very slowly, roughly approaching the natural logarithm function.

Bertrand's postulate entails that, except for the case $n = 1$, the harmonic numbers are never integers.

Calculation of H_n

The n_{th} harmonic number is about as large as the natural logarithm of n, $ln(n)$.

Identities Involving Harmonic Numbers

$$\sum_{k=1}^{n}Hk = (n+1)H{n+1} - (n+1)$$

Application

Jeep Problem

More at Wiki.

Coupon Collector's Problem

More at Wiki