

Re: A question on Reimann (ref Prime Obsession by John Derbyshire)

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*Source:* <http://sci.tech-archive.net/Archive/sci.math/2007-12/msg04697.html>

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- *From:* [drmwecker@xxxxxxxxxx](mailto:drmwecker@xxxxxxxxxx)
  - *Date:* Sun, 23 Dec 2007 15:22:00 -0800 (PST)
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Besides the more obvious definitional meaning given by another poster, here is one that I found intriguing since I was an undergrad:

The  $p$ -series (series  $\sum 1/n^p$ ,  $n = 1 \dots \infty$ ) is well-known to converge if and only if  $p > 1$ . For  $p = 1$  we have the harmonic series, divergent. For  $p = 1 + \epsilon$ , with  $\epsilon > 0$  tiny, we have convergence.

On the other hand, series  $\sum 1/(n \cdot \ln(n))$ ,  $n = 1 \dots \infty$ , diverges (for instance, by the integral test).

This means that  $\ln(n)$  becomes smaller than any power  $n^\epsilon$ .

For more on this, I recommend the MAA book "Real Infinite Series" by Bonar and Khoury, which came out in the last two years or so.

Best, Mike

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He writes "[Natural] Log  $x$  increases slower than any power of  $x$ "

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