Quizzes 24, March 24, 2016

Does the series $\sum_{n=1}^{\infty} \frac{\ln n}{n^3}$ converge? Justify your answer.

Answer: Compare the given series to $\sum_{n=1}^{\infty} \frac{1}{n^2}$. Notice that

$$\frac{\ln n}{n^3} < \frac{n}{n^3} = \frac{1}{n^2}.$$

The series $\sum_{n=1}^{\infty} \frac{1}{n^2}$ is the p-series with $p = 2$; this series converges. The $\boxed{\text{series } \sum_{n=1}^{\infty} \frac{\ln n}{n^3} \text{ converges}}$ by part (a) of the comparison test.