

PRINT Your Name: _____

Quiz 11 — November 6, 2009 – 8:00 section

Remove everything from your desk except this page and a pencil or pen.

Circle your answer. **Show your work.**

The quiz is worth 5 points.

Does the series $\sum_{k=1}^{\infty} \left(1 + \frac{1}{k}\right)^{-k}$ converge? **Justify your answer very thoroughly.**

Answer: The limit of the individual terms is

$$\lim_{k \rightarrow \infty} \left(1 + \frac{1}{k}\right)^{-k} = \frac{1}{\lim_{k \rightarrow \infty} \left(1 + \frac{1}{k}\right)^k} = \frac{1}{e},$$

which is NOT zero.

Thus the series diverges $\sum_{k=1}^{\infty} \left(1 + \frac{1}{k}\right)^{-k}$ by the Individual Term Test For Divergence.

If you don't know that $\lim_{k \rightarrow \infty} \left(1 + \frac{1}{k}\right)^k = e$, then you have to use L'Hôpital's rule to compute this limit.