PRINT Your Name:_____

Quiz 29 — November 24, 2015

Does the series $\sum_{n=1}^{\infty} \frac{10^n}{(n+1)4^{2n+1}}$ converge? Justify your answer.

Try the ratio test. Observe that

$$\rho = \lim_{n\to\infty} \frac{|a_{n+1}|}{|a_n|} = \lim_{n\to\infty} \frac{\frac{10^{n+1}}{(n+2)4^{2n+3}}}{\frac{10^n}{(n+1)4^{2n+1}}} = \lim_{n\to\infty} \frac{10^{n+1}}{(n+2)4^{2n+3}} \frac{(n+1)4^{2n+1}}{10^n}$$

$$= \lim_{n\to\infty} \frac{10}{16} \frac{(n+1)}{(n+2)} = \lim_{n\to\infty} \frac{10}{16} \frac{(1+\frac{1}{n})}{(1+\frac{2}{n})} = \frac{10}{16} < 1.$$

We conclude that

$$\boxed{\sum_{n=1}^{\infty} \frac{10^n}{(n+1)4^{2n+1}} \text{ converges.}}$$