Name: SOLUTIONS

Quiz #10 - April 14, 2009

Determine whether the series is absolutely convergent, conditionally convergent or divergent. Justify your answer.

1.

$$\sum_{n=1}^{\infty} \frac{2 \cdot 4 \cdot 6 \cdots (2n)}{n!}$$

Ratio Test $\frac{a_{n+1}}{a_n} = \frac{2 \cdot 4 \cdot 6 \cdots (2n)(2n+2)}{(n+1)!} \cdot \frac{n!}{2 \cdot 4 \cdot 6 \cdots 2n}$

$= \frac{2n+2}{n+1}$

$\lim_{n \to \infty} \left| \frac{a_{n+1}}{a_n} \right| = 2$ so diverges by Ratio Test

2.

$$\sum_{n=1}^{\infty} (-1)^{n-1} \frac{1}{n \ln n}$$

Converges by A.S.T.

But $\sum \frac{1}{n \ln n}$ diverges (integral test, done in class!)

Thus conditionally convergent.

Name: SOLUTIONS

Quiz #10 - April 16, 2009

1. Determine whether the series is absolutely convergent, conditionally convergent or divergent. Justify your answer.

$$\sum_{n=1}^{\infty}(-1)^n 2^{1/n}$$

$\lim_{n\to\infty} 2^{1/n} = 2^0 = 1$

so diverges

terms not going to zero.

2. Prove that

$$\sum_{n=1}^{\infty}(-1)^{n-1}\frac{1}{n^2}$$

converges. How many terms must we add in order to find the sum within accuracy |error| < .01?

converges by A.S.T.

$1 - 1/2 + 1/3 - 1/4 + 1/5 - 1/6 + \ldots + 1/99 - 1/100$

will have error $< 1/100$ by A.S error estimate.

99 terms

~~100 terms suffices~~