

Name:

SOLUTIONS

Quiz #9 - April 7, 2009

For 1-3, decide if the series converges or diverges. Be sure to justify your answer with whatever test you are using.

1. $\sum_{n=1}^{\infty} \frac{1}{\sqrt[3]{n}}$

Diverges, p-series $p=1/3$

2. $\sum_{n=1}^{\infty} \frac{e^{1/2}}{n^2}$

converges, L.C.T. with $1/n^2$

3. $\sum_{n=1}^{\infty} \frac{n+2^n}{n+3^n}$

Converges (no reason necessary for credit)

4. Evaluate:

$$9 - 3 + 1 - 1/3 + 1/9 - 1/27 + 1/81 - \dots$$

$$\frac{9}{1 - -1/3} = \frac{9}{\frac{4}{3}} = \left(\frac{27}{4} \right)$$

SOLUTIONS

Name:

Quiz #9 - April 9, 2009

For 1-3, decide if the series converges conditionally, converges absolutely or diverges. Be sure to justify your answer with whatever test you are using.

1. $\sum_{n=1}^{\infty} (-1)^n \frac{1}{\sqrt[3]{n}}$.

Converges by A.S.T.

but only conditionally, since p-series $p = 1/3$ diverges

2. $\sum_{n=1}^{\infty} \frac{n!}{20^n}$.

$$\lim_{n \rightarrow \infty} \left| \frac{a_{n+1}}{a_n} \right| = \lim_{n \rightarrow \infty} \frac{(n+1)!}{20^{n+1}} \cdot \frac{20^n}{n!} = \lim_{n \rightarrow \infty} \frac{n+1}{20} \quad \text{Diverges}$$

3. $\sum_{n=1}^{\infty} \frac{n+5}{n^2+30}$.

Diverges, Limit comparison test with $\sum 1/n$

4. Determine $\sum_{n=1}^{\infty} \frac{-1^n}{n}$ accurate to within 0.1.

$$-1 + 1/2 - 1/3 + 1/4 - 1/5 + 1/6 - 1/7 + 1/8 - 1/9$$