

Quiz 3

A Term, 2013

Show all work needed to reach your answers.

High: 20
Median: 19
Low: 14

(5 points each) For each series, please state what type it is (harmonic, alternating or geometric), whether it converges or diverges (circle one), and if possible what limit L the series converges to.

5 1. $\sum_{n=1}^{\infty} \left(\frac{e}{10}\right)^n = \frac{e/10}{1-e/10} = \frac{e}{10-e}$

Geometric $a = e/10$

converges diverges

$L = \frac{e}{10-e}$

5 2. $\sum_{n=1}^{\infty} \frac{7}{n}$ Harmonic

converges diverges

$L = \text{DNE}$

5 3. $\sum_{n=1}^{\infty} (-1)^n \sin\left(\frac{1}{n}\right)$

Alternating, $a_n = \sin(1/n) \rightarrow 0$

converges diverges

Not required

$L \leq 0$

5 4. $\sum_{n=0}^{\infty} \left(\frac{-1}{\sqrt{5}}\right)^n = \frac{1}{1-(-1/\sqrt{5})} = \frac{1}{1+1/\sqrt{5}} = \frac{\sqrt{5}}{\sqrt{5}+1} \cdot \frac{(\sqrt{5}-1)}{(\sqrt{5}-1)} = \frac{5-\sqrt{5}}{4}$

Alternating, Geometric.

$a = 1$

converges diverges

$L = \frac{5}{4} - \frac{\sqrt{5}}{4}$