

Quiz 3

A Term, 2015

High: 20
Median: 18
Low: 15

Show all work needed to reach your answers.

(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.

1. $\sum_{n=1}^{\infty} \left(\frac{e}{\pi}\right)^n$

Geometric (+1)

(+1) $a = \frac{e}{\pi}$

(+1) $r = \frac{e}{\pi} < 1$ (+1)

converges diverges

$L = \frac{\frac{e}{\pi}}{1 - \frac{e}{\pi}} = \frac{e}{\pi - e}$ (+1)

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

Alternating Series, (+1)

but $a_n = \frac{n}{3n+2} \rightarrow \frac{1}{3} \neq 0$ (+1)

converges diverges

$L = \underline{DNE}$

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

Harmonic (+2)

converges diverges (+2)

$L = \underline{DNE}$

4. $\sum_{n=2}^{\infty} (-\sqrt{3})^{1-n}$

Alternating, Geometric (+1)

$a = -\frac{1}{\sqrt{3}}$ (+1)

$r = -\frac{1}{\sqrt{3}}$ (+1)

$\Rightarrow |r| = \frac{1}{\sqrt{3}} < 1$

converges diverges

$S_0 \frac{a}{1-r} = \frac{-\frac{1}{\sqrt{3}}}{1 + \frac{1}{\sqrt{3}}} = \frac{-1}{(\sqrt{3}+1)} \cdot \frac{(\sqrt{3}-1)}{(\sqrt{3}-1)}$
 $= \frac{1-\sqrt{3}}{2}$ (+1)

$L = \underline{(1-\sqrt{3})/2 < 0}$