



Tutorial 7

Q1. Find $\lim_{n \rightarrow \infty} a_n$.

(a). $1, \frac{-1}{2}, \frac{1}{3}, \frac{-1}{4}, \frac{1}{5}, \dots$

(b) $a_n = 3n \sin \frac{\pi}{2n}$

(c) $\ln\left(\frac{2}{1}\right), \ln\left(\frac{3}{2}\right), \ln\left(\frac{4}{3}\right), \dots$



UNIVERSITY
OF WOLLONGONG
IN DUBAI

Faculty of Engineering
and Information Sciences

Q2. Find $\lim_{n \rightarrow \infty} a_n$.

(i) $a_n = n \sin \left(\pi + \frac{3}{n} \right)$

(ii) $\frac{4}{1}, \frac{7}{3}, \frac{10}{5}, \frac{13}{7}, \dots$

(Show your work)



Q3. Determine whether the series converges or diverges. If it converges, find the sum

1. $\sum_{n=1}^{\infty} 4^n \cdot 5^{1-n}$

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



Q4. Find the sum of the following series

$$(i) \sum_{n=1}^{\infty} [(-0.2)^n + (0.6)^{n-1}]$$

(Show your work)

$$(ii) \sum_{n=0}^{\infty} \left[6 \tan^{-1} \left(\frac{\sqrt{3}}{n+1} \right) - 6 \tan^{-1} \left(\frac{\sqrt{3}}{n+2} \right) \right] .$$



Q5. Determine whether the series converges or diverges. (Justify your answer)

1. $\sum_{n=1}^{\infty} \sqrt[n]{\frac{-8n}{n+4}}$

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



Q6. Determine whether the following series converges or diverges. (Justify your answer and show your work)

$$(i) \sum_{n=2}^{\infty} (-1)^n \frac{1}{n \ln n} \qquad (ii) \sum_{n=2}^{\infty} \frac{1}{n \ln n}.$$

(Show your work)