

1) Use the appropriate test to determine convergence or divergence of the following series. I need to see your work in order to give you full credit. Please write the name of the method you use!

$$\sum_{n=10}^{\infty} \frac{(-1)^n + 2^n}{3^n + 50} \quad (1)$$

$$\sum_{n=2}^{\infty} \frac{1}{n(\ln(n))^{\frac{5}{7}}} \quad (2)$$

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

2) Use the telescope method in order to find the exact value of the following series.

$$\sum_{n=2}^{\infty} \ln\left(1 - \frac{1}{n^2}\right) \quad (4)$$

Hint: Simplify whatever we have inside \ln , then use properties of natural logarithm to split this series into two separated telescopic series. Please note that at one stage you need to calculate a limit when $n \rightarrow \infty$.

3) For what value of x , does the following series converge?

$$\sum_{n=0}^{\infty} \left(\frac{2x-1}{3}\right)^n \quad (5)$$

Hint: $\sum_{n=1}^{\infty} (a)^n$ converges when $|a| < 1$.