

TD Test 1

Name :

Surname :

Group :

Question from the class

Let $(\alpha, \beta) \in \mathbb{R}^2$. Remind of the necessary and sufficient conditions for the convergence of the series $\sum \frac{1}{n^\alpha (\ln(n))^\beta}$.

Exercise 1

Determine $\lim_{x \rightarrow 0} \frac{1 - \ln(1 + x^2) - \cos(2x)}{1 - \sqrt{1 - x^2}}$.

Exercise 2

1. Determine the nature of the series $\sum \frac{(n!)^2 3^n}{(2n)!}$.

2. First, determine $\lim_{n \rightarrow +\infty} \sqrt[n]{n}$, and then, give the nature of the series $\sum \frac{1}{n \sqrt[n]{n}}$ by reasoning with an equivalent.