

2022-2023 年《高等数学 3》期中考试试卷

1. Determine if the series $\sum_{n=1}^{\infty} \frac{1}{n(1+\ln^2 n)}$ is convergent or divergent.
 The answer is _____. Specify why you make this choice.
- 积分判别法
 $\leq \int_1^{\infty} \frac{1}{x(1+\ln^2 x)} dx \leq \int_1^{\infty} \frac{1}{x \ln^2 x} d \ln x$
 $\leq \left[-\frac{1}{\ln x} \right]_1^{\infty} = \frac{1}{\ln 1} = 1$

2. Determine if the series $\sum_{n=1}^{\infty} n \tan \frac{1}{n}$ is convergent or divergent.
 The answer is _____. Specify why you make this choice.
- $n \tan \frac{1}{n} \rightarrow 0 \Rightarrow \sum n \tan \frac{1}{n}$ 发散

3. Determine if the series $\sum_{n=1}^{\infty} \frac{5^n + 4^n}{7^n - 6^n}$ is convergent or divergent.
 The answer is _____. Specify why you make this choice.
- 比较判别法
 $\sum_{n=1}^{\infty} \frac{5^n - 1}{7^n}$

