

2) Determine if the series is absolute convergent, convergent, or divergent?

$$\sum_{n=1}^{\infty} \frac{(-1)^n \ln(n)}{n}$$

Look at $\sum \left| \frac{(-1)^n \ln(n)}{n} \right| = \sum \frac{\ln(n)}{n}$

use the LCT with $\sum \frac{1}{n}$

$$\lim_{n \rightarrow \infty} \frac{\frac{\ln(n)}{n}}{\frac{1}{n}} = \lim_{n \rightarrow \infty} \ln(n) = \infty$$

Since $\sum \frac{1}{n}$ div then $\sum \frac{\ln(n)}{n}$ will div

so the series $\sum \frac{(-1)^n \ln(n)}{n}$ is

not abs. conv.

See #1 to see that the series is convergent.