Questions for recitation 26 March 2021

1. Does the following series converge? Why or why not? If it does converge, for what value of m will the mth sum be within .001 of the infinite sum? $\sum_{n=1}^{\infty} \frac{(-1)^n}{3n}$

2. Which of the following alternating series converge and which diverge? Be sure to fully support your answer.

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

   (b) $\sum_{n=1}^{\infty} (-1)^n \frac{10^n}{n^{10}}$

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

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

   (e) $\sum_{n=1}^{\infty} (-1)^{n+1} \frac{\sqrt{n}+1}{n+1}$

   (f) $\sum_{n=1}^{\infty} n^{\frac{-1}{10}} \cos(n\pi)$

3. Find an example of a divergent alternating series $\sum a_k$ for which $\lim_{k\to\infty} a_k = 0$.