1. Show that the series $\sum_{n=1}^{\infty}(-1)^n \frac{\cos n}{2^n}$ is absolutely convergent.
2. Consider the series $\sum_{n=1}^{\infty}(-1)^{n+1} \frac{\ln n}{\sqrt{n}}$.
   i) Use the alternating series test to show that the series is convergent.
   ii) Using part i) or otherwise, show that the series is conditionally convergent.
3. For each of the following series, determine whether the series is absolutely convergent, conditionally convergent or divergent. Justify your answers.
   (a). $\sum_{n=1}^{\infty}(-1)^n \frac{3}{2n+1}$.
   (b). $\sum_{n=1}^{\infty}(-1)^n \frac{n}{4n+3}$.
   (c). $\sum_{n=1}^{\infty}(-1)^n \left(\frac{1+2n}{3+4n}\right)^n$.
   (d). $\sum_{n=2}^{\infty}(-1)^{n+1} \frac{1}{n \ln n}$.
4. Estimate the infinite sum $\sum_{n=1}^{\infty} \frac{1}{n^5}$ such that the error is within 0.001.
5. Estimate the infinite sum $\sum_{n=1}^{\infty}(-1)^{n+1} \frac{1}{n^5}$ such that the error is within 0.001.
6. Find the domain of the functions.
   (a). $f(x) = \sum_{n=1}^{\infty} \frac{x^n}{n^{\frac{3}{2}}}$
   (b). $g(x) = \sum_{n=1}^{\infty} \frac{(-1)^n (x-1)^n}{2n+1}$

Some suggested answers:

3(a). conditionally convergent.
3(b). divergent.
3(c). absolutely convergent.
3(d). conditionally convergent.
4. $1 + \frac{1}{2^5} + \frac{1}{3^5} + \frac{1}{4^5}$.
5. $1 - \frac{1}{2^5} + \frac{1}{3^5}$.
6(a). $[-1, 1]$.
6(b). $(0, 2]$.