1. **Determine if the following series converge. If the series converges, compute its value.**

   (a) $\displaystyle\sum_{k=3}^{\infty} \frac{5}{n^2-1}$

   (b) $\displaystyle\sum_{j=1}^{\infty} \frac{1}{14j}$

   (c) $\displaystyle\sum_{n=0}^{\infty} \frac{3}{4^{n+1}5^{1-n}}$

   (d) $\displaystyle\sum_{n=1}^{\infty} \frac{5^{3+n}}{2^{2+3n}}$

   (e) For what values of x does $f(x) = \displaystyle\sum_{k=0}^{\infty} x^k$ converge? Is f continuous at these values?

2. **Determine if the following series converge. If the series converges, you do not need to compute its value.**

(a) $\displaystyle\sum_{n=0}^{\infty} \frac{1}{n^2+1}$

(b) $\displaystyle\sum_{k=1}^{\infty} \frac{1}{k \ln k}$

(c) $\displaystyle\sum_{k=1}^{\infty} \frac{k^2}{2^k}$

(d) $\displaystyle\sum_{k=2}^{\infty} \frac{k^e}{k^\pi}$

(e) $\displaystyle\sum_{n=0}^{\infty} \frac{n^3}{(n^4+1)^2}$

(f) $\displaystyle\sum_{k=1}^{\infty} \left(\frac{k+6}{k}\right)^k$

3. How many terms are needed to ensure that the remainder is less than 10^{-3} for the series $\displaystyle\sum_{k=2}^{\infty} \frac{1}{k(\ln k)^2}$? If you have a calculator, compute the corresponding estimate using the partial sum.