1. (seqseries:quiz1)

   (a) Find

   $$\lim_{n\to\infty} \frac{n^2+n+1}{3n^2-n-2}$$

   (b) Find an example of a sequence a_n which is bounded but not convergent.

2. (seqseries:quiz2)

   (a) Find

   $$\lim_{n\to\infty} \frac{3n^2+n+1}{n^2-n-2}$$

   (b) Find an example of a sequence a_n which is bounded but not convergent.

3. (seqseries:geom2/x)
   If $x > 2$, use the geometric series formula to find $\sum_{n=0}^{\infty} \frac{2^{n+1}}{x^n}$.

4. (seqseries:pftelescope)
   Let $a_n = \frac{1}{n^2-n}$ and $S_N = \sum_{k=2}^{N} a_n$.

   (a) Use partial fractions to rewrite a_n.

   (b) Use part (a) to write out S_2, S_3 and S_4 explicitly and notice how terms cancel. Generalize this to find a formula for S_N.

   (c) Compute $\sum_{k=2}^{\infty} a_n$ $(= \lim_{N\to\infty} S_N)$.

5. (seqseries:serieslist)
   Determine whether the following series converge:

   (a) $\sum_{n=1}^{\infty} \frac{1}{n^3}$

   (b) $\sum_{n=1}^{\infty} \frac{e^n}{n^3}$

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

   (d) $\sum_{n=1}^{\infty} \left(\frac{n^3}{n!}\right)^n$

   (e) $\sum_{n=0}^{\infty} (-1)^n \frac{x^{2n+1}}{(2n+1)!}$

(f) $\sum_{n=2}^{\infty} \frac{1}{n \ln(n)}$

(g) $\sum_{n=1}^{\infty} e^{-(\ln(n))^2}$ (Hints: $a^{bc} = (a^b)^c$ and $e^{-\ln(n)} = \frac{1}{n}$)

6. (seqseries:serieslist2)
Determine whether the following series converge. If the series depends on x, determine for which values of x it converges.

(a) $\sum_{n=0}^{\infty} e^{-nx}$

(b) $\sum_{n=1}^{\infty} \frac{1}{n^6+5n}$

(c) $\sum_{n=1}^{\infty} \frac{n!}{e^n}$

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

(e) $\sum_{n=1}^{\infty} \left(1 - \frac{1}{n}\right)^n$

7. (seqseries:quiz3)
Determine whether or not the series $\sum_{n=1}^{\infty} ne^{-n}$ converges.

8. (seqseries:quiz4)
Determine whether or not the series $\sum_{n=1}^{\infty} ne^{-2n}$ converges.