1. Write out the first 5 terms of the sequence (beginning with $n = 1$). Do you think it will converge? To what?

   (a) $a_n = \left\{\frac{1}{n}\right\}$

   (b) $a_n = \left\{\left(\frac{1}{2}\right)^n\right\}$

   (c) $a_n = \{3^n\}$

   (d) $a_n = \left(1 - \frac{1}{n}\right)^n$

   (e) $x_n = n^{\frac{1}{n}}$

   (f) $y_n = \left(\frac{2}{5}\right)^n$

   (g) $e_n = \left(1 + \frac{2}{n}\right)^n$

2. Do the following sequences converge? Find the limit of each convergent sequence.

   (a) $b_n = \left\{\left(\frac{1}{4}\right)^n\right\}$

   (b) $a_n = \frac{\ln(n)}{n}$

   (c) $x_n = \frac{(\ln(n^2+1))^2}{n}$

   (d) $e_n = \left(1 + \frac{2}{n}\right)^n$

   (e) $p_n = \left\{\frac{2n^2 - n + 3}{n^2 + 4n + 1}\right\}$

   (f) $a_n = \frac{n + (-1)^n}{n}$

   (g) $b_n = \sqrt{\frac{2n}{n+1}}$

   (h) $g_n = \{(-1)^n\}$

   (i) $y_n = \left(1 + \frac{7}{n}\right)^n$

3. Let $S_n = \sum_{k=1}^{n} a_k$. For each of the following, find a_1, a_2, a_3, a_4 and S_1, S_2, S_3, S_4.

   (a) $a_n = \left(\frac{1}{2}\right)^n$

   (b) $a_n = \frac{1}{n}$

   (c) $a_n = \frac{1}{n^2}$

   (d) $a_n = \left(\frac{2}{3}\right)^n$

4. Do the following series converge? Find the sum of each convergent series.

   (a) $\sum_{n=1}^{\infty} \left(\frac{1}{4}\right)^n$

   (b) $\sum_{n=6}^{\infty} \left(\frac{e}{\pi}\right)^n$

   (c) $\sum_{n=0}^{\infty} 7\left(\frac{8}{9}\right)^n$

   (d) $\sum_{n=0}^{\infty} \left(\frac{5}{2^n} - \frac{1}{3^n}\right)$

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

   (f) $\sum_{n=1}^{\infty} (\sqrt{3})^n$

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

   (h) $\sum_{n=1}^{\infty} e^{2n}$

   (i) $\sum_{n=1}^{\infty} e^{-2n}$