1. For each series:
   (i) Find the limit of $\{a_k\}$, the sequence of terms of the series
   (ii) Show that the series converges
   (iii) Find the limit of $\{S_n\}$, the sequence of partials sums of the series

$$(a)\sum_{k=0}^{\infty} 7e^{-k} \qquad (b)\sum_{k=13}^{\infty}\left(-\frac{3}{7}\right)^k$$

2. Do the following series converge or diverge?

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

   (b) $\displaystyle\sum_{k=2}^{\infty}\frac{1}{k^2}$ Hint: Draw a picture comparing with $\displaystyle\int_1^{\infty}\frac{1}{x^2}\,dx$.

   (c) $\displaystyle\sum_{k=1}^{\infty}\frac{1}{k}$ Hint: Draw a picture comparing with $\displaystyle\int_1^{\infty}\frac{1}{x}\,dx$.