Seminar 5

Infinite series.

1. Find the sum of the following series:

   a $\displaystyle\sum_{n=0}^{\infty} 100 \cdot (0.9)^n$

   c $\displaystyle\sum_{n=0}^{\infty} \left(\frac{1}{2^n} + \frac{1}{5^n} \right)$

   b $\displaystyle\sum_{n=0}^{\infty} (-1)^n \cdot \frac{1}{3^n}$

   d $\displaystyle\sum_{n=2}^{\infty} \frac{n-1}{n!}$

2. Prove that the following series are divergent.

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

   b $\displaystyle\sum_{n=1}^{\infty} \sqrt[n]{0.2}$

3. Which of the following series are convergent?

   a $\displaystyle\sum_{n=1}^{\infty} \frac{1}{10n+3}$

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

   b $\displaystyle\sum_{n=1}^{\infty} \frac{1}{3n-1}$

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

4. Which of the following series are divergent, conditionally convergent or absolute convergent?

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

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

5. Prove that $\displaystyle\lim_{n\to\infty} \frac{3n+1}{-2n+3} = -\frac{3}{2}$.