# Calculus with Analytic Geometry II

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## 1 Sequences/Series Worksheet

I. Find function representation of the following sequences. For each sequence, determine whether it converges or diverges. It it converges, find its limiting value and prove it using $\epsilon - N$ definition.

a. $\frac{1}{2},\ -\frac{2}{3},\ \frac{3}{4},\ -\frac{4}{5},\ \ldots$

b. $1,\ 3,\ 5,\ 7,\ \ldots$

c. $\frac{1}{3},\ \frac{2}{5},\ \frac{3}{7},\ \frac{4}{9},\ \ldots$

II. For each series, determine if the sequence of partial sums converges or diverges. If it converges, find its limiting value (you may use L'Hopitals rule).

a. $\displaystyle\sum_{k=0}^{\infty} \frac{1}{3^k}$

b. $\displaystyle\sum_{k=2}^{\infty} \frac{1}{k^2-1}$

c. $\displaystyle\sum_{k=1}^{\infty} \frac{1}{k}$