MAT 137
Problem Set D

This problem set is intended to help you prepare for Test 4. The past problem sets and tutorials have been very comprehensive, so we are only adding a couple of questions. You do not need to turn in any of these problems.

Problems

1. We want to compute the sum of the series $\displaystyle\sum_{n=1}^{\infty} \frac{1}{4n^2-1}$.

   (a) Obtain (with proof) a formula for the value of the k-th partial sum. You can either guess a pattern from the first few ones and prove it by induction, or you can use partial fraction decomposition.

   Define $S_k = \displaystyle\sum_{n=1}^{k} \frac{1}{4n^2-1} = \sum_{n=1}^{k} \frac{1}{(2n+1)(2n-1)} = \sum_{n=1}^{k} \frac{1}{2}\left[\frac{1}{2n-1} - \frac{1}{2n+1}\right]$.