MATH 3190
Sequences and Series Homework
Due 23 February 2015

Name:_____

You may not use your notes. Please show all of your work. An answer without justification will receive little credit.

(1) Compute $\lim_{n \to \infty} \frac{n^2+3n+1}{4n^2}$. Prove your answer.

(2) Compute $\lim_{n \to \infty} \frac{n^2+3n+1}{3n^3}$. Prove your answer.

(3) Compute $\lim_{n \to \infty} \frac{n+1}{3n+2}$. Prove your answer.

(4) Compute $\sum_{n \geq 0} \left(\frac{2}{3}\right)^n$.

(5) Compute $\sum_{n \geq 0} \left(\frac{1}{9}\right)^n$.

(6) Compute $\sum_{n \geq 2} \left(\frac{1}{9}\right)^n$.

(7) Show that $\sum_{n \geq 0} (-1)^n$ does not exist. Note that this will involve negating the statement that the limit does exist which involves 3 quantifiers. Be careful.