Full name(s): ______________________________ .

Questions

1. Use the integral test to determine whether each of the following series converges absolutely:
   (a) $\sum_{k=1}^{\infty} \frac{1}{k^3}$
   (b) $\sum_{k=1}^{\infty} \frac{(-1)^{k+1}}{k\ln(k)}$
   (c) $\sum_{k=1}^{\infty} \frac{2k}{k^3+k}$
   (d) $\sum_{k=1}^{\infty} \frac{\ln(n)}{n}$
2. Show using ϵ calculus that $s_n = 1 + 1/n$ is Cauchy. This implies it has a limit, what is the limit? Prove the limit using ϵ calculus.
3. Choose between the integral test, the comparison test, and the limit comparison test to say whether each of the following series converges absolutely:
   (a) $\sum_{n=1}^{\infty} \frac{1}{\sqrt{n}}$
   (b) $\sum_{n=1}^{\infty} \frac{\sin(n)}{n^2}$
   (c) $\sum_{n=1}^{\infty} \frac{\sqrt{n}}{\sqrt{n+1}+n^{3/2}}$
   (d) $\sum_{n=1}^{\infty} \frac{1}{\cos(n)+e^n}$
   (e) $\sum_{n=1}^{\infty} \frac{n}{\pi^n - n^2}$