Name:

1. (4 pts) Use the integral test to determine whether the following sums converge.

   a. $\sum_{n=1}^{\infty} \dfrac{1}{n \ln(n)}$

   b. $\sum_{n=1}^{\infty} \dfrac{e^n}{1 + e^{2n}}$

2. (3 pts) Find the minimum value of N such that the remainder estimate

$$\int_{N+1}^{\infty} f(x)dx \le R \le \int_{N}^{\infty} f(x)dx$$

   guarantees that $\sum_{n=1}^{N} \dfrac{1}{n^2}$ estimates $\sum_{n=1}^{\infty} \dfrac{1}{n^2}$ accurate to within 10^{-4}.

3. (3 pts) For each of the following series, if the divergence test applies, either state that $\lim\limits_{n\to\infty} a_n$ does not exist or find $\lim\limits_{n\to\infty} a_n$. If the divergence test does not apply, state why.

   a. $a_n = \dfrac{n}{5n^2 - 3}$.

   b. $a_n = \dfrac{2^n}{3^{\frac{n}{2}}}$.

   c. $a_n = \cos n$.