Math 1b. Series—The Integral and Comparison Tests; Estimating Sums (The Integral Test and p-series)

Spring 2006

1. Use the integral test to determine the convergence or divergence of

$$\sum_{n=1}^{\infty} \frac{1}{\sqrt[4]{n}}.$$

2. Use the integral test to determine the convergence or divergence of

$$\sum_{n=1}^{\infty} \frac{1}{n^4}.$$

3. Use the integral test to determine the convergence or divergence of

$$\sum_{n=1}^{\infty} \frac{1}{n^2+1}.$$

4. If $f(k) = a_k$, rank the values $\int_1^n f(x)\,dx$, $\sum_{k=1}^{n-1} a_k$, and $\sum_{k=2}^{n} a_k$ in increasing order.

5. If $f(k) = a_k$, rank the values $\int_n^\infty f(x)\,dx$, $\sum_{k=n+1}^{\infty} a_k$, and $\int_{n+1}^\infty f(x)\,dx$ in increasing order.

6. For what values of p is the series

$$\sum_{n=2}^{\infty} \frac{1}{n(\ln n)^p}$$

convergent?