Problem statement Under the hypotheses of the integral test, if $a_n = f(n)$ then for any positive integer N, $\sum\limits_{N+1}^{\infty} a_n \leq \int\limits_{N}^{\infty} f(x)\, dx$.

a) How large does N have to be to ensure that

(1) $\sum\limits_{n=1}^{N} \frac{1}{n^5}$ is within 10^{-6} of $\sum\limits_{n=1}^{\infty} \frac{1}{n^5}$?

(2) $\sum\limits_{n=1}^{N} ne^{-n^2}$ is within 10^{-6} of $\sum\limits_{n=1}^{\infty} ne^{-n^2}$?

b) Get a decimal approximation for the sum of one of the series with error less than 10^{-6}.