

Ex 3 Estimate the value of $\sum_{n=1}^{\infty} \frac{1}{n^2}$

within 0.001 of its exact value.

Use S-test Remainder w/ $f(x) = \frac{1}{x^2}$

Know $f=f(x)$ satis conditions of S-test by Ex 1.

(good - already done - otherwise - DO!)

$$\left| \sum_{k=1}^{\infty} \frac{1}{k^2} - \sum_{k=1}^n \frac{1}{k^2} \right| = \sum_{k=n+1}^{\infty} \frac{1}{k^2} \leq \int_n^{\infty} \frac{1}{x^2} dx = \frac{1}{n} < 0.001$$

want
↓
Ⓢ 8.8 methods
11
1000

$$\text{So } \frac{1}{n} \leq \frac{1}{1000} \Rightarrow 1000 < n.$$

$$\text{So } \sum_{n=1}^{\infty} \frac{1}{n^2} \approx \sum_{n=1}^{1000} \frac{1}{n^2} \text{ w/in } 0.001.$$