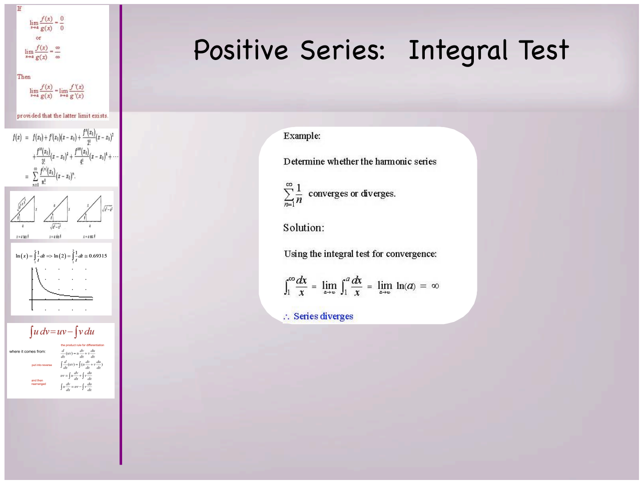

<u>Positive Series: Integral Test</u>

<u>Bounded Sum Test</u>

A series $\sum a_i$ of nonnegative terms converges if and only if its partial sums are bounded above.

EX 1   Does $\sum_{k=1}^{\infty} \frac{|\sin k|}{(k+1)!}$ converge?

Integral Test

If $f(x)$ is continuous, positive and nonincreasing on $[N,\infty)$ and $a_k = f(k)$ for all positive integers, k, then $\sum_{n=N}^{\infty} a_n$ converges if and only if $\int_N^{\infty} f(x)dx$ converges.

EX 2 Does $\sum_{k=1}^{\infty} \frac{5k^2}{1+k^3}$ converge or diverge?

p-series test

$\sum_{k=1}^{\infty} \frac{1}{k^p}$ is called a p-series. It converges if $p > 1$ and diverges if $p \le 1$.

EX 3 Does $\sum_{k=1}^{\infty} \frac{1}{k^3}$ converge or diverge?

EX 4 Estimate the error made by approximating the series by the sum of the first five terms.

$$E_n = \sum_{k=n}^{\infty} \frac{1}{k\sqrt{k}} \qquad S_n = \sum_{k=1}^{n} \frac{1}{k\sqrt{k}}$$