Absolute?

$\sum \frac{1}{2n}$ Multiple of the Harmonic Diverges

$\sum \frac{1}{n+2}$ Compare to Harmonic

$$\lim_{n \to \infty} \frac{\frac{1}{n}}{\frac{1}{n+2}} = 1$$

Absolute

$\sum^{\infty} \frac{\ln n}{n}$

compare to Harmonic

$\lim_{n\to\infty} \cancel{\frac{\frac{\ln n}{n}}{\frac{1}{n}}} = \frac{n \ln n}{n} = \ln n$

$\frac{1}{n} < \frac{\ln n}{n}$

(10) $\sum \frac{(-1)^{n-1}\ln(n)}{n}$

i) $\lim_{n\to\infty} \left|\frac{(-1)^{n-1}\ln(n)}{n}\right| = 0$

ii) $\left|\frac{(-1)^{n}\ln(n+1)}{n+1}\right| < \left|\frac{(-1)^{n-1}\ln n}{n}\right|$

$\lim_{n\to\infty} \frac{\ln n}{n} = \frac{\infty}{\infty}$

$\lim_{n\to\infty} \frac{\frac{1}{n}}{1} = 0$

$\lim_{b\to\infty} \int_1^b$

$\ln(\cancel{x})$	$\frac{1}{\cancel{x}}$
$\frac{1}{\cancel{x}}$	$\ln \cancel{x}$

$= \ln^2(\cancel{x}) - \int \frac{\ln x}{x}$

$\int \frac{1}{x}\ln x = \ln^2(x) - \int \frac{\ln x}{x}$

$2\int \frac{1}{x}\ln x = \ln^2(x)$

$\int \frac{1}{x} = \frac{1}{2}\ln^2(x)$